EXTENDED REPORT

Are they relevant? A critical evaluation of the international classification of functioning, disability, and health core sets for osteoarthritis from the perspective of patients with knee osteoarthritis in Singapore

F Xie, J Thumboo, K-Y Fong, N-N Lo, S-J Yeo, K-Y Yang, S-C Li

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See end of article for authors' affiliations

Correspondence to:
Dr Shu-Chuen Li,
Department of Pharmacy,
National University of
Singapore, 18 Science
Drive 4, Singapore
117543; phalisc@nus.edu.sg

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Objectives: To determine the extent to which health items identified from the perspective of patients with knee osteoarthritis can be linked with the International Classification of Functioning, Disability and Health (ICF); and to evaluate critically the content validity of ICF comprehensive and brief core sets for osteoarthritis.

Methods: Items identified from a focus group study were linked independently by two researchers based on the 10 a priori linking rules. Both percentage agreement and κ statistics were calculated to measure interobserver agreement. Any disagreements were resolved by reaching a consensus among the researchers. The categories linked with all items were compared with the comprehensive core set, while the categories linked with those items reported as important by over 30% of subjects within each of three local ethnic groups (Chinese, Malay, and Indian) were compared with the brief core set. Both comparisons were made only at the second level of the ICF.

Results: In all, 74 items were linked with 44 different ICF categories through 105 linkages with generally good interobserver agreement. The 69 items were linked with the ICF at the third or fourth levels. Both commonalities and disparities were found through comparison between the categories linked with these items and both core sets.

Conclusions: All items could be successfully linked with the ICF. The comprehensive core set showed good content validity, while the brief core set needs to be supported by more empirical evidence in various sociocultural contexts. This study specifically complemented the development and refinement of both core sets from the perspective of patients with knee osteoarthritis.

Osteoarthritis is one of the commonest chronic diseases and imposes a significant burden on both individuals and society as a whole.¹ Thus, many health status measures are available to assess the impact of the disease, either generically or specifically.² These measures were developed in different sociocultural backgrounds and vary in the breadth and depth of health domains and items covered. However, it has been recognised that the importance of these domains and items varies with the sociocultural context.³ There remains a need to map the impact of osteoarthritis in different contexts on a common rubric or framework, to facilitate our understanding of the impact of this disease worldwide.

The International Classification of Functioning, Disability and Health (ICF), approved by the World Health Organisation (WHO) in 2001, is one such globally agreed framework and standard classification system for multi-dimensional health related domains with quantifiable assessments.⁴ These domains consist of body functions, body structure, activities and participation, and environmental factors, which cover different perspectives including biological, individual, and societal. Thus this classification system has been applied to many sectors such as clinical research⁵ and policy management.^{7–8} As the ICF aims to describe the health states of all people irrespective of kinds and levels of their health conditions (that is, no separate group for physical and mental conditions, or disabled and non-disabled

populations), it can be used as a cardinal reference for existing health status measures and thus allows comparison and evaluation of the performance of these measures across studies, across diseases, and across countries, provided that these measurements can be successfully linked with the ICF.⁴

As the ICF tends to cover a wide range of information on health and health related states, it has to be tailored to use for a specific condition, a process which involves the use of ICF comprehensive and brief core sets.⁹ Recently, a series of ICF core sets was identified to characterise the specific problems encountered by patients with 12 chronic diseases, including osteoarthritis.¹⁰ The ICF comprehensive core set for a specific condition is a list of ICF categories that depict the typical spectrum of problems in functioning of patients with that condition, while the ICF brief core set is a list of ICF categories that are as short as possible and are reported in every clinical study to describe the burden of that condition in a comparable way across studies.¹⁰ These ICF core sets were identified through a formal decision making and consensus process integrating evidence from Delphi exercise with experts,¹¹ systematic review of clinical trials representing the view of researchers,¹² and empirical data from patients using the ICF checklist.^{6–13} There are several concerns regarding the methods used to derive these core sets. First,

Abbreviations: ICF, International Classification of Functioning, Disability and Health

information obtained from the perspective of patients was limited by using structured questions based on the ICF itself.¹³ It is likely that some problems of importance to patients might be omitted if these were not covered in the ICF checklist, while some less important problems may be included in these core sets. Second, the representativeness of patients in the empirical studies might be limited as all of them were recruited from western Europe.^{6, 13} Thus it highlights the need to evaluate the ICF core sets from the perspective of patients in various sociocultural contexts by using open ended questions to allow patients ample opportunity to share their ideas without any outside influences and constraints.

