SHORT COMMUNICATION

CONCEPTS OF CAPACITY AND PERFORMANCE IN ASSESSMENT OF FUNCTIONING AMONGST STROKE SURVIVORS: A COMPARISON OF THE FUNCTIONAL INDEPENDENCE MEASURE AND THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH

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Objective: To investigate the use of concepts of capacity and performance when assessing functioning of stroke survivors, measured with the Functional Independence Measure (FIM) and the International Classification of Functioning, Disability and Health (ICF).

Methods: During an inpatient interdisciplinary rehabilitation programme for 62 subacute stroke survivors, limitations in speaking, walking, toileting and eating were assessed at admission and discharge with both the FIM and a scale based on the ICF Brief Core Set for stroke. Correlation between the results obtained with these 2 scales was assessed using Spearman's correlation coefficient.

Results: The level of restriction of functioning, defined as capacity or performance in terms of the ICF, correlated well with the results obtained with the FIM (0.47–0.87) . The only statistically significant difference was found in assessing limitations in eating, where assessment with the FIM had a higher correlation with the concept of capacity than performance (0.75 vs 0.55). The observed correlations were not associated with stroke severity.

Conclusion: Even though the FIM and an ICF-based scale may describe limitation of functioning of stroke survivors similarly, ICF is probably more comprehensive in describing both capacity and performance.

INTRODUCTION

The assessment of functioning and disability is at the core of healthcare in general, and in rehabilitation in particular (1). A rehabilitation team uses different tools during the rehabilitation process to assess restrictions in functioning caused by a condition (2). Many of the scales used in stroke rehabilitation are based on the International Classification of Functioning, Disability and Health (ICF) (3). Also, the Functional Independence Measure (FIM), which was developed almost 30 years ago based on the International Classification of Impairments, Disabilities and Handicaps (ICIDH), the predecessor of ICF (4), has been commonly used since then in stroke rehabilitation worldwide (5). In 2004, the ICF Research Branch introduced the ICF Core Set for stroke, with the aim of describing the level of functioning among people with stroke (6). Both the FIM and ICF Core Sets for stroke can be used to assess the degree of restrictions of functioning and the need for assistance in activities of daily living.

The items of the FIM have been linked with the items of the ICF Core Set for stroke (7, 8) and have been found to produce similar results (7, 9–12). There is, however, one aspect that has not been studied so far. The ICF contains a more comprehensive model of functioning than the FIM, introducing a means of assessing the levels of "activity and participation", essential components of functioning, using 2 concepts: capacity and performance. The concept of capacity describes the level of activity a person may reach in a standard environment without assistance. In turn, the concept of performance describes how well a person is coping with disability in real-life situations. Does a health professional trained in using the FIM scale employ both of these concepts when assessing the level of functioning of a stroke survivor? It has been suggested that a rehabilitation nurse's opinion on a patient's functioning may well reflect the opinion formed by an entire interdisciplinary rehabilitation team (13).

The aim of this study was to compare the results of assessment by a rehabilitation nurse using the FIM with those using a scale based on the ICF, in order to determine whether there is a difference between the measurement of level of functioning with the FIM and with a scale based on the ICF. We hypothesized that a difference may occur, especially when distinguishing the concept of capacity from that of performance.

METHODS

This study is a part of the ongoing Turku ICF study (13). The study was conducted in the in-patient rehabilitation clinic of a university hospital.

All consecutive adult stroke survivors who entered the clinic between October 2012 and October 2013 were included. Most of the rehabilitants were referred for rehabilitation by a neurologist working at the department of acute neurology of the same university hospital. The diagnosis of stroke was confirmed and the severity of stroke assessed according to the National Institutes of Health Stroke Scale (NIHSS) criteria. NIHSS score <5 was regarded as a mild stroke, 5–15 as a moderate stroke, and >15 as a severe stroke. Rehabilitants with chronic neurological disorders or a traumatic brain injury were excluded. The ethics committee of Turku University Hospital approved the study.

The rehabilitation lasted several weeks. The interdisciplinary team comprised a neurologist, a social worker, a neuropsychologist, a speech therapist, a rehabilitation planner, an occupational therapist, a physiotherapist, and a rehabilitation nurse. A rehabilitation nurse, trained as a FIM rater, assessed the level of functioning of each rehabilitant at admission and discharge using an electronic FIM tool (FIM® version 5.2, Uniform Data System for Medical Rehabilitation, Amherst, NY, USA) rating the results on a scale 1–7 ("total assistance" – "complete independence"). The rehabilitation nurse also completed a structured form containing 4 ICF items: d550 "eating", d530 "toileting", d450 "walking", and d330 "speaking" included in the ICF Brief Core Set for stroke (14). These items correspond to the FIM items "eating/feeding", "toileting", "locomotion/walking", and "expression, verbal". For each ICF item, 2 qualifiers denoted the severity of limitation: performance (in the current environment) and capacity (without assistance). Both qualifiers were assessed by a numeric scale as: 0=no difficulty, 1=mild, 2=moderate, 3=severe, and 4=complete difficulty. The team neurologist gathered all other data from electronic patient records and during a routine clinical examination. The Finnish translation of the form was based on the Finnish edition of the ICF, 2011. Diagnoses were defined according to the 10th International Classification of Diseases (ICD-10).

