The ICF comprehensively covers the spectrum of health problems encountered by health professionals in patients with musculoskeletal conditions

M. Weigl, A. Cieza, N. Kostanjsek, M. Kirschneck and G. Stucki

Objectives. The objective of this study was to investigate, whether the International Classification of Functioning, Disability and Health (ICF) comprehensively covers the spectrum of health problems encountered by medical doctors and physiotherapists in patients with musculoskeletal conditions.

Methods. A worldwide e-mail survey with questionnaires that requested lists of relevant areas in the ICF components—body functions, body structures, activities and participation, and environmental factors—in patients with rheumatoid arthritis, osteoarthritis, low back pain and osteoporosis was conducted. The suitability of linking the named concepts to the ICF as well as the precision of the linking was characterized by assigning the concepts to six groups.

Results. All concepts that were named by the experts could be linked to the ICF, with the exception of personal factors. Between 32% (environmental factors) and 51% (activities and participation) of the named concepts were linked to an ICF category with an identical meaning and the same grade of precision. All other named concepts were linked to ICF categories with a lower level of precision, or encompassed more than one ICF category, or were linked to an ICF category with a related, but not identical meaning.

Conclusions. The ICF covers comprehensively the spectrum of problems encountered in patients with musculoskeletal conditions by clinical experts throughout the world. This strengthens the validity of the ICF in the view of the users and will encourage the use of ICF-based applications such as the ICF checklist and the now-developed ICF Core Sets.

KEY WORDS: Outcome assessment (health care), Activities of daily living, Rehabilitation, Musculoskeletal diseases, ICF.

Introduction

The importance to address the patients’ perspective and the patients’ experience of functioning, disability and health associated with a health condition is now commonly accepted. Condition-specific health-status measures that were primarily developed to assess the effectiveness of drug interventions tend to cover primarily physical functional ability and assess specific aspects most strongly associated with a determined condition [1]. Instead, in rehabilitation, a comprehensive assessment and description of the patients’ experience within the context of personal and environmental factors forms the basis for a patient-oriented and efficient intervention.

Therefore, concepts and measures used in rehabilitation should address all aspects encountered and considered important by health professionals caring for patients with musculoskeletal conditions. The first framework by the WHO, the International Classification of Impairments, Disability and Handicap (ICIDH), has stimulated discussions of disability concepts and has been the basis for legislation in many countries. However, it was only approved by the World Health Assembly for field trial purposes and the classification was rarely used in clinical medicine. The current framework of disability—the WHO International Classification of Functioning, Disability and Health (ICF)—has addressed many of the criticisms of prior conceptual frameworks, and it has been developed in a global comprehensive consensus process [2]. Also, it is the first international classification of functioning, disability and health approved by the World Health Assembly (in May 2001).

The ICF components, namely, body functions, body structures, and activities, and participation are complemented by the components’ environmental factors and personal factors reflecting that human beings and, consequently, their level of functioning and disability are to be seen in interaction with their context. The ICF-model, which represents a bio–psycho–social perspective, shows the interactions between the ICF components (Fig. 1). The ICF is likely to become the generally accepted conceptual framework to describe persons’ level of function and health in rehabilitation.

However, the success of the ICF will depend on several factors [3]. Among many considerations, the comprehensiveness of the ICF in covering relevant domains encountered in patients in need of rehabilitation and its feasibility will be critical [4]. Currently, there are only a few studies that evaluate the comprehensiveness of the ICF. In a formal workshop testing the comprehensiveness of the ICF Checklist, a short version of the ICF, experts from three societies for physical medicine and rehabilitation of Germany, Austria and Switzerland did not identify any missing domains for the three examined indicator conditions—stroke, back pain and
The ICF has two parts [2]. Part 1 of the ICF covers functioning and disability and includes the components body functions (b), body structures (s) and activities and participation (d). Part 2 covers contextual factors and includes the components environmental factors (e) and personal factors. ICF categories are ‘nested’ so that broader categories are defined to include more detailed subcategories of the parent categories. The full version extends to four levels. The ICF uses an alphanumeric system in which letters b, s, d and e are used to denote body functions, body structures, activities and participation and environmental factors, respectively. These letters are followed by a numeric code that starts with a chapter number (one digit), followed by a second level (two digits), and third and forth levels (one digit each). The different levels of the ICF are displayed in Fig. 2. For example, the classification body functions contains the following codes:

- b2 sensory functions and pain
- b280 sensation of pain
- b2801 pain in body part
- b28015 pain in lower limb

Personal factors are not coded in the present version of the ICF.