The issues of which specific items should be used to measure the impact of osteoarthritis on patients and the methodological concerns regarding derivation of the ICF core sets need to be resolved before they can be more widely used. We addressed these issues using data from a qualitative focus group study in patients with knee osteoarthritis. This focus group study identified a pool of items of importance for patients from three major ethnic groups (Chinese, Malays, and Indians) sharing a common sociocultural context in Singapore, which allowed for subsequent critical evaluation of the ICF core sets in an Eastern sociocultural context. Specifically, we aimed to link each item with the ICF based on a priori linking rules, to determine the extent to which these items can be linked with the ICF; and to evaluate critically the content validity of the ICF comprehensive and brief core sets for osteoarthritis.

METHODS

We conducted a qualitative focus group study among Singaporean patients with knee osteoarthritis.

Patients

Subjects were recruited from databases maintained by the Departments of Rheumatology and Immunology and Orthopaedic Surgery in the Singapore General Hospital, a tertiary referral hospital in Singapore. All subjects were diagnosed with knee osteoarthritis by their attending rheumatologist or orthopaedic surgeon, based on clinical and radiographic features, and had not undergone knee surgery at the time of focus group attendance. Written informed consent was obtained from participating subjects for this institutional review board approved study.

Sample size

We planned the number and composition of focus groups in this study based on sex, ethnicity, and language spoken. Ideally, there would be thus four focus groups for each ethnic group (English speaking men and women, and native language speaking men and women). We were able to conduct these planned focus groups with the exception of those for Malay and Indian men, because we could not identify a large enough number of Malay and Indian men with knee osteoarthritis despite intensive efforts. We also limited the group size to between three and six subjects in order to allow each subject ample opportunity to share their ideas while allowing a diversity of opinions.¹⁴

Focus group discussion

We followed the focus group procedure recommended by Kreuger.¹⁴ One experienced moderator who was fluent in the language in which the focus group was conducted led each focus group, with the assistance of two note takers. An open ended question was asked: "What are the most important ways osteoarthritis has affected your life in your own experience?" In each focus group, the moderator repeatedly emphasised that the topic of the discussion was the impact of

osteoarthritis per se. Each focus group lasted approximately two hours. All focus groups were audio taped and transcribed verbatim, with subsequent translation into English for groups conducted in Chinese, Malay, or Tamil.

Focus group data analysis

Transcripts were analysed, based on the key elements of grounded theory and content analysis^{15, 16} with the assistance of the qualitative software ATLAS/ti 5.0 (Scientific Software Development, Berlin, Germany). Specifically, open coding and axial coding were used to identify items and domains. The theoretical sampling technique was then conducted by comparing items and domains, identifying the gaps among them, and purposely collecting the data from the transcripts to fill in these gaps. This process of data analysis ended when no new data emerged which fitted into the already identified items and domains after serial review of the transcripts (that is, "saturation"). Finally, based on the content analysis, we calculated the percentage of subjects within each ethnic group who indicated that a given item or domain was important.

