ORIGINAL REPORT

ICF CORE SETS FOR EARLY POST-ACUTE REHABILITATION FACILITIES

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Objective: To identify candidate categories for International Classification of Functioning, Disability and Health (ICF) Core Sets for the reporting and measurement of functioning in patients in early post-acute rehabilitation facilities.
Design: Prospective multi-centre cohort study.
Patients: Patients receiving rehabilitation interventions for musculoskeletal, neurological or cardiopulmonary injury or disease in early post-acute rehabilitation facilities.
Methods: Functioning was coded using the ICF. The criterion for selecting candidate categories for the ICF Core Sets was based on their ability to discriminate between patients with high or low functioning status. Discrimination was assessed using multivariable regression models, the independent variables being all of the ICF categories of the respective comprehensive ICF Core Set. Analogue ratings of overall functioning as reported by patients and health professionals were used as dependent variables.
Results: A total of 165 patients were included in the study (67 neurological, 37 cardiopulmonary, 61 musculoskeletal), mean age 67.5 years, 46.1% female. Selection yielded 38 categories for neurological, 32 for cardiopulmonary, and 31 for musculoskeletal.
Conclusion: The present selection of categories can be considered an initial proposal, serving to identify the issues most relevant for the assessment and monitoring of functioning in patients undergoing early post-acute rehabilitation for neurological, cardiopulmonary, and musculoskeletal conditions.

Key words: ICF; health status measurements; outcome assessment; classification; regression analysis; rehabilitation.

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INTRODUCTION

Following an acute episode of disease or an acute injury patients are at risk of experiencing a significant loss of functioning. Inactivity, immobility, complications and prevalent chronic conditions may have a wide range of adverse effects. Thus, many patients require specialized rehabilitation care. In addition to their rehabilitation needs, these patients may also have needs for ongoing extensive medical and nursing care. Early post-acute rehabilitation may be provided either in dedicated units of an acute care hospital or in specialized rehabilitation facilities. In some countries, such as Germany, there are early post-acute rehabilitation units for patients with any diagnosis, and units caring exclusively for patients with neurological conditions or for aged patients (1).

In situations entailing post-acute and long-term rehabilitation, professionals specialized in rehabilitation care provision should share a common understanding of functioning, and utilize clinical assessment instruments that are based on a standard model of functioning in order to optimize the management of the rehabilitation process. While a multitude of measuring instruments has been used in post-acute rehabilitation settings, typical instruments vary with respect to their underlying models and scales, and are tailored for specific populations or diagnoses. Accordingly, the methods differ in their sensitivity to discover incremental gains in recovery of functioning (2). Thus, there is urgent need for implementing improved and standardized outcome measurement in rehabilitation (3–4).

The International Classification of Functioning, Disability and Health (ICF), a part of the family of international classifications of the World Health Organization (WHO), provides a common framework for describing and classifying health and disability. The ICF classifies domains of functioning, along with their contextual factors, which are encountered in human life. As such, the ICF may arguably constitute a comprehensive framework and a guide for healthcare planning and for measuring the changes brought by interventions across a multitude of dimensions, from body functions to personal activities, societal participation and environmental factors. It also provides the potential framework for transition along the continuum of care. A classification must be exhaustive by its very nature and becomes very complex in daily use unless it is transformed into practice-friendly tools. Comprising over 1,400 categories, the entire volume of the ICF cannot be applied by the clinicians to all their patients. In daily practice clinicians will need only a fraction of the categories found in the ICF. Although there are generic instruments based on the

ICF, which are designed as practical translations of the ICF and are usable across a wide range of applications, the generic character may be a drawback in specific settings. Thus, in this trade-off between generalizability and the need to capture the detail, the ICF must be adapted to the perspectives and needs of different users. The need to tailor ICF to the needs of particular contexts is the primary motivation behind the ICF Core Set project, which aims to extract selections of ICF categories from the entire classification that are relevant to specific health conditions or care situations. This on-going project of selection of the so-called ICF Core Sets will define common standards for what should properly be measured and reported.

