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ORIGINAL RESEARCH

Identification of relevant categories for inpatient physical therapy care using the International Classification of Functioning, Disability and Health: a Brazilian survey

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International Classification of Functioning, Disability and Health;
Rehabilitation;
Disability evaluation;
Treatment outcome;
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Abstract
Background: Hospitalized patients are at risk for the loss of function and impairment. Physical therapists aim to improve functionality and prevent disabilities. The International Classification of Functioning, Disability and Health (ICF) propose a universal language to classify the functionality of patients across different health care settings and over diverse health conditions.
Objectives: To identify the International Classification of Functioning, Disability and Health categories that describe most common and relevant patient problems managed by physical therapists in Brazilian hospitals in the acute and post-acute care settings.
Subjects: The participants were physical therapists who worked in hospitals with a minimum work experience of two years.
Methods: A consensus-building, two-round, emailed survey was conducted using the Delphi technique.
Results: For the development of an ICF short list, 47 physical therapists from the acute care setting and 30 physical therapists from the post-acute care setting responded to the Delphi exercise. Most of the professionals were from the cardiorespiratory physical therapy area. A 80% level of consensus or higher was established for the selection of the categories of the ICF components (*Body Functions*, *Body Structures*, *Activities* and *Participation*, and *Environmental Factors*). We obtained two short lists to be used in clinical practice comprising 39 ICF categories for acute care settings and 53 for post-acute care settings.

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Conclusion: This study is the first to identify the most relevant aspects for physical therapy in Brazilian hospitals using the ICF framework. Our results can help to promote the adoption of the ICF in physical therapy clinical practice in the hospital setting.

Introduction

Hospitalized patients are at risk of transient or permanent loss of functioning.[1,2] This may be due to the deficiencies induced by the diseases, complications, co-morbidities, immobilization, old age, and/or frailty regardless of their underlying health condition.[1,2] Physical therapists in hospitals should be able to assess deficiencies and identify patient's risks for disability in order to make an appropriate rehabilitation intervention.[2]

Several instruments are used in rehabilitation settings to assess functioning in specific population groups. However, they are not consistent in their models and scales and have different sensitivities for predicting changes in patients' conditions.[3,4] These scales and questionnaires are frequently either too specific or too generic, and lack sensibility in this setting, mainly in the acute phase. The International Classification of Functioning, Disability and Health (ICF) provides a common framework that is globally recognized to understand and describe functioning and disability considering impairments in body structures and functions, limitations in activities and restrictions in participation and environmental factors.[5] Its use has been explored and implemented in the area of rehabilitation as a universal model.[6] In Brazil, the Federal Council of Physical Therapy recommends its adoption in clinical and academic practice.[7] The ICF has proven to be appropriate for the description of integral health status, setting rehabilitation therapy goals, estimating rehabilitation prognosis, monitoring progress and assessing the outcomes of rehabilitation interventions.[1,8,9]

Nevertheless, because of its size (1400 categories), the ICF must be adapted to the different needs and to the different settings and conditions, considering: usual clinical conditions, heath service conditions, rehabilitation and outcome objectives, social and environmental conditions of the patient and his family.[10,11] To improve its applicability in clinical practice, studies have been conducted to select categories that are relevant to specific health conditions and care situations[12,13] or for use by specific professions.[10,14] Previous studies from the multiprofessional point of view identified and validated the most relevant categories of the ICF for the acute and post-acute hospital phase and grouped patients with neurological, cardiopulmonary, and musculoskeletal issues in ''Core Sets''.[12,13] Besides the ''Core sets'', other studies that focused only on physiotherapeutic interventions during the hospital phase identified the relevant ICF categories for this profession.[3,14] However, they were developed with a focus on German-speaking countries pointing out the need for studies that represent the views of the professionals from other countries that present different models of care.[13]

Regarding this matter, there is not yet a proposed selection of ICF categories to be used by physical therapists working in Brazilian hospitals that takes into consideration the particularities of the profession and care in this setting. Short lists with selections of the most relevant ICF categories are needed to enable and encourage the practical use of the ICF in Brazilian hospitals. The objective of this study was to identify the ICF categories that describe the most common and relevant patient problems addressed and managed by physical therapists in the acute and post-acute care settings in Brazilian hospitals.