Linking to the ICF

The ICF consists of four components—namely, body functions (b), body structure (s), activities and participation (d), and environmental factors (e). In the ICF code system, the letters (b, s, d, and e) refer to these corresponding components in this classification system, and are followed by a numerical code starting with the first level (one digit), the second level (two digits), the third level, and the fourth level (one digit each). The description becomes more specific the higher the level. For example, the body functions component contains the following codes with different levels:

- b Body functions (component)
- b2 Sensory functions and pain (level 1)
- b280 Sensation of pain (level 2)
- b2801 Pain in body part (level 3)
- b28011 Pain in chest (level 4)

The items identified from the focus group study were separately linked by two researchers (FX and SCL) who are familiar with the ICF by a self taught curriculum based on the 10 a priori linking rules which have been specifically developed and tested to be reliable.¹⁷ Any disagreements were resolved by reaching a consensus among three researchers (FX, SCL, and JT). The ICF categories linked with the items were compared with the ICF comprehensive core set for osteoarthritis. Those items reported by over 30% of subjects within a given ethnic group were empirically considered as commonly important for patients in that ethnic group; they were thus compared with the ICF brief core set for osteoarthritis. As no published study are available to aid the selection of a cut off point, the value of 30% was specifically chosen by recognising that a higher cut off point (for example, 45%) would generate very few items, which makes the comparison meaningless, while lower cut off point (for example, 20%) would include almost all the items, which would mask the potential ethnic variations. As the core sets for osteoarthritis were developed only at the second level of the ICF, for those categories linked with the items at the third or fourth level the comparisons were made only at the second level to which these categories belong.

Statistical analysis

Percentage agreements between two researchers were calculated for all linkages as a whole, as well as for the linkages made at each level within each component of the ICF. As the percentage agreement cannot measure the magnitude of

Table 1 Linkage between patient reported items and corresponding ICF categories

Domain/items	ICF code and title
Pain (n = 21)	
Every item in this domain	b28016 Pain in joints
Relief of pain	b28016 Pain in joints
Pain when walking	d4509 Walking, unspecified
Pain when going up stairs	d4551 Climbing
Pain when going down stairs	d4551 Climbing
Pain when standing for a long period	d4154 Maintaining a standing position
Pain when walking for a long period	d4508 Walking, other specified
Pain when sitting down for a long period	d4153 Maintaining a sitting position
Pain when carrying heavy things	d4308 Lifting and carrying, other specified
Night pain	b28016 Pain in joints
Pain when rising from sitting or squatting for a long period	d4101 Squatting
	d4103 Sitting
	d4101 Squatting
Pain when squatting down	d4551 Climbing
Pain when getting off a bus	d4502 Walking on different surfaces
Pain when walking on uneven ground	d4508 Walking, other specified
Pain when walking too fast	d4502 Walking on different surfaces
Pain when getting on a bus	b729 Functions of joints and bones, other specified and unspecified
Pain when doing exercises	d4100 Lying down
Pain when standing up immediately after getting up in the morning	d4104 Standing
	d4103 Sitting
Pain when walking immediately after sitting for a long period	d4153 Maintaining a sitting position
	d4509 Walking, unspecified
Pain when bending	d4105 Bending
Pain when kneeling	d4102 Kneeling
Pain when lying down	d4100 Lying down
Problems and difficulties in mobility and self care (n = 26)	
Going down stairs	d4551 Climbing
Squatting down	d4101 Squatting
Going up stairs	d4551 Climbing
Rising from a low chair	d4103 Sitting
Bending	d4105 Bending
Walking	d4509 Walking, unspecified
Standing for a long period	d4154 Maintaining a standing position
Getting off a bus/taxi	d4551 Climbing
Getting on a bus/taxi	d4502 Walking on different surfaces
Carrying heavy things	d4308 Lifting and carrying, other specified
Walking for a long period	d4508 Walking, other specified
Rising from squatting for a long period	d4101 Squatting
	d4151 Maintaining a squatting position
Walking after a period of inactivity	d4158 Maintaining a body position, other specified
	d4509 Walking, unspecified
Need walking aids	e1201 Assistive products and technology for personal indoor and outdoor mobility and transportation
Housekeeping activities	d649 Household tasks, other specified and unspecified
Travelling	d489 Moving around using transportation, other specified and unspecified
Kneeling down	d4102 Kneeling
Sitting for a long period	d4153 Maintaining a sitting position
Sitting on the ground	d4103 Sitting
Doing exercises	b729 Functions of joints and bones, other specified and unspecified
Walking on uneven ground	d4502 Walking on different surfaces
Limitation of mobility	d499 Mobility, unspecified
Catching up with others when walking	d4508 Walking, other specified
Walking too fast	d4508 Walking, other specified
Taking off socks	d5408 Dressing, other specified
Standing on a moving bus	d4154 Maintaining a standing position
	d4702 Using public motorised transportation
Other symptoms of OA (n = 8)	
Clicking when moving knees	b7100 Mobility of a single joint
	s75011 Structure of knee joint
Limping	d4508 Walking, other specified
Swelling	s75011 Structure of knee joint
Cramps	b28015 Pain in lower limb
	b7650 Involuntary contractions of muscles
Stiffness	b7808 Sensations related to muscles and movement functions, other specified
Deformity	s75019 Structure of lower leg, unspecified
Cracking when moving knees	b7100 Mobility of a single joint
	s75011 Structure of knee joint
Hang up when moving knees	b7108 Mobility of joint functions, unspecified
Mental health (n = 14)	
Sad	b1528 Emotional functions, other specified
Afraid of stairs	b1528 Emotional functions, other specified
Fear of falling	b1528 Emotional functions, other specified
Hopeless	b1265 Optimism
Anxious/worried	b1528 Emotional functions, other specified
Depressed	b1528 Emotional functions, other specified
Dependent	d599 Self-care, unspecified
Sleepless	b1348 Sleep functions, other specified
Irritable	b1263 Psychic stability