In general, the ICF Core Set project seeks to define, on an empirical basis, the ICF categories relevant for the condition and rehabilitation of typical patients after an acute episode, especially when applied as an endpoint in clinical trials, or if it was identified as being relevant following discussion among health professionals (5). By including all theoretically relevant categories, the selection process is comprehensive, omitting only those factors that proved to be irrelevant to designing treatment strategy or assessing outcome. Due to the consensus process, the ICF Core Sets in their present version are comprehensive, with applicability for the assessment of individual problems and needs. As such, they permit the estimation of prognosis and the potential for rehabilitation, with general applicability for assessment of functioning in any rehabilitation situation. ICF Core Sets for early post-acute rehabilitation facilities were developed for patients with neurological, cardiopulmonary and musculoskeletal conditions (6–8). This stratification was based on practical considerations related to healthcare provision being organized according to organ system and the varying spectrum of problems experienced in patients with neurological, musculoskeletal and cardiopulmonary conditions. This approach was used in prior studies on functioning in the acute care situation (9) and verified by focus groups (10). They were validated in the patients' and healthcare professionals' perspective (11–13). They are intended to be practical and useful for healthcare professionals specialized in rehabilitation and involved in interdisciplinary rehabilitation teams. They are based on the experience of patients in need of medical, nursing and therapeutic management.

The comprehensive post-acute ICF Core Sets include 116 (neurological conditions), 84 (cardiopulmonary conditions) and 70 (musculoskeletal conditions) second-level ICF categories, respectively. However, a minimally sufficient data set, which is feasible in clinical practice, may encompass only 20 different concepts or topics, but not much more as contained in the comprehensive ICF Core Sets. Thus, subsets can be created from the comprehensive Core Sets, according to specific needs of the individual user. Specific methods have been proposed for identifying candidate categories for ICF Core Sets, selected from the comprehensive post-acute ICF Core Sets (14).

The objective of this study was to employ these methods for identifying candidate categories for ICF Core Sets out of the comprehensive post-acute ICF Core Sets for the reporting and measurement of functioning in patients in early post-acute rehabilitation facilities.

METHODS

Detailed methods involved in the ICF Core Set development have been described elsewhere (14). In brief, a prospective multi-centre cohort study was conducted from May 2005 to August 2008 in 9 early post-acute rehabilitation facilities in Austria and Germany, including 5 facilities specialized in geriatric rehabilitation. Patients were eligible for inclusion in the study if they were at least 18 years of age and were receiving rehabilitation interventions for musculoskeletal, neurological or cardiopulmonary injury or disease.

As described above, we have developed the ICF Core Sets in order to facilitate and encourage the use of the ICF in clinical practice and research. The ICF Core Sets are selections from the entire list of ICF categories, which emerged from a multi-stage consensus process seeking to identify those aspects of functioning most relevant for patients in specific settings or with specific health conditions. Three comprehensive ICF Core Sets were developed for patients with neurological, cardiopulmonary and musculoskeletal conditions in early post-acute rehabilitation facilities (6–8). The current study made use of these 3 comprehensive Core Sets for patient assessment.

For scoring of the Core Sets, the ICF suggests assigning qualifiers ranging from 0 to 4 for each category. Since the properties of all qualifiers are not yet sufficiently evaluated, in the present study we used a simplified qualifier, defined as follows. Each category of the components Body Functions and Activities and Participation was graded with the qualifiers 0 for "no impairment/limitation", 1 for "moderate impairment/limitation" and 2 for "severe impairment/limitation". The categories of the component Body Structures were graded with the qualifiers 0 for "no impairment" and 1 for "impairment". The categories of the component Environmental Factors were graded with 0 for "no barrier/facilitator" and 1 for "barrier/facilitator". Impairments of body functions or structures, and limitations or restrictions of activities and participation were recorded if they were directly associated with the condition necessitating rehabilitation.