Methods

Study design

We used a Delphi technique to develop the short lists on the relevant ICF categories for acute and post-acute care settings.[15,16] All participants worked in tertiary-level hospitals. The professionals who work in intensive or semi-intensive care units made up the acute care group, and the professionals who worked in the other hospital units made up the post-acute care group. The acute health care context concerns units directed to the care of patients with critical and/or unstable clinical conditions. Post-acute care includes units directed to patients with less critical and/or more stable conditions, but still in need of hospital care.

Sample

Purposive sampling was used. A partnership with the Brazilian Association of Cardiorespiratory Physical Therapy (ASSOBRAFIR) was established – the Association sent a link about participating in this study through email to its members. Invitations to take part in the study were also made through the researchers' network. Participants met the inclusion criteria if they worked primarily as a physical therapist in Brazilian hospitals for at least two years. Physical therapists who did not work directly with patient care were not included. The study was approved by the Ethics Committee of the Sírio-Libanês Hospital, São Paulo, SP, Brazil, protocol 1.506.428, and participants were asked to accept a consent form.

Data collection

The study was carried out in three stages:

Stage 1 – Initial proposal. A questionnaire with presentation of the proposed categories of the ICF (based in available studies)[12–14] for selection considering most relevant and frequently used by the physical therapists in clinical practice. The questionnaire contained 69 proposed categories related to the acute care setting and 94 for the post-acute care setting.

Stage 2 – New evaluation, considering the former expert panel. A dispatch of the first stage responses for a new voting process.

Stage 3 – Applicability research. In this stage, lists were restructured according to the result of the second stage and sent to participants for their opinion on the selected list's applicability through a structured questionnaire that used a Likert scale.

The questionnaires were made available on a website developed for this research (www.cifisiohospitalar.com.br) with instructions on: how to complete them, schedules, the study aim and the definitions for *Body Functions*, *Body Structures*, *Activities and Participation*, and *Environmental Factors* according to WHO. A 3-week time limit was established for returning the answers of each stage, and reminders about the deadline were sent. Only professionals who took part in the first round of the study were allowed to participate in the remaining stages.

The questionnaires included propositions for ICF second-level categories. The series of proposed categories was based on previous studies that identified categories relevant to physical therapists that work with inpatient care[14] and categories of Core Sets for acute and post-acute hospital for musculoskeletal, cardiopulmonary, and neurological conditions.[12,13] The initial proposal included all categories present in these studies, except those that were only specific to one of these groups (musculoskeletal, cardiopulmonary or neurological conditions). The questionnaires were structured with dichotomous questions, so participants voted on whether each category was ''applicable'' or ''not applicable.'' Participants were advised to consider the necessary and essential aspects of the planning of the rehabilitation program, including assessment, intervention, and the relevance and applicability of those aspects in their practice.

Data analysis

Response rates from the first round, second round, and the exploratory research on applicability were analyzed using descriptive statistics. We included the ICF categories that obtained a frequency of 80% consensus or higher, after the second round of appraisals, in the short lists.[10,17]

Results

Data collection took place between May and June 2016. A total of 47 physical therapists participated for the acute care group and 30 for the post-acute group. The link to the questionnaire was sent to a total of 738 members of ASSOBRAFIR, and was also sent to 200 researchers' contacts. The proportion of answers/sent questionnaires was 8%. The sample's characteristics are shown in Table 1. The majority of the participants were female professionals of the southeast region of Brazil who worked in public hospitals. Over 90% of the professionals had a postgraduate degree in cardiorespiratory physical therapy or a related area. A total of 29 professionals worked at acute care units, 12 at post-acute and 18 in both.

The total number of categories and the ones that were nominated by more than 80% of participants are shown in Table 2, broken down by each component of the ICF. For the acute care group, there was consensus on 39 (56.5%) categories from the 69 initial categories at the end of the second phase. For the post-acute care group, there was consensus on 53 (56.4%) of the 94 categories proposed in the first phase. As a result, we obtained a short list for physical therapy in the acute care setting with 22 categories related to *Body Functions*, 8 on *Body structures*, 7 on *Activities and Participation*, and 2 on *Environmental Factors* (Table 3). The short list for physical therapy in post-acute care settings covered 27 categories on *Body functions*, 8 on *Body structures*, 13 on *Activity and Participation*, and 5 on *Environmental Factors* (Table 4).

