

The Relationship between the Functional Independence Measure and the International Classification of Functioning, Disability, and Health Core Set for stroke

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ABSTRACT

The Functional Independence Measure (FIM) is one of many instruments available for assessing the functionality of stroke patients. However, with the approval of the International Classification of Functioning, Disability, and Health (ICF), the Core Set that was developed for stroke patients, a new tool for understanding functionality and disability of these patients is available. **Objective:** To establish a relationship between the FIM and the ICF Core Set for stroke. Four researchers of different healthcare backgrounds, all working in the field of rehabilitation, considered the descriptions of the activities of the FIM and the definitions of the ICF categories. **Method:** They selected the categories of the ICF Core Set for stroke, which could be related to the tasks assessed by the FIM. Once the relationship was established, the researchers came to a consensus for the inclusion or exclusion of those categories. **Results:** From the 130 second-level categories used in the Core Set, 27 (20.8%) were related to the activities of FIM, eight (29.6%) regarded the bodily functions component (b), 17 (63%) concerned activity and participation (d), and two (7.4%) considered environmental factors (e). As for the 10 categories that are part of the Brief Core Set for stroke, only five were related to the activities of FIM. **Conclusion:** The FIM is focused on the individual, while the ICF is concerned not only with the dysfunctions and disabilities of the patient, but also considers these factors within social activities, as well as environmental influences, either as a facilitator or a barrier to functional independence.

Keywords: Stroke, International Classification of Functioning, Disability and Health, Rehabilitation

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INTRODUCTION

Stroke is related to motor, sensory and/or cognitive impairments.^{1,2} A large percentage of patients who survive the acute phase of stroke will experience some degree of functional deficit.³ To assess the functioning of these patients, there are several tools recommended by the National Institute on Disability and Rehabilitation Research (NIDRR),⁴ including the Functional Independence Measure (FIM) which, despite having been proposed in the 80s, is still frequently used.^{5,6,7,8}

The FIM was developed to measure the degree of care that an individual with a disability requires to perform motor and cognitive tasks.⁹ The main objective is measure quantitatively what the patient with the disability can accomplish. It can also provide consistent data to follow up the patient functional degree from the beginning of rehabilitation, until and after the discharge,^{10,11} and to evaluate the effectiveness of the therapeutic approach.¹²

However, since 2001, with the approval of the International Classification of Functionality, Disability and Health (ICF) by the World Health Organization (WHO), the understanding of human functioning and disability came to identify not only consequences of diseases, but the unimpaired aspects of the body and those activities and participations with or without problems, together with the environmental and personal characteristics that affect the human experience. Thus, the ICF is a standard classification that takes into account the presence and the severity of health problem regarding individual and/or social aspects.^{13,14}

The acceptance and use of ICF as classification and reference, has been facilitated by its development and consensus process in the world, with growing evidence of its validity.¹⁵ To enhance its use, the ICF Core Sets project was established and aims to establish a tailored selection of categories to represent the standards of assessment of specific health conditions either for multidisciplinary or isolated health professional use.¹⁶ Thirty-six experts from 12 different countries developed the Core Set for stroke patients. It includes 130 second-level categories¹⁷ that represent the ICF categories necessary to describe stroke patients.¹⁸

OBJECTIVE

Using as reference the descriptions of the activities of the MIF and a detailed classification of items in the ICF, this research aimed to establish a relationship between the MIF and the ICF Core Set for stroke.

METHOD

FIM has two constructs: motor and cognitive. It evaluates the performance of 18 activities that have been divided into six subscales: self-care, mobility, transfer, sphincter control, locomotion, communication and social cognition. Each activity is scored according to the level of dependency to perform the task from one to seven. One stands for total dependence and seven to total independence.

ICF uses an alphanumeric coding system, in which the letter of the code refers to a particular component: "b" for body functions, "s" for structures of the body, "d" for activity and participation (domain), and "e" for environmental factors. The numeric part refers to the chapters (or first level category) and the categories of the second, third and fourth level. The fourth level is the most detailed.