To describe an overall view of functioning, the patients were asked to appraise their personal limitations in overall functioning using a horizontal visual analogue scale, ranging from zero, for complete limitation in all aspects of functioning to 10, for no limitation in functioning). Independently, and blinded to the patients' responses, the health professionals were asked to appraise their patients' functioning on the same analogue scale.

Patients were recruited and interviewed by health professionals trained in the application and principles of the ICF. Data was primarily collected from patients' medical record sheets, by interview of health professionals in charge of the patients, and by patient interviews. ICF Core Set categories were assessed within the first 24 h after admission (baseline).

The criterion for selecting candidate categories for the ICF Core Sets was based on their ability to discriminate between patients with high or low functioning status. Discrimination was assessed using multivariable regression models, in which the independent variables were all of the ICF categories of the respective comprehensive ICF Core Set. Analogue ratings of overall functioning as reported by patients and health professionals were used as dependent variables. To improve prediction accuracy, and to derive small subsets of independent variables having the strongest effects on the dependent variable, we used the least absolute shrinkage and selection operator (LASSO) (15). This procedure minimizes the residual sum of squared errors with a bound on the sum of the absolute values of the coefficients. To avoid large variance, as often occurs in ordinary least square regression, the LASSO sets some regression coefficients to zero and shrinks others based on a preset regularization parameter, the so-called penalty. Thus, the method acts recursively to select valid subsets with adequate discrimination.

To validate the approach for selection of ICF Core Sets described above, we additionally used the Random Forest algorithm, which is based on Classification and Regression Trees (CART) non-parametric regression techniques. CART divides a population into several sub-populations depending on certain characteristics defined by successive

binary splits in predictor variables. In the course of the iterations, successive subpopulations emerge as increasingly homogenous with respect to the outcome variable, which in this case is the overall functioning as reported by patients and health professionals. Of the many different ways to construct CART, we employed the technique proposed by Breiman et al. (16–17).

All data analyses were carried out with R 2.9.0 (18).

RESULTS

A total of 165 patients were included in the study; 67 with neurological, 37 with cardiopulmonary and 61 with musculoskeletal conditions. Mean age was 67.5 years (neurological: 63.9 years, cardiopulmonary: 78.3 years, musculoskeletal: 64.8 years), 46.1% were female (neurological: 35.8%, cardiopulmonary: 54.1%, musculoskeletal: 52.5%). Mean length of stay in the rehabilitation facility was 30.5 days (neurological: 34.2 days, cardiopulmonary: 23.7 days, musculoskeletal: 30.6 days). The most frequent diagnoses are shown in Table I. Patients with neurological conditions reported a mean functioning score of 2.6 (95% confidence interval (CI) 2.1–3.1) at admission and of 4.8 (95% CI 4.1–5.5) at discharge. Patients with cardiopulmonary conditions reported a mean functioning score of 4.1 (95% CIl 3.3–4.9) at admission and of 6.5 (95% CI 5.7–7.4) at discharge. Patients with musculoskeletal conditions reported a mean functioning score of 3.5 (95% CI 3.0–4.0) at admission and of 6.2 (95% CI 5.7–6.8) at discharge. All differences were statistically significant.

For patients with neurological conditions, statistical selection of ICF categories by LASSO and CART yielded 14 categories for the component Body Functions, 15 categories for the component Activities and Participation, 2 categories for the component Body Structures and 7 categories for the component Environmental Factors, i.e. a total of 31 categories for the functioning part and 7 categories for the contextual part of the ICF.

For patients with cardiopulmonary conditions, statistical selection of ICF categories by LASSO and CART yielded 12 categories for the component Body Functions, 9 categories for the component Activities and Participation, 1 category for the component Body Structures and 10 categories for the component Environmental Factors, i.e. a total of 22 categories for the functioning part and 10 categories for the contextual part of the ICF.