The adoption of the ICF in clinical practice was considered important and applicable by 100% of participants, both in the generation of functionality data and in the definition of goals and outcomes (Table 5).

Discussion

This study identified the most relevant issues regarding patients in acute and post-acute care from the perspective of Brazilian physical therapists, by utilizing the ICF categories and a consensus methodology. The use of the ICF as a systematic coding scheme for information on functionality and disability has advantages over other instruments, such as standardized terminology; promotion of the improvement of communication among health professionals; improved data, which allows for comparisons between services; and the recognition of the biopsychosocial model, which is needed for a comprehensive evaluation and care.[6]

The series of items identified as relevant was broad. Both groups obtained a level of consensus of 80% or higher for all selected ICF components. These results highlight which ICF components and domains are targeted in physical therapy assessments and interventions. The longest list of categories was for the *Body Functions* and *Activities and Participation* components. Considering these components, categories related to movement were in larger quantity. All the categories from the *Neuromusculoskeletal* and *Movement-related Functions* chapter, as well as the majority of the categories in the *Mobility* chapter, that were available for appraisal were selected to be included in both short lists. The musculoskeletal system's function and activities are the most frequent goals of physical therapists' interventions in all stages of rehabilitation in hospitals and other settings.[10,15] These results are in agreement with national and international literature. A Brazilian study identified the relevant chapters for different physical therapy specialties and found similar results in all of them (i.e., *b7 Neuromusculoskeletal and Movement-related functions*, *s7 Structures related to movement, and d4 Mobility*).[15] The researchers concluded that these are essential goals for physical therapy, which is consistent with the profession's definition as a science focused on the prevention

Table 1 Participants and characteristics of the sample.

	ICF Short list for acute care	ICF Short list for post-acute care
Number of participants		
Round 1	47	30
Round 2	37	24
Round 3 (applicability research)	26	21
Time of professional experience (average)	12	13
Age (average)	35.89	36.37
Sex		
Female	66%	70%
Male	34%	30%
% Professionals with specialization	96%	90%
Characteristics of the workplace		
Public	51%	73%
Private	34%	20%
Philanthropic	6%	0%
Other	9%	7%
Country region		
Midwest	6%	0%
Northeast	9%	10%
North	2%	0%
Southeast	77%	80%
South	6%	10%

Table 2 Consensus process from first to second Delphi rounds.

	Acute care	Post-acute care
Round 1		
Total of identified ICF categories (*n*)	69	94
ICF categories with a consensus $\geq$80% (*n*)	37	79
Round 2		
ICF categories with a consensus $\geq$80% (*n*)	39	53
Final consensus: ICF categories with a consensus $\geq$ 80% per component		
Body functions (*n*)	22	27
Body structures (*n*)	8	8
Activities and participation (*n*)	7	13
Environmental factors (*n*)	2	5

and treatment of kinetic-functional impairments.[15] Noteworthy, pain category achieved a 100% consensus, showing that pain and its consequences must be considered during an intervention. *Environmental Factors* were also considered relevant. Although it might be challenging to modify them, it is important to consider their potential to facilitate or have barrier effects toward functioning and participation.[16] For post-acute care, additional functional aspects were included when compared to acute care, as expected. Among them, there are the categories relating to *Mental Functions* (e.g., *attention* and *memory*), *Self-care* (e.g., *dressing, washing oneself*), and *Environmental Factors* (e.g., *immediate family, products* and *technology for personal use in daily living, mobility and transportation*). In this context, these findings relate to the better opportunities for restoring functionality after the resolution of the acute care needs.

Consensus among the professionals was defined as a 80% agreement – 37 participants in the acute care group and 24 participants in the post-acute care group in the second round, respectively. The cut-off point was set at 80%. In part, this may be arbitrary and is therefore subject to criticism. Indeed, several Delphi studies have used this cut-off point for practical reasons.[18] A number between 15 and 30 participants is considered sufficient for consensus.[19] The literature indicates an abstention number of 30–50% from the first to the second stage.[19] The sample loss in this study was lower than reported in the literature, which was believed to be due to the communication strategies regarding the deadlines: there was a 21% dropout of participants from the acute care group and a 20% dropout from the post-acute care group on the second stage. The first round response rate was 8%. Our results not coincide with the response rates of prior studies,

Table 3 ICF Short List for acute care.