In order to add meaning to ICF codes, qualifiers should be assigned in order to indicate the severity and other characteristics of the problem. The qualifiers range from zero to four: zero means without problems, while the four represents complete problem. There are also eight and nine qualifiers, meaning "unspecified" and "not applicable", respectively.¹⁴

The ICF Core Set for stroke patients includes the four components of the ICF, and comprises 130 categories: 41 body functions (b), 5 body structures (s), 51 activities and participation (d), and 33 related to environmental factors (e). There is also a shortened version of the Core Set: the Brief ICF Core Set, which includes 10 categories: four body functions (b), one related to body structures (s), four on activity and participation (d), and one component for environmental factors (e).¹⁷

To ensure reliability in establishing the relationship between the ICF and the FIM, eight standard sequences proposed by Cieza¹⁹ (2005) were used:

1. Before one links meaningful concepts to the ICF categories, one should have acquired good knowledge of the conceptual and taxonomical fundamentals of the ICF, as well as of the chapters, domains, and categories of the detailed classification, including definitions;
2. Each meaningful concept is linked to the most precise ICF category;
3. Do not use the so-called "other specified" ICF categories which are uniquely identified by the final code eight. If the content of a meaningful concept is not explicitly named in the corresponding ICF category, the

additional information not explicitly named in the ICF is documented;

4. Do not use the so-called "unspecified", ICF categories which are uniquely identified by the final code nine but the lower level category;
5. If the information provided by the meaningful concept is not sufficient for making a decision about the most precise ICF category it should be linked to, the meaningful concept is assigned nd (not definable);
6. If the meaningful concept is not contained in the ICF, but it is clearly a personal factor as defined in the ICF, the meaningful concept will be assigned pf (personal factor);
7. If the meaningful concept is not contained in the ICF and it is clearly not a personal factor, this meaningful concept is assigned nc (not covered by ICF);
8. If the meaningful concept refers to a diagnosis or a health condition, the meaningful concept will be assigned hc (health condition).

In order to establish the relationship between the scales, four researchers from different healthcare background and working with rehabilitation selected categories of the ICF Core Set for stroke which could be related to the activities evaluated by FIM. For this, every activity of the FIM was included with the detailed description and definition of each category of the ICF. Once the relationship was established, researchers reached a consensus or the inclusion or exclusion of the categories. A fifth researcher was only included when a consensus was not achieved.

RESULTS

An inverse relationship between the FIM and ICF qualifiers was established. In the FIM, it was observed that as smaller was the scale, as larger was the disability. A similar result was founded using the ICF, as smaller was the qualifier, as lower was the disability (Table 1). A relationship was also proposed between the quantitative and qualitative indicators of the ICF and the scales and levels of the MIF function (Table 2).

From 130 second-level categories used in the ICF Core Set for stroke, 27 (20.8%) were related to the activities of the FIM, 8 (29.6%) being of the component body functions (b), 17 (63%) of the activity and participation (d) and 2 (7.4%) of the environmental factors (e).

Table 1. Suggested relationship between the responses of the FIM and the ICF qualifiers

Level of Independence of the FIM	FIM Score	ICF Qualifier
Complete Independence	7	0
Modified Independence	6	0
Supervision	5	1
Minimal assistance	4	1
Moderate assistance	3	2
Maximal assistance	2	3
Total assistance	1	4

Table 2. Suggested relationship between the quantitative and qualitative descriptors of the ICF and the scales and levels of functioning of the FIM

Qualifier	ICF		FIM	
	Quantitative descriptor	Qualitative descriptor	Scale	Level of functioning
.0	0-4%	No problem	7 and 6	Complete independence or modified
.1	5-24%	Mild problem	5 and 4	Supervision or minimal dependence
.2	25-49%	Moderate problem	3	Moderate dependence
.3	50-95%	Severe problem	2	Maximal dependence
.4	96-100%	Complete problem	1	Total dependence

Regarding the 10 categories that are part of the Brief Core Set, five were related to the activities of the FIM. For all activities of the FIM it was possible to establish a relationship with the Core Set category, but it was required the combination of two or more categories for eight activities and the use of additional information for six activities (Table 3).