For patients with musculoskeletal conditions, statistical selection of ICF categories by LASSO and CART yielded 10 categories for the component Body Functions, 15 categories for the component Activities and Participation, no category for the component Body Structures and 6 categories for the component Environmental Factors, i.e. a total of 25 categories for the functioning part and 6 categories for the contextual part of the ICF.

Selection of categories along with information on the corresponding comprehensive ICF Core Sets is shown in Tables II–V.

DISCUSSION

For a sample of 165 patients undergoing post-acute rehabilitation we identified candidate categories for brief ICF Core Sets extracted from the comprehensive ICF Core Sets. These candidate categories provide a practical alternative to the lengthy comprehensive sets, in providing a minimal standard for measuring and communicating patients' functioning.

The results of the selection processes have high face validity, as the selected categories seem to accurately represent the relevant issues in the early post-acute situation.

For patients with neurological conditions, the selected categories of the component Body Functions generally reflect the typical spectrum of problems that have to be monitored, namely cognitive and speech functions, blood pressure, respiration, ingestion, urination, weight maintenance and gait pattern (19). The component Activities and Participation was represented by a number of categories from the chapters *Mobility* and *Self-care*, which are also highly relevant. Indeed, these are issues typically also covered by the instruments most commonly used in early post-acute rehabilitation facilities (20), the Functional Independence Measure (FIM) (21) and the Barthel Index (BI) (22). Additionally, categories were included that are important for the monitoring of therapy efficiency, and that are very often limited in patients with neurological conditions, namely *Listening* (d115), *Acquiring skills* (d155) and *Solving problems* (d175) (23). Also, products and technology

Table I. *Most frequent diagnoses responsible for inpatient stay (International Classification of Diseases-10; ICD-10)*

	All conditions $n=165$ n (%)	Neurological conditions $n=67$ n (%)	Cardiopulmonary conditions $n=37$ n (%)	Musculoskeletal conditions $n=61$ n (%)
Diseases of the respiratory system (J00-J99)	1 (0.6)	1 (1.5)	0 (0)	0 (0)
Diseases of the circulatory system other than cerebrovascular diseases (I00-I52 and I70-I99)	34 (20.6)	2 (3)	27 (73.0)	5 (8.2)
Cerebrovascular diseases (I60-I69)	27 (16.4)	27 (40.3)	0 (0)	0 (0)
Diseases of the nervous system (G00-G99)	25 (15.2)	22 (32.8)	0 (0)	3 (4.9)
Diseases of the musculoskeletal system and connective tissue (M00-M99)	25 (15.2)	10 (14.9)	1 (2.7)	14 (23.0)
Injury, poisoning and certain other consequences of external causes (S00-T98)	24 (14.5)	0 (0)	0 (0)	24 (39.3)
Neoplasms (C00-D48)	6 (3.6)	2 (3.0)	1 (2.7)	3 (4.9)
Symptoms, signs etc. (R00-R99)	8 (4.8)	1 (1.5)	7 (18.9)	0 (0)
Other diagnoses	15 (9.1)	2 (3.0)	1 (2.7)	12 (19.7)

Table II. *International Classification of Functioning, Disability and Health (ICF) – categories of the component Body Functions contained in the comprehensive ICF Core Sets (comp) and proposed as candidates for the ICF Core Sets for patients with neurological (NEUR), cardiopulmonary (CP) and musculoskeletal (MSK) conditions in post-acute rehabilitation facilities*