Body functions	Impairments				
	0	1	2	3	4
b110 – Consciousness functions					
b114 – Orientation functions					
b134 – Sleep functions					
b180 – Experience of self and time functions					
b260 – Proprioceptive function					
b280 – Sensation of pain					
b410 – Heart functions					
b415 – Blood vessel functions					
b420 – Blood pressure functions					
b430 – Hematological system functions					
b435 – Immunological system functions					
b440 – Respiration functions					
b445 – Respiratory muscle functions					
b450 – Additional respiratory functions					
b455 – Exercise tolerance functions					
b545 – Water, mineral and electrolyte balance functions					
b710 – Mobility of joint functions					
b715 – Stability of joint functions					
b730 – Muscle power functions					
b735 – Muscle tone functions					
b740 – Muscle endurance functions					
b760 – Control of voluntary movement functions					

Body structures	Impairments				
	0	1	2	3	4
s410 – Structure of cardiovascular system					
s430 – Structure of respiratory system					
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					

Activities and participation	Restrictions/limitations				
	0	1	2	3	4
d330 – Speaking	D				
d410 – Changing basic body position	D				
d415 – Maintaining a body position	D				
d420 – Transferring oneself	D				
d445 – Hand and arm use	D				
d450 – Walking	D				
d550 – Eating	D				

Environmental factors	Facilitators					Barriers				
	+4	+3	+2	+1	+0	0	1	2	3	4
e355 – Health professionals										
e580 – Health services, systems and policies										

Simplified documentation of ICF short list for Acute Care.

which range from 59% to 90%.[18] We expected a low response rate, considering the time expenditure, the various stages and the fact that only more recently the use of the ICF has been a matter of greater attention in the area. In our study,

Table 4 ICF Short List for post-acute care.

Body functions	Impairments				
	0	1	2	3	4
b110 – Consciousness functions					
b114 – Orientation functions					
b140 – Attention functions					
b144 – Memory functions					
b156 – Perceptual functions					
b180 – Experience of self and time functions					
b260 – Proprioceptive function					
b265 – Touch function					
b280 – Sensation of pain					
b410 – Heart functions					
b415 – Blood vessel functions					
b420 – Blood pressure functions					
b430 – Hematological 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					
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					

Body structures	Impairments				
	0	1	2	3	4
s410 – Structure of cardiovascular system					
s430 – Structure of respiratory system					
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					

Activities and participation	Restrictions/limitations				
	0	1	2	3	4
d410 – Changing basic body position	D				
d415 – Maintaining a body position	D				
d420 – Transferring oneself	D				
d430 – Lifting and carrying objects	D				
d440 – Fine hand use	D				
d445 – Hand and arm use	D				
d450 – Walking	D				
d460 – Moving around in different locations	D				
d465 – Moving around using equipment	D				
d510 – Washing oneself	D				
d540 – Dressing	D				
d550 – Eating	D				
d560 – Drinking	D				

Table 4 (*Continued*)

Environmental factors	Facilitators					Barriers				
	+4	+3	+2	+1	+0	0	1	2	3	4
e115 – Products and technology for personal use in daily living										
e120 – Products and technology for personal indoor and outdoor mobility and transportation										
e310 – Immediate family										
e355 – Health professionals										
e580 – Health services, systems and policies										

Simplified documentation of ICF short list for Post-Acute Care.

Table 5 Response rate applicability research.

	ICF Short list for acute care	ICF Short list for post-acute care
Importance of adopting ICF in clinical practice	100%	100%
Functionality data generation	100%	100%
Definition of the objectives of the treatment and evaluation of the results	100%	100%
Standardization of language	100%	100%
Applicability of the core sets in clinical practice		
Not applicable	0%	0%
Rarely applicable	0%	0%
Reasonably applicable	23.1%	9.1%
Very applicable	57.7%	63.6%
Fully applicable	19.2%	27.3%

we chose not to include new participants in each round, as this could have modified the results. Nevertheless, we must consider this low response rate as a potential limitation of our findings.