Methods

Study design

A consensus-building, three-round, e-mail survey with clinical experts in the field of musculoskeletal conditions using the Delphi technique was conducted [8–10]. For the purpose of investigating the comprehensiveness of the ICF, the first round was evaluated. The consensus results of the three-round Delphi survey have been reported elsewhere [11].

International classification of functioning, disability and health (ICF)

The ICF has two parts [2]. Part 1 of the ICF covers functioning and disability and includes the components body functions (b), body structures (s) and activities and participation (d). Part 2 covers contextual factors and includes the components environmental factors (e) and personal factors. ICF categories are ‘nested’ so that broader categories are defined to include more detailed subcategories of the parent categories. The full version extends to four levels. The ICF uses an alphanumeric system in which letters b, s, d and e are used to denote body functions, body structures, activities and participation and environmental factors, respectively. These letters are followed by a numeric code that starts with a chapter number (one digit), followed by a second level (two digits), and third and forth levels (one digit each). The different levels of the ICF are displayed in Fig. 2. For example, the classification body functions contains the following codes:

- b2 sensory functions and pain
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Personal factors are not coded in the present version of the ICF.

Recruitment of participants

Since the ICF was developed to facilitate communication between different groups of people and to be used globally, the aim was to include physicians with different specializations as well as physiotherapists from all over the world with expertise in the treatment of musculoskeletal health conditions. In a first step, international societies in the fields of LBP, OP, RA and OA were identified. In a second step, representatives from the identified organizations, as well as from partner organizations in this project [Swiss Society for Rehabilitation Sciences (DGRW); German, Swiss and Austrian Societies of Physical Medicine and Rehabilitation; International Society of Physical Medicine and Rehabilitation (ISPRM); Swiss Association of Physiotherapy; and World Health Organization] were contacted and asked to name experts for each health condition.

Data collection and measures

Open-ended, self-developed condition-specific questionnaires and information letters were sent by e-mail to all identified experts. The questionnaires request lists of relevant and/or typical areas in the ICF components—body functions, body structures, activities and participation and environmental factors. In addition, the participants were asked for their country of origin, their profession and their familiarity with the ICF. The questionnaires were adapted for each health condition. To illustrate the procedure, a portion of the questionnaire for experts in LBP is shown in Fig. 3.

The information letter included background information, a description of the objective of the project and instructions for the participants with a detailed time line. To clarify which kind of information was requested, an example containing a list of relevant and/or typical body functions, body structures, activities and participation and environmental factors for patients with Parkinson’s disease was provided. The participants had 3 weeks to respond, and reminders were sent out ~2 days before the deadline. The experts were not aware of the other participants in the survey.

Linking of body functions, body structures, activities and participation, and environmental factors to the ICF

The linkage was performed separately by two trained health professionals on the basis of 10 linking rules that have been developed to link health-status measures to the ICF [12]. The linking rules were adapted for the linkage of responses of experts to the ICF and to thereafter analyse the precision of the linkage. The most important linking rules are listed below:

1. Each concept contained in the experts’ responses should be identified and linked to the most precise ICF category.
2. If concepts refer to more than one ICF category, then all the ICF categories to which the concepts refer should be linked. For example, the environmental factor ‘family’ was linked to the ICF categories e310 immediate family and e315 extended family.
Consensus between health professionals was used to decide which ICF category should be linked to each answer. To resolve disagreements between the two health professionals concerning the selected categories, a third person trained in the linking rules was consulted. In a discussion led by the third person, the two health professionals who had linked the answers stated their pros and cons for the linking of the answer in question to a specific ICF category. Based on these statements, the third person made an informed decision. One of the three health professionals involved was always a psychologist, one was a medical doctor with specialization in Physical Medicine and Rehabilitation and the third one was a psychologist, a medical doctor or a physiotherapist. The linkage process was conducted in English.

**Analyses**

Descriptive statistics were used to analyse the response rates and the personal characteristics of the participants. The representation of the experts’ opinions in the ICF was studied putting the data for all four health conditions together. Then, the suitability of linking the named concepts to the ICF as well as the precision of the linking was characterized by assigning the concepts to the following six groups:

1. ‘Not represented’: the concept was not represented in the ICF.
2. ‘Identical’: the concept was linked to an ICF category with an identical meaning and the same grade of precision.