ICF code and category description		NEUR comp Core Set	NEUR Core Set	CP comp Core Set	CP Core Set	MSK comp Core Set	MSK Core Set
b110	Consciousness functions	×		×	×		
b114	Orientation functions	×		×	×		
b126	Temperament and personality functions	×	×				
b130	Energy and drive functions	×	×	×	×	×	
b134	Sleep functions	×		×	×	×	×
b140	Attention functions	×		×	×		
b144	Memory functions	×		×			
b147	Psychomotor functions	×					
b152	Emotional functions	×		×		×	
b156	Perceptual functions	×					
b160	Thought functions	×	×				
b164	Higher-level cognitive functions	×	×				
b167	Mental functions of language	×	×				
b176	Mental function of sequencing complex movements	×					
b180	Experience of self and time functions	×					
b210	Seeing functions	×	×				
b215	Function of structures adjoining the eye	×					
b230	Hearing functions	×					
b235	Vestibular functions	×					
b240	Sensations associated with hearing and vestibular function	×					
b260	Proprioceptive function	×		×	×	×	×
b265	Touch function	×					
b270	Sensory functions related to temperature and other stimuli	×				×	
b280	Sensation of pain	×		×		×	×
b310	Voice functions	×		×			
b320	Articulation functions	×					
b340	Alternative vocalization functions	×					
b410	Heart functions	×		×	×		
b415	Blood vessel functions	×		×		×	
b420	Blood pressure functions	×	×	×			
b430	Haematological system functions	×		×	×		
b435	Immunological system functions	×		×		×	×
b440	Respiration functions	×		×		×	
b445	Respiratory muscle functions			×			
b450	Additional respiratory functions	×	×	×	×		
b455	Exercise tolerance functions	×		×		×	
b460	Sensations associated with cardiovascular and respiratory functions			×			
b510	Ingestion functions	×	×	×	×		
b515	Digestive functions	×					
b525	Defecation functions	×		×		×	
b530	Weight maintenance functions	×	×	×		×	×
b535	Sensations associated with the digestive system	×					
b540	General metabolic functions	×					
b545	Water, mineral and electrolyte balance functions	×		×			
b550	Thermoregulatory functions	×	×				
b610	Urinary excretory functions			×			
b620	Urination functions	×	×	×		×	×
b630	Sensations associated with urinary functions	×					
b710	Mobility of joint functions	×		×		×	
b715	Stability of joint functions	×				×	
b730	Muscle power functions	×		×		×	×
b735	Muscle tone functions	×				×	
b740	Muscle endurance functions	×	×	×		×	×
b755	Involuntary movement reaction functions	×				×	×
b760	Control of voluntary movement functions	×		×		×	
b770	Gait pattern functions	×	×			×	
b780	Sensations related to muscles and movement functions			×		×	×
b810	Protective functions of the skin	×		×	×	×	
b820	Repair functions of the skin			×	×		

Table III. *International Classification of Functioning, Disability and Health (ICF) – categories of the component Activities and Participation contained in the comprehensive ICF Core Sets (comp) and proposed as candidates for the ICF Core Sets for patients with neurological (NEUR), cardiopulmonary (CP) and musculoskeletal (MSK) conditions in post-acute rehabilitation facilities*

ICF code and category description		NEUR comp Core Set	NEUR Core Set	CP comp Core Set	CP Core Set	MSK comp Core Set	MSK Core Set
d110	Watching	×					
d115	Listening	×	×				
d120	Other purposeful sensing	×					
d130	Copying	×					
d135	Rehearsing	×					
d155	Acquiring skills	×	×	×		×	×
d160	Focusing attention	×					
d166	Reading	×					
d170	Writing	×	×				
d175	Solving problems	×	×				
d177	Making decisions	×		×	×	×	×
d230	Carrying out daily routine			×		×	×
d240	Handling stress and other psychological demands			×	×	×	×
d310	Communicating with – receiving – spoken messages	×				×	
d315	Communicating with – receiving – nonverbal messages	×					
d330	Speaking	×					
d335	Producing nonverbal messages	×					
d350	Conversation	×					
d360	Using communication devices and techniques	×					
d410	Changing basic body position	×	×	×	×	×	×
d415	Maintaining a body position	×		×		×	×
d420	Transferring oneself	×	×	×	×	×	
d430	Lifting and carrying objects	×		×		×	×
d440	Fine hand use (picking up, grasping)	×	×	×		×	
d445	Hand and arm use	×		×		×	×
d450	Walking	×	×	×	×	×	×
d460	Moving around in different locations	×	×	×	×	×	
d465	Moving around using equipment	×	×	×	×	×	×
d510	Washing oneself	×		×		×	×
d520	Caring for body parts	×	×	×		×	×
d530	Toileting	×	×	×		×	×
d540	Dressing	×	×	×	×	×	×
d550	Eating	×	×	×		×	×
d560	Drinking	×	×	×		×	
d570	Looking after one's health			×		×	
d760	Family relationships	×		×		×	
d870	Economic self-sufficiency			×			
d910	Community Life			×	×		
d930	Religion and spirituality	×				×	
d940	Human rights					×	