Statistical analysis

Continuous variables were reported as means and standard deviations. Categorical variables were reported as frequencies and percentages. Differences in the demographics were assessed by Pearson's χ^2 test. The correlations were assessed by Spearman's correlation coefficient at admission and discharge. The correlations of 0–0.30 were considered weak, 0.30–0.50 moderate, 0.50–0.70 strong, and greater than 0.70 very strong. The equality of the 2 correlations was assessed by Fisher's z transformation. Two-tailed *p*-values <0.05 were considered significant. All analyses were conducted using SAS System for Windows, version 9.4 (SAS Institute Inc., Cary, NC, USA).

RESULTS

The mean age of the included 62 rehabilitants (36 men) was 56 years (standard deviation (SD) 15.5, range 19–86). The mean interval between stroke onset and admission to rehabilitation clinic was, 95.3 days (SD 72.6, range 23–223), with the mean length of stay of 34.3 days (SD 21.8, range 9–85). Of the rehabilitants, 32 (52%) were retired at the time of stroke and 48 (77%) were married or cohabiting. The main diagnoses were distributed as following: cerebral infarction, I63–39 (63%), intracerebral haemorrhage, I61–18 (29%), and subarachnoid haemorrhage, I60–5 (8%). For 45 (73%) rehabilitants, the present cerebrovascular event was their first. Three (5%) had a mild, 32 (52%) moderate, and 27 (44%) had a severe stroke. Of the 27 rehabilitants with severe stroke, 12 (19%) needed acute surgical intervention. Of all rehabilitants, 23 (37%) had a right-sided lesion, 24 (39%) a left-sided lesion and 15 (24%) had a bilateral or a brain-stem lesion. The rehabilitants (65%)

were usually discharged to home. On admission, 79% of the rehabilitants had problems in speaking; with assistance, the percentage fell to 68%. The respective figures for difficulties in walking were 90% (84% with assistance), toileting 77% (63% with assistance), and eating 84% (53% with assistance).

Table I shows the correlations between the FIM and the ICF. The correlations were high for all variables, being highest for speaking and toileting. The correlations were slightly higher for capacity (0.51–0.87) than for performance (0.47–0.84), with no statistically significant difference except for eating assessed at discharge (0.55 vs 0.75, *p*<0.05). The severity of stroke did not affect the strength of correlations.

DISCUSSION

In this descriptive study of 62 stroke survivors, the level of restriction of functioning, defined as capacity or performance in terms of the ICF, correlated well with the results obtained with the FIM. The only statistically significant difference was found in assessing limitations in eating, where assessment using the FIM had higher correlation with the concept of capacity than performance (0.75 vs 0.55). The observed correlations were not associated with stroke severity.

Experienced rehabilitation nurses involved in the study were trained FIM raters. Due to the descriptive nature of the study, no strong inferences can be drawn concerning the entire field of stroke rehabilitation. A non-validated form had a limited number of items to gather data on ICF qualifiers. The use of ICF qualifiers has previously been regarded as the most difficult part of learning how to use the ICF (15).

The findings of this study are in line with previous reports on the similarity between results obtained with the FIM and the ICF (7, 9–12). The importance of a gap between the best possible and actual support for relatives of stroke survivors has been accentuated (16). Interestingly, in this study, the FIM scores correlated slightly better with the ICF capacity qualifier than with that of performance. This can be explained by the nature of the FIM as a tool of assessment of a person's independence.

Table I. *Correlations between scores obtained with the Functional Independence Measure (FIM) and the International Classification of Functioning, Disability and Health (ICF) (Spearman's r)*

	FIM/ICF (performance)	FIM/ICF (capacity)
Speaking		
Admission	0.84	0.87
Discharge	0.77	0.81
Walking		
Admission	0.47	0.75
Discharge	0.57	0.51
Toileting		
Admission	0.82	0.84
Discharge	0.81	0.87
Eating		
Admission	0.67	0.75
Discharge	0.55	0.75*

*p<0.05.

In other words, the FIM score defines how much assistance a person may need in order to achieve the optimal level of his or her functioning rather than the actual performance in everyday life without any assistance. This finding leads to a speculative suggestion that, compared with the FIM, a scale based on the ICF may be more comprehensive for assessing the level of functioning, as it is able to take into account both concepts; capacity and performance. While the FIM describes the burden of care and the need for help from the point of view of the healthcare system, the ICF is more "patient-centred". Further research may reveal the usefulness of scales based on a broader range than the Brief Core Set of ICF activity and participation domains. In conclusion, even though the FIM and an ICF-based scale may describe limitation of functioning of stroke survivors similarly, the ICF is probably more comprehensive in describing both capacity and performance.

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