Table 1 Continued

Domain/items	ICF code and title
Disturbed	b1263 Psychic stability
Frustrated	b1528 Emotional functions, other specified
Lack of self confidence	b1266 Confidence
Reduced concentration	b1400 Sustaining attention
Impact on thinking	b1609 Thought functions, unspecified
Social health (n = 5)	
Impact on religious activities	d9300 Organised religion
Impact on work	d8509 Remunerative employment, unspecified
Impact on relations with friends	d7500 Informal relationships with friends
Complaints from spouse	d7701 Spousal relationships
Complaints from family	e410 Individual attitudes of immediate family members
	d7609 Family relationships, unspecified
	e410 Individual attitudes of immediate family members

ICF: International Classification of Functioning, Disability and Health; OA, osteoarthritis.

Table 2 Degree of interobserver agreement

	Component	1st Level	2nd Level	3rd Level	4th Level
Percentage agreement	95 (105)				
Body functions		100 (42)	88 (42)	78 (40*)	100 (22*)
Body structure		100 (4)	100 (4)	100 (4)	100 (4)
Activities and participation		100 (54†)	95 (54)	96 (49†)	
Environmental factors		100 (3)	100 (3)	100 (3)	
Mean		100	96	94	100
Kappa statistic	0.97 (105)				
Body functions		1.00 (42)	0.83 (42)	0.66 (40*)	1.00 (22*)
Body structure		1.00 (4)	1.00 (4)	1.00 (4)	1.00 (4)
Activities and participation		1.00 (56)	0.93 (54†)	0.96 (49†)	
Environmental factors		1.00 (3)	1.00 (3)	1.00 (3)	
Mean		1.00	0.94	0.91	1.00

The number in parenthesis is the number of linkages made at each level within the corresponding category.

*Two linkages were made only at the second level and 18 only at the third level.

†Two linkages were made differently at the component level and five only at the second level.

agreement exceeding chance level, Cohen's κ statistic was also used to evaluate the chance corrected agreement accordingly.^{18, 19} The κ statistic ranges from -1.0 to 1.0 . Positive values indicate level of agreement higher than expected by chance while negative values demonstrate level of agreement lower than expected by chance¹⁸; κ values of 0.61 to 0.80 have been considered as good levels of agreement, and over 0.81 as almost perfect.¹⁹ Both percentage agreement and the κ statistic at a given level of the ICF were calculated accordingly.