![The different levels of the ICF](image)

**Fig. 2.** The different levels of the ICF. The ICF uses an alphanumeric system in which letters *b*, *s*, *d* and *e* are used to denote *body functions*, *body structures*, *activities and participation*, and *environmental factors*, respectively. These letters are followed by a numeric code that starts with a chapter number (one digit), followed by a second level (two digit), and third and forth levels (one digit for each).

<table>
<thead>
<tr>
<th>Please list in the following cells the functional areas of the body that are relevant and/or typical for patients with LBP</th>
<th>Please list in the following cells structural areas of the body that are relevant and/or typical for patients with LBP</th>
<th>Please list in the following cells the activities of daily living and life situations that are relevant and/or typical for patients with LBP</th>
<th>Please list in the following cells factors of the environment that are relevant and/or typical supports or barriers for patients with LBP</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Table" /></td>
<td><img src="image" alt="Table" /></td>
<td><img src="image" alt="Table" /></td>
<td><img src="image" alt="Table" /></td>
</tr>
</tbody>
</table>

**Fig. 3.** Fraction of the LBP-specific questionnaire.
Table 1. Examples for the precision of the linking of named health domains to the ICF

<table>
<thead>
<tr>
<th>Precision of the linkage</th>
<th>Original response from the expert</th>
<th>First possible ICF category</th>
<th>Second possible ICF category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identical*</td>
<td>Muscle endurance</td>
<td>b740 muscle endurance function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ability to squat</td>
<td>d4101 squatting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cardiovascular system</td>
<td>s410 structure of cardiovascular system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Climate</td>
<td>e225 climate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pain in the hip</td>
<td>h28016 pain in joints</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Climbing stairs</td>
<td>d4551 climbing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Back muscles</td>
<td>s7601 muscles of trunk</td>
<td></td>
</tr>
<tr>
<td>ICF less precise†</td>
<td>Attitudes of doctors</td>
<td>e450 individual attitudes of health professionals</td>
<td></td>
</tr>
<tr>
<td>ICF other level†</td>
<td>Extremities</td>
<td>s750 structure of lower extremity</td>
<td>s730 structure of upper extremity</td>
</tr>
<tr>
<td></td>
<td>Family</td>
<td>e310 immediate family</td>
<td>e315 extended family</td>
</tr>
<tr>
<td></td>
<td>Movement functions</td>
<td>h570–h578 movement functions</td>
<td>d5403 taking off foot wear</td>
</tr>
<tr>
<td></td>
<td>Dressing (shoes and socks)</td>
<td>d5402 putting on footwear</td>
<td>e155 design, construction and building products and technology of buildings for public use</td>
</tr>
<tr>
<td></td>
<td>Stairs, elevator and ramps</td>
<td>e150 design, construction and building products and technology of buildings for public use</td>
<td></td>
</tr>
</tbody>
</table>

*The participants’ concept was linked to an ICF category with an identical meaning and the same grade of precision.
†The participants’ concept was linked to an ICF category with less precision.
‡The participants’ concept encompassed more than one ICF category, but was more precise than the next corresponding ICF category on the next higher level of the ICF.

Table 2. Complete list of body functions, body structures, activities and participations, and environmental factors that could be linked to similar, but not identical ICF categories

<table>
<thead>
<tr>
<th>Areas named by experts</th>
<th>Similar ICF category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>b710 mobility of joint functions</td>
</tr>
<tr>
<td>Raising arms</td>
<td>b7101 mobility of several joints</td>
</tr>
<tr>
<td>Bone metabolism</td>
<td>b729 functions of the joints and bones, other specified and unspecified</td>
</tr>
<tr>
<td>Stiffness</td>
<td>b710 mobility of joint functions or b7800 sensation of muscle stiffness</td>
</tr>
<tr>
<td>Morning stiffness</td>
<td>b710 mobility of joint functions or b7800 sensation of muscle stiffness</td>
</tr>
<tr>
<td>Stiffness in the back</td>
<td>b710 mobility of joint functions or b7800 sensation of muscle stiffness</td>
</tr>
<tr>
<td>Body structures</td>
<td>s898 skin and related structures, other specified</td>
</tr>
<tr>
<td>Connective tissues</td>
<td>s898 skin and related structures, other specified</td>
</tr>
<tr>
<td>Mucous membrane</td>
<td></td>
</tr>
<tr>
<td>Activities and participation</td>
<td></td>
</tr>
<tr>
<td>Grooming</td>
<td></td>
</tr>
<tr>
<td>Opening doors</td>
<td>d5202 caring for hair</td>
</tr>
<tr>
<td>Environmental factors</td>
<td>d4453 turning or twisting the hands or arms</td>
</tr>
<tr>
<td>Access to nature</td>
<td></td>
</tr>
<tr>
<td>Services, systems and policies for the provision of consumer goods</td>
<td>e210 physical geography</td>
</tr>
</tbody>
</table>