The use of purposive sampling was justified because the aim of this study was to involve professionals who work with inpatient care in acute and/or post-acute settings. With the aim of involving a representative sample of specialists, we establish partnerships with associations and groups of known hospitals that the researchers had contact with.[19] A limitation of our study is that although much care was taken in selecting the invited physical therapists, partnering with ASSOBRAFIR, and participating with a wide range of institutions, it was not defined a more rigorous criterion to be considered an expert (i.e., authors of articles). Specialization is not a legal requirement for a physical therapist to work in a hospital, but in the southeast region of Brazil, it is usually requested. Considering that more than 70% of the sample came from this region, all physical therapists would meet this criteria and so cannot be conclusively considered as a population of generalists nor highly specialists. Some regions in the country were not significantly represented, which should be considered when generalizing the results. Nevertheless, the sample has the potential to define a consensus among physical therapists since more than half of registered physical therapists reside in southeast region.[10]

Other limitation is that most of the professionals that participated in the study were from the cardiorespiratory physical therapy area. This reflects a particularity of the Brazilian reality, where cardiorespiratory physical therapy is a growing and regulated field of work in hospitals.[20,21] Most physical therapists working in general hospitals are from this specialty. Although professionals of this specialty are competent in performing physical and kinesio-functional evaluations of the cardiorespiratory and neuro-musculoskeletal system,[20] this background could have influenced the results since more specific neurological or musculoskeletal aspects may have been undervalued. For example, categories *b750 Motor reflex functions, s110 Structure of brain*, and other categories, which are important in the area of neurology, were not included in the acute and post-acute care short lists. However, previous studies have found that there are categories common to all three diagnostic areas, which supports the concept of developing a list of relevant categories for physical therapists complemented by lists of categories specific for musculoskeletal, neurological, and cardiopulmonary conditions.[14] Since the use of the pre-established lists do not prevent the inclusion of additional categories, special cases can be treated with these inclusions.[22] This encourages greater familiarization and adherence of users without the difficulty of having a large set of instruments to use and manage.[11,22]

Regarding the external validity of this study, there are also some limitations that require special attention. In previous studies, open-ended questionnaires were used in the first round to identify the problems and then later code the responses into categories according ICF linking rules.[14,17,18] This study used preselected categories that had been suggested by several authors.[16] The availability of preliminary literature contributed to the feasibility of our study.[14,17] A

limitation was that aspects that could have been identified may not have been considered since the questionnaires did not allow suggestions. Besides that, health professionals having less familiarity with the ICF would have greater difficulty to understand the categories. Previous studies showed that professionals, with different levels of familiarity with ICF, are able to identify ICF components as they are relatively well-known to clinicians.[23]

The results have to be viewed with caution and need to be validated in the future. The composition of different physical therapy specialties, as well as the sample size, has to be taken into account when generalizing the results. Further studies with a more diversified participation of other specialties of physical therapists on the application of the short lists identified in this study will provide information on any significant gaps and examine which aspects of functioning included in these lists will be more frequently used at admission, discharge, and follow-up during hospital stay.[12] Validation processes have been developed in multi-center studies where the prevalence of disabilities, limitations or restrictions, and tendency to changes in different assessment times are observed.[4] More specialized services, such as stroke units, may have to check the validity of these developed lists and adapt them to their needs. Future studies should consider patients' perspectives to the development of the short lists.[4] Although this study focuses the use of the ICF by physical therapists, it is essential to keep in mind the importance of multidisciplinary communication, aligning the overall goals of treatment and not just rehabilitation.

ICF Core Sets, sets of categories of the ICF, intended to be use by physicians, nurses, therapists and other health professionals working in the Brazilian hospitals should be developed and validated in a formal decision-making and consensus process.

An electronic tool was developed and is available online (www.cifisiohospitalar.com.br). This tool includes a proposition for operationalizing the qualifiers[3] and allows for the creation of an electronic document after its completion that generates a functional profile[24] where the goals for intervention and treatment can be defined. The lack of a standardized use of qualifiers and the time required to document findings have been identified as barriers to implementing the ICF in the clinical practice.[24] The development of an electronic tool with the short lists can contribute to a decrease in the time needed to register information and enable the input of information to a database.[24] This electronic tool allows useful information for clinical practice to be registered and needs future development and analysis.

Conclusions

This study supports the adoption of the ICF by physical therapists in hospitals. The short lists developed are considered to be extremely applicable by the majority of participants. By classifying the relevant domains as the functions and structures of the body, activities and social participation, and environmental factors in a qualitative, quantitative, universal, and standardized manner, this research enables the assessment of the degree of complexity of a treatment and the definition of strategies that are aimed at improving functional status upon discharge.

Conflicts of interest

The authors declare no conflicts of interest.

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