RESULTS

Patients' characteristics

Forty one subjects participated in one of nine focus groups conducted from August to November, 2004. Four groups were conducted in ethnic Chinese (separate groups for English and Chinese speaking men and women), two in ethnic Malay women (separate groups for English and Malay speakers), two in ethnic Indian women (separate groups for English and Tamil speakers), and one in Malay and Indian men (conducted in English). The median number of subjects was four persons per group (range three to six) with a median age of 64 years (range 41 to 84). Most subjects were married (66%), had received between seven and 10 years of education (53%), were retired or as homemakers (76%), and were diagnosed with comorbidities (73%).

The ICF categories linked

Seventy four items identified as important by subjects in the focus group study were linked with 44 different categories of the ICF through a total of 105 linkages (as some items were linked with more than one category). Of the 74 items, five,

43, and 26 were linked at the second, third, and fourth levels, respectively. Of the 26 items linked at the fourth level, 21 were concurrently linked with different categories at the third level and one (pain when doing exercise) with different categories at the second level (table 1).

Details of linkages are shown in table 1 and summarised as follows:

- *Pain*: 21 items were linked with two different categories in body functions and 13 in activities and participation.
- *Problems and difficulties in mobility and self care*: 26 items were linked with 17 different categories in activities and participation and one each in body functions and environmental factors.
- *Other symptoms of osteoarthritis*: eight items were linked with five different categories in body functions, two in body structure, and one in activities and participation.
- *Mental health*: 14 items were linked to seven different categories in body functions and one in activities and participation.
- *Social health*: five items were linked with five different categories in activities and participation and one in environmental factors.

Interobserver agreement of linkage at various ICF levels

For the 105 linkages, the percentage agreement between two researchers exceeded 95% at all levels with the exception of the second and third levels of body function categories, where the agreement was 88% and 78%, respectively (table 2). Similarly, the κ statistic exceeded 0.90 at all levels with the

Table 3 Comparison between second level categories linked with patient reported items and the ICF comprehensive and brief core sets for osteoarthritis

ICF code	Title	Core set for OA		CH* (n = 20)	MA* (n = 10)	IN* (n = 11)	Total† (n = 41)
		Comprehensive	Brief				
	Body functions						
b126	Temperament and personality functions	—	—	—	—	—	+
b130	Energy and drive functions	+	—	—	—	—	—
b134	Sleep functions	+	—	—	—	—	+
b140	Attention functions	—	—	—	—	—	+
b152	Emotional functions	+	—	—	—	+	+
b160	Thought functions	—	—	—	—	—	+
b280	Sensation of pain	+	+	+	+	+	+
b710	Mobility of joint functions	+	+	+	+	—	+
b715	Stability of joint functions	+	—	—	—	—	—
b720	Mobility of bone functions	+	—	—	—	—	—
b729	Functions of joints and bones, other specified and unspecified	—	—	—	—	—	+
b730	Muscle power functions	+	+	—	—	—	—
b735	Muscle tone functions	+	—	—	—	—	—
b740	Muscle endurance functions	+	—	—	—	—	—
b760	Control of voluntary movement functions	+	—	—	—	—	—
b765	Involuntary movement functions	—	—	+	+	—	+
b770	Gait pattern functions	+	—	—	—	—	—
b780	Sensations related to muscles and movement functions	+	—	—	—	+	+
	Body structure						
s720	Structure of shoulder region	+	—	—	—	—	—
s730	Structure of upper extremity	+	+	—	—	—	—
s740	Structure of pelvic region	+	—	—	—	—	—
s750	Structure of lower extremity	+	+	+	+	+	+
s770	Additional musculoskeletal structures related to movement	+	+	—	—	—	—
s799	Structure related to movement, unspecified	+	—	—	—	—	—
	Activities and participation						
d410	Changing basic body function	+	—	+	+	+	+
d415	Maintaining a body position	+	—	+	+	+	+
d430	Lifting and carrying objects	+	—	+	+	+	+
d440	Fine hand use	+	—	—	—	—	—
d445	Hand and arm use	+	+	—	—	—	—
d450	Walking	+	+	+	+	+	+
d455	Moving around	+	—	+	+	+	+
d470	Using transportation	+	—	—	—	—	+
d475	Driving	+	—	—	—	—	—
d489	Moving around using transportation, other specified and unspecified	—	—	—	—	—	+
d499	Mobility, unspecified	—	—	—	—	—	+
d510	Washing oneself	+	—	—	—	—	—
d530	Toileting	+	—	—	—	—	—
d540	Dressing	+	+	—	—	—	+
d599	Self care, unspecified	—	—	—	—	—	+
d620	Acquisition of goods and services	+	—	—	—	—	—
d640	Doing housework	+	—	—	—	—	—
d649	Household tasks, other specified and unspecified	—	—	—	—	—	+
d660	Assisting others	+	—	—	—	—	—
d750	Informal social relationships	—	—	—	—	—	+
d760	Family relationships	—	—	—	—	—	+
d770	Intimate relationships	+	—	—	—	—	+
d850	Remunerative employment	+	—	—	+	—	+
d910	Community life	+	—	—	—	—	—
d920	Recreation and leisure	+	—	—	—	—	—
d930	Religion and spirituality	—	—	—	+	—	+
	Environmental factors						
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	+	—	—	—	—	+
e135	Products and technology for employment	+	—	—	—	—	—
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	+	—	—	—	—	—
e310	Immediate family	+	+	—	—	—	—
e320	Friends	+	—	—	—	—	—
e340	Personal care providers and personal assistants	+	—	—	—	—	—
e355	Health professionals	+	—	—	—	—	—
e410	Individual attitudes of immediate family members	+	—	—	—	—	+
e450	Individual attitudes of health professionals	+	—	—	—	—	—