(3) ‘ICF less precise’: the concept was linked to an ICF category that encompassed the same concept, but the ICF category was less specific, e.g. ‘pain in the hip’ was linked to the ICF category h28016 pain in joints.

(4) ‘ICF other level’: the concept encompassed more than one ICF category of the second, third or fourth ICF level, but was more specific than the corresponding category on the next higher level of the ICF, e.g. the body structure ‘gastro-intestinal tract’ was linked to the three ICF categories s520 structure of esophagus, s530 structure of stomach and s540 structure of intestine. The next corresponding ICF category on the next higher level would be s5 structures related to the digestive, metabolic and endocrine system.

(5) ‘ICF similar’: the concept was linked to an ICF category with a related meaning, but the ICF did not include a category with an identical concept. e.g. ‘morning stiffness’ was linked to b7800 sensation of muscle stiffness, although morning stiffness includes stiffness that is related to other structures than muscles.

(6) Personal factors: concepts belonging to the component personal factors that has not been classified yet. Personal factors are the particular background of an individual’s life and living, and comprise features of the individual that are not part of a health condition or health states. These factors may include gender, race, age, other health conditions, fitness, lifestyle, habits, upbringing, coping styles, social background, education, profession, past and current experience (past life events and concurrent events), overall behaviour pattern and character style, individual psychological assets and other characteristics, all or any of which may play a role in disability at any level [2].

Examples of the assignment of the linkage precision to the groups 2–4 are presented in Table 1. Table 2 shows all constructs that could not be linked to an ICF category that comprised the named concept, but were linked to an ICF category with a related concept.

Finally, it was calculated how frequent concepts were assigned to each of the six groups.

Results

Participants and response rates

A total of 84 experts from 21 countries responded. Table 3 shows the response rates, the regions of origin of participants,
the participants’ professions, their median years of clinical experience and their familiarity with the ICF.

The comparison of the response rates of physiotherapists with that of physicians showed higher response rates in the group of physiotherapists in the health conditions OA (88 vs 39%), OP (50 vs 30%) and LBP (67 vs 61%), but a lower response rate in RA (33 vs 37%).

**Representation of the expert opinion in the ICF**

The participants named 108 different body functions, 134 body structures, 155 activities and participations, and 200 environmental factors. A total of 67 named concepts were categorized as personal factors.

Table 4 displays the representation of the experts’ opinion in the ICF and the precision of the linkage. No concept was assigned to the group ‘not represented in the ICF’. That means all concepts, except the personal factors, could be linked to the ICF.

Approximately half of the named concepts in the components body functions, body structures and activities and participation were linked to an ICF category with an identical meaning and the same grade of precision. From the named environmental factors, 32% were linked to an identical ICF category.

Approximately 40% of the named concepts in the components body function, body structure and activity and participation, and 59% of the environmental factors were linked to an ICF category that comprised the named concept, but was less precise.

Between 5 and 12% of the named concepts, depending on the component, encompassed more than one ICF category, but were more precise than the next higher level of the ICF. Some of these concepts could not be linked to an ICF category with the same level of precision, because the ICF had other accents than the concepts named by the experts. For example, the second-level ICF categories ‘e150 design, construction and building products for public use’ and ‘e155 design, construction and building products and technology of buildings for private use’ in the component environmental factors accentuate the purpose of the building (‘public use or private use’), but the experts emphasized the different types of technology of the
building: ‘stairs, elevator, ramps’. Therefore, the experts’ concept was covered by the ICF, but it was not possible to link it precisely to any ICF category.