Table IV. *International Classification of Functioning, Disability and Health (ICF) – categories of the component Body Structures contained in the comprehensive ICF Core Sets (comp) and proposed as candidates for the ICF Core Sets for patients with neurological (NEUR), cardiopulmonary (CP) and musculoskeletal (MSK) conditions in post-acute rehabilitation facilities*

ICF code and category description		NEUR comp Core Set	NEUR Core Set	CP comp Core Set	CP Core Set	MSK comp Core Set	MSK Core Set
s110	Structure of brain	×					
s120	Spinal cord and related structures	×					
s130	Structures of meninges	×					
s410	Structure of cardiovascular system	×	×	×			
s430	Structure of respiratory system	×		×	×		
s530	Structure of stomach	×					
s710	Structure of head and neck region	×				×	
s720	Structure of shoulder region	×				×	
s730	Structure of upper extremity	×	×			×	
s740	Structure of pelvic region					×	
s750	Structure of lower extremity	×				×	
s760	Structure of trunk			×		×	
s810	Structure of areas of skin	×		×		×	

Table V. *International Classification of Functioning, Disability and Health (ICF) – categories of the component Environmental Factors contained in the comprehensive ICF Core Sets (comp) and proposed as candidates for the ICF Core Sets for patients with neurological (NEUR), cardiopulmonary (CP) and musculoskeletal (MSK) conditions in post-acute rehabilitation facilities*

ICF code and category description		NEUR comp Core Set	NEUR Core Set	CP comp Core Set	CP Core Set	MSK comp Core Set	MSK Core Set
e110	Products or substances for personal consumption	×	×	×	×	×	×
e115	Products and technology for personal use in daily living	×	×	×	×	×	×
e120	Products and technology for personal indoor and outdoor mobility and transportation	×	×	×		×	×
e125	Products and technology for communication	×	×	×	×	×	
e150	Design, construction and building products and technology of buildings for public use			×		×	
e155	Design, construction and building products and technology of buildings for private use			×	×		
e225	Climate					×	×
e245	Time-related changes			×	×		
e250	Sound			×	×		
e260	Air quality			×			
e310	Immediate family	×		×		×	
e315	Extended family	×		×			
e320	Friends	×		×		×	
e340	Personal care providers and personal assistants					×	
e355	Health professionals	×	×	×		×	×
e360	Health related professionals	×		×			
e410	Individual attitudes of immediate family members	×		×		×	
e415	Individual attitudes of extended family members	×	×	×	×		
e420	Individual attitudes of friends	×		×	×	×	
e430	Individual attitudes of people in positions of authority					×	
e440	Individual attitudes of personal care providers and personal assistants					×	
e450	Individual attitudes of health professionals	×		×		×	×
e455	Individual attitudes of other professionals			×	×		
e465	Social norms, practices and ideologies	×		×	×		
e550	Legal services, systems and policies	×	×				
e555	Associations and organizational services, systems and policies			×		×	
e570	Social security, services, systems and policies	×		×			
e575	General social support services, systems and policies			×		×	
e580	Health services, systems and policies	×		×		×	

for personal use, mobility and communication are relevant as factors that are preconditions for successful reintegration into the community.