DISCUSSION

The lack of standardized procedures and also the lack of the questions content in the evaluative instruments lead to results that cannot be compared with other studies that used a different methodology. This situation hinders the integration of results with other studies and consequently reduce the efficiency of the rehabilitation.²⁰

The ICF provides a terminology system that allows a standardized international classification for the description of the problems associated with health conditions and relevant environmental factors, thus assuming a common language among professionals involved in rehabilitation.²¹ However, the ICF does not replace other forms of assessment as both interact.

Several studies have demonstrated this interaction through the use of evaluative instruments already in place for coverage of ICF categories in order to describe the congruence between the ICF and the measuring tools used in rehabilitation) both for generic tools, as for specific regions or diseases. In this study we chose a generic but often used tool with stroke patients: the FIM.²²⁻²⁹

It was possible establish a relationship between the more than one ICF comprehensive Core Set for stroke category for each activity and the “self-care” activity of FIM for all activity and participation components. The activity “dressing” was assigned to the *d540* category, which includes this activity. However in the ICF there is no category for “above or below the waist” it was required the inclusion of this additional information to complement the relationship. For the other FIM categories a relationship was established with two or more ICF components and/or categories.

As the description of the FIM category “sphincter control” included the use of equipment or medication to control urine or stools, it was necessary to correlate two categories of the Core Set to address this activity. In addition to ensure the specific categories for these functions (*b620* urination functions and *b525* defecation function) another category was attributed, *e115* (products and technology for personal use in daily life) and *e110*, and *d530*. This covered the description of the FIM activity. However, for the activity “bladder management” it is suggested to use a category that does not appear in the Core Set: *b630*, sensations associated with urinary functions, once this function is not present on the description of this activity in the FIM.

For the “transfers” category, the same category was assigned for three activities: *d410* (changing basic body position), but for each activity it was necessary to complement with additional information to specify each activity. Besides this information, the activity “transfer

to toilet and tub or shower” was associated with the category *e120* (products and technology for personal indoor and outdoor mobility and transportation), since the FIM contemplates the use of facilitators to perform these activities. The Core Set exists in a specific category for “transfers”: *d420* (transferring oneself), however, it includes moving while sitting or lying down, without considering people independently walking not even those that remain standing, thus limiting the correlation with the FIM.

For the “walk/wheelchair” activity in the “locomotion” category, it was necessary to combine three categories, where each component of the Core Set (*b770* gait pattern functions, *d450* walking and *e120* products and technology for personal indoor and outdoor mobility and transportation) to include a description of this activity by the FIM. As for the locomotion activity on stairs, the additional information “stairs” was necessary to complement the category *d455* (moving around). However, there is a third level CIF category: *d4551*, which includes moving the whole body upwards or downwards, over surfaces or objects, such as climbing steps, rocks, ladders or stairs, curbs or other objects.

The correlation between the Core Set and the category “communication” was the one that required the greater number of categories for the activity. For the activity “comprehension” four categories were needed, two related to body functions (*b156* perceptual functions and *b167* mental functions of language) and two for activity and participation (*d310* communication with - receiving spoken messages and *d315* communication with - receiving - nonverbal messages). However, for both body functions the use of third-level categories is recommended to make them more specific in relation to the FIM: *b1560* auditory perception and *b1670* reception of spoken language. As for the activity “expression”, six categories were assigned, two of body functions (*b167* mental functions of language and *b320* articular functions) and four of activity and participation (*d330* speaking, *d335* producing nonverbal messages, *d345* writing messages and *d360* using communication devices and techniques). Only one replacement is suggested for a third level category, the *b156* for the *b1671*: expression of language.