Six percent of the body functions and every 1% of body functions, body structures and activity and participation could not be linked to an ICF category that comprised the named concept, but were linked to an ICF category with a related concept. The linkage of these concepts is presented in Table 4.

Discussion

The ICF comprehensively covers the spectrum of problems encountered in patients with musculoskeletal conditions by experts throughout the world. In this expert survey, all body functions, body structures, activities and participations, and environmental factors that were encountered as relevant for patients with musculoskeletal diseases could be linked to the ICF.

The concepts that were named by the experts were frequently more precise than the corresponding ICF category. In particular, the ICF category b2800 sensation of pain was assigned to a substantial number of narrower descriptors of pain. Some experts named detailed concepts of triggers for pain, e.g. ‘pain on movement’ or ‘pain on standing’. The description of triggers for pain provides additional information about the grade of impairment by pain, but it is also important for the evaluation of the causation of pain. Other experts named precise body structures that are painful, e.g. ‘pain in hip’, but the most precise ICF category is b28016 pain in joints.

Only a few concepts that were considered relevant for patients with musculoskeletal diseases in the opinions of clinical experts could not be linked to ICF categories that encompassed these concepts (Table 2). However, all these concepts could be linked to ICF categories that categorize concepts similar to the named concept. In the component body functions, the experts did name complex functions that are not coded in the ICF, but that are composed of functions that are coded in the ICF. For example, the complex function ‘raising arms’ is related to b7102 mobility of several joints and 730 muscle power functions, and the function ‘flexibility’ is related to b710 mobility of joints and b735 muscle tone functions.

It is important to separate the assessment of disease and disability dimensions, and to utilize these constructs jointly using both the International Classification of Diseases (ICD) and the ICF classification. ICF analyses the functioning in relation to a health condition in terms of: (1) body functions and body structures; (2) activities of the person and participation of the person in the society and (3) contextual factors such as the environmental factors and the personal factors. The separation of signs and symptoms that are associated with a specific disease and consequences that may result from various health conditions and its interactions with contextual factors permits better understanding of the disease pathophysiology on the one hand and the consequences (e.g. its impact at the body, person and person-in-context levels) on the other.

The clinical symptom ‘morning stiffness’, which is an important symptom in patients with musculoskeletal diseases and one of the American College of Rheumatology (ACR) criteria for defining OA [13], is neither explicitly named in the ICD-10 nor in the ICF. If morning stiffness is considered as a clinical symptom that refers to the pathophysiology of the disease, it could be coded with the ICD code M25.6 stiffness of joints. If morning stiffness is considered as an impairment of the body function, it could be linked to the ICF category b710 mobility of joint functions or b7800 muscle stiffness depending on the structures that cause the morning stiffness. However, it is important to recognize that it is not in the scope of a universal classification like ICD or ICF to provide the level of granularity, which is characteristic for diagnostic symptoms like morning stiffness; rather, it is the task of clinical terminologies or adaptation of the classification for clinical practice to list these symptoms.

In this survey, the experts named 63 different personal factors, although we did not explicitly ask for personal factors. This underscores the importance of personal factors in the experts’ opinion. Frequently named personal factors were education status, profession, comorbidities, lifestyle, fitness and coping style. We recommend that in the development of future revisions of the ICF coding personal factors should be considered.

Response rates ranging from 33% in OP experts to 62% in LBP have to be considered low. It is difficult to know why non-responders do not participate in an e-mail survey. However, the most plausible reason in this study seems to be the time required to read all the information sent and to answer the questionnaires. Although special care was taken to keep the information for the participants as concise as possible, to be able to answer the e-mail survey they still had to read one page of general information about the project, one page with instructions on their task, and one page containing examples of relevant health areas in patients with Parkinson’s disease, and then fill in the questionnaire. It can be assumed that the requested task was more time consuming for experts without prior knowledge of the ICF and could have led to a selection of experts with prior knowledge on the ICF. We know that in the group of responders, 44% of the experts were familiar with the ICF. Unfortunately, we do not know how many non-responders were familiar with the ICF before the survey. Prior knowledge of the ICF could have introduced bias in the direction of overestimation of the comprehensiveness of the ICF, especially if experts selected relevant ICF categories from the ICF itself.