For patients with cardiopulmonary conditions, the selected categories for the component Body Functions relate to functions that will typically be monitored in the post-acute situation, namely heart functions and respiratory functions. A large part of the included categories describe higher integrated mental functions. Orientation, attention and sleep functions are particularly relevant for older patients with cardiovascular disease. Repair functions of the skin and protective functions of the skin point at the sequels of surgery. Categories of the component Activities and Participation include basic activities of daily living as well as psychosocial issues such as making decisions and handling stress, both important for long-term outcome of cardiopulmonary disease (24). Focus of the selected categories of the component Environmental Factors was in the area of psychological and psychosocial stress as potentially triggered by attitudes of family members and friends, as well as by social norms.

For patients with musculoskeletal conditions, many of the selected categories from both Body Functions and Activities and Participation referred to mobility and pain. Very typically, patients with musculoskeletal conditions are characterized by pain, limited mobility, subsequent loss of sleep and loss of function of the musculoskeletal system leading to restrictions in activities of daily living such as self care and ambulation. Major goals or post-acute rehabilitation are thus to enable patients to move and perform self care activities safely and independently, with the ultimate goal of resuming domestic and workplace activities (25). Likewise, selected categories from the component Environmental Factors refer mainly to assistive products for personal use and mobility.

The aim of this study was to define practical and feasible ICF Core Sets with no more than 20 items or ICF categories. In general, the criterion *feasibility* is satisfied when a measure can, in practical terms, be applied by health professionals, given circumstances of restricted time and resources. With this in mind, we sought in the present study to define practical and applicable ICF Core Sets with no more than 20 items or ICF categories. This upper limit was based on the precedent set by generic health status measures, and the practical requirement for a measure to be completed in a 20 min interview. The briefer ICF Core Sets emerging in the present study are generally

feasible in the post-acute situation, albeit containing slightly more than 20 categories to assess functioning. We proposed assessing a total of 21–29 categories from the components Body Functions and Activities and Participation, and, eventually, supplemented by 6–10 categories from Environmental Factors. Use of categories from Body Structures would depend on the underlying health condition, as required by the routine medical assessment.

Among the limitations of this study, it must be considered that selection bias may have occurred due to the use of a convenience sample of patients. Still, the spectrum of impairments and limitations encountered in our group of patients was consistent with the results from similar studies (26–27). Another limitation might arise from the statistical selection process. Although we used 2 established methods, a split sample approach might have proved superior validation of the results. However, this approach was not possible because of the limited sample size. Further studies of sufficient size would more firmly establish the validity of the proposed selection, and would yield more insights into the association structures (28) and potential scale attributes (29) of the categories.

Defining ICF Core Sets for patients in post-acute rehabilitation facilities has the advantage of providing the potential framework for standardized reporting and measurement and setting the framework along the continuum of care. ICF Core Sets encourage measurement of health status from a patient-centred and multi-professional perspective. This is not a generic, but a focused approach, taking into consideration the special needs and characteristics of that population.

In conclusion, the present selection of categories can be considered an initial proposal, serving to identify the issues most relevant for the assessment and monitoring of functioning in patients with neurological, cardiopulmonary, and musculoskeletal conditions. The main strength of the study lies in the selection of a restricted set of categories, facilitating the inclusion of ICF Core Sets into daily clinical routine. If it should occur that important categories are missing from the briefer Core Sets, the comprehensive ICF Core Sets could easily be used to reconfigure the assessment. Also, for patients with multiple diagnoses or for aged patients, a more generic Set could be constructed, containing all categories from the 3 comprehensive post-acute ICF Core Sets. Another advantage of the proposed selection is derived from its participatory approach, taking into consideration the perspectives both of patients and healthcare professionals. Thus, the ICF Core Sets for post-acute rehabilitation facilities can contribute substantially to the optimal management of patients, the teaching of health professionals, the planning of studies and the development of new assessment instruments.

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