The activities “social interaction” and “memory” in the “social cognition” category were linked to a single category of the Core Set (*d710* basic interpersonal interactions and *b144* memory functions, respectively). As for the “problem solving” activity, three categories were assigned, one of body functions

Table 3. Suggested relationship between activities of the FIM and the categories of the ICF Core Set for stroke

Activity of FIM	Category of the ICF Core Set for stroke	Additional information
Self-Care		
Eating	d550* Eating	
Grooming	d520 Caring for body parts	
Bathing	d510 Washing oneself	
Dressing - upper body	d540 [†] Dressing	The waist up
Dressing - lower body	d540 [†] Dressing	The waist down
Toileting	d530* Toileting	
Sphincter control		
Bladder management	b620 Urination functions, d530 Toileting e115* Products and technology for personal use in daily life, e110 Products and substances for personal consumption	
Bowel management	b525 Defecation function, d530 Toileting 115* Products and technology for personal use in daily life, e110 Products and substances for personal consumption	
Transfers		
Bed, chair, wheelchair	d410 [†] Changing basic body position, d420 Transferring oneself, e115* Products and technology for personal use in daily life	To the bed and the chair
Toilet	d410 [†] Changing basic body position, d420 Transferring oneself, e120 [†] Products and technology for personal indoor and outdoor mobility and transportation, e115* Products and technology for personal use in daily life	To the toilet
Tub, shower	d410 [†] Changing basic body position, d420 Transferring oneself, e120 [†] Products and technology for personal indoor and outdoor mobility and transportation	To the shower
Locomotion		
Walk, wheelchair	d450* Walking, d455 Moving around, d460 Moving around in different locations, d465 moving around with equipment e120 [†] Products and technology for personal indoor and outdoor mobility and transportation	
Stairs	d455 Moving around	Stairs
Communication		
Comprehension	b156 Perceptual functions b167** Mental functions of language d310 Communication with - receiving - spoken messages d315 Communication with - receiving - nonverbal messages, d325 Communication - receiving - written messages	
Expression	b167** Mental functions of language b320 Articular functions d330* Speaking d335 Producing nonverbal messages d345 Writing messages d360 Using communication devices and techniques	
Social cognition		
Social interaction	d710 Basic interpersonal interactions, b720	Complex interpersonal interactions
Problems solving	e110 Products and substances for personal consumption, b164 Higher-level cognitive functions d175 Solving problems d870 Economic self-sufficiency	
Memory	b144 Memory functions, d230 carrying out daily routine, d570 looking after one's health	

* Category which also includes in the Brief ICF Core Set for stroke; [†] Category used for more than one activity

(b164 higher-level cognitive functions) and two of activity and participation (d175 Solving problems and d870 economic self-sufficiency).

All activities of the FIM could be related to the ICF Core Set for stroke, however, as third and fourth level categories were not includ-

ed in the consensus during the development of this Core Set, such categories are needed for the correlation with the FIM.¹⁷ For some activities the meaningful concept was too general requiring the inclusion of additional information for a more detailed categoriza-

tion. This lack of Core Set categories for stroke patients has been cited in the literature not limiting its clinical applicability.^{26,30,31,32}

Regarding the Brief Core Set, only half of the categories could be related to the FIM. The categories that were not were not

included were: *b110* consciousness functions, *b114* orientation functions, *b730* muscle power functions, *s110* structure of brain and *e310* immediate family. The brief version included only five of the 18 activities, two in full: "eating" and "toileting", and three partially: "walk/wheelchair", "comprehension" and "expression".

The strongest relationship between activities of the FIM and of the Core Set, were the components activity and participation (d) with 63% and body functions (b) with 29.6%. The inclusion of environmental factors (e) in the multidimensional assessment of patients living with disabilities seems to be relevant³³ for the acknowledgement of the influence of these factors in the rehabilitation.³⁴ However, only two categories of the environmental factors (e) were related to the activities of FIM. No activity of the FIM included the component body structures (s).

CONCLUSION

In view of the relationship between the FIM and the ICF, it is clear that the FIM is focused on the individual, whereas the ICF is concerned not only with the problems and shortcomings of the patient, but also considers these factors in social activities, as well as the influence of the environment, either as a facilitator or a barrier to functional independence.

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