The response rate was higher in the group of physiotherapists than in the group of physicians. However, this result has to be considered carefully since the total number of physiotherapists contacted and requested to participate in the survey was relatively small compared with the group of physicians. The reason why fewer physiotherapists than physicians were contacted in the survey is exclusively the lack of contact e-mail addresses of physiotherapists specialized in one of the musculoskeletal health conditions under consideration. This under-representation of physiotherapists compared with physicians can be considered a limitation of the present study.

A further limitation is the relatively small total number of experts, in particular in OP and RA. This might have decreased the chance to detect missing categories of the ICF. The missing of psychologists in the LBP survey may overestimate the comprehensiveness of psychological categories. We tried to recruit experts from different continents and different cultures, but the majority of experts came from West Europe. In the RA and LBP surveys, experts from South America were missing, and in the OP and LBP surveys no experts from East Europe responded. This reduces the generalizability of the results to other cultures.

The responses of the experts in this survey suggest that in clinical practice the description of the functioning of a patient by ICF categories needs to be complemented by information that is specific to a disease or a clinical setting. This is in line with recent experiences in a joint project of the Department of Physical Medicine and Rehabilitation at the Ludwig Maximilians University in Munich, Germany, the Department of Rheumatology and Rehabilitation at the Bethesda-Spital in Basel and the rehabilitation clinic in Adelheid, Unteragri (Switzerland) that aims to implement the ICF in the rehabilitation process. In this project, physicians and allied health professionals use the ICF model and the ICF for the assessment of patients at the beginning of the rehabilitation programme, for the assignment to specific interventions, for the execution of interventions and for the evaluation of rehabilitation programmes [14]. In the assessment, it was considered necessary to add more precise information to the ICF categories that comprise the main problems of the patients to allow their assignment to specific interventions. Frequently, the health professionals described the regions of impaired body functions in much detail than the corresponding ICF category (i.e. hypomobility of the upper ankle joint: b7100 mobility of a single joint; muscle power
left quadriceps muscles: b7301 power of muscles of one limb). Other examples for more precise descriptions by the health professionals compared with ICF categories were hyperaesthesia (b2702 sensitivity to pressure), driving a bicycle (d4750 driving human powered transportation) or stairs inside the private house (e1551 design, construction and building products and technology for gaining access to facilities in buildings for private use). In this context, it should be considered that the ICF is a reference classification to be used in all health-care situations and in all regions of the world. In clinical settings, the ICF can be recommended as the basis for a standardized and patient-oriented description of the functioning of a patient, but additional more precise information that is specific to the health condition, setting or to the specific patient needs to be added.

There are several benefits of the implementation of the ICF in clinical settings and in research [15] that deserve mention. The ICF can be used as a reference for standardized multidisciplinary documentation of functioning and disability of a patient based on history, examination and analysis. Most importantly, the ICF provides a common standardized language for health professionals, like physicians, physiotherapists, occupational therapists, psychologists and nurses. The ICF promotes patient-oriented goal setting and treatment and not just a disease-oriented treatment. In research, the ICF can serve as a reference for the content comparison of outcome measures and thereby facilitate the selection of the most appropriate measure to efficiently cover the required categories of functioning in clinical practice or in studies [1, 16–18]. The ICF can be used to understand the literature in relation to functioning and disability, to compare what domains of functioning and disability and health have been investigated in clinical studies and to plan studies focusing on functioning and disability [19]. The ICF model can also be used in teaching for a common understanding of functioning and disability, especially because it shows that disability is a process and not a state or only a consequence of disease.

We conclude that the ICF comprehensively covers the spectrum of problems clinical experts throughout the world encounter in patients with musculoskeletal conditions. In clinical settings, the ICF or ICF-based applications can be recommended as the basis for a multidisciplinary description of the functioning of a patient, but some ICF categories may need to be complemented by information that is specific to a determined health condition, a clinical setting or an individual patient. This study strengthens the validity of the ICF in the view of the users and will encourage the use of ICF-based applications, such as the ICF Checklist [5] and the new developed ICF Core Sets [20–23].

### Key messages

**Rheumatology**

- The ICF covers comprehensively the spectrum of problems encountered in patients with musculoskeletal conditions by clinical experts throughout the world.
- In daily clinical practice, additional information needs to be added to some ICF categories to improve the precision of the description of a specific patient.

### Acknowledgements

We express our thank to the participants of the Delphi exercise for their most valuable contribution and the time they have devoted to respond to the demanding questionnaires (in alphabetical order, sorted by health condition):


### References