Table 3 Continued

ICF code	Title	Core set for OA		CH* (n = 20)	MA* (n = 10)	IN* (n = 11)	Total† (n = 41)
		Comprehensive	Brief				
e460	Societal attitudes	+	—	—	—	—	—
e540	Transportation services, systems and policies	+	—	—	—	—	—
e575	General social support services, systems and policies	+	—	—	—	—	—
e580	Health services, systems and policies	+	+	—	—	—	—

CH, Chinese; ICF, International Classification of Functioning, Disability and Health; IN= Indian; MA, Malay; OA, osteoarthritis; +, the ICF codes are included in the corresponding category; —, the ICF codes are not included in the corresponding category.

*Categories reported by over 30% of subjects within the corresponding ethnic group; †categories reported by at least one subject in the focus group study.

exception of the second and third levels of body function categories, where the it was 0.86 and 0.66, respectively.

Comparison with the ICF Comprehensive core set for osteoarthritis

As shown in table 3, of the 29 different second level ICF categories linked with these items, 17 are included in the ICF comprehensive core set,²⁰ of which five are from body functions, one from body structure, nine from activities and participation, and two from environmental factors. In contrast, 12 categories identified as important by patients in the focus group study are not covered by this core set, of which five are from the body functions component (b126, b140, b160, b729, and b765) and seven from the activities and participation component (d489, d499, d599, d649, d750, d760, and d930).

Comparison with the ICF brief core set for osteoarthritis

As shown in table 3, nine second level ICF categories were linked with the items reported as important by over 30% of Chinese subjects who participated in the focus group study, of which only four categories are covered by the brief core set. Similarly, nine second level categories (differing somewhat from those in Chinese) were linked with items reported as important by over 30% of Indian subjects, of which only three are included in the brief core set. In contrast, 11 second level ICF categories were linked with the items reported as important by over 30% of Malay subjects, of which only four are included in the brief core set. Notably, the three items linked with the categories within the component of environmental factors were reported as important by less than 30% of subjects across all three ethnic groups.

DISCUSSION

This study showed that all 74 items reported as important by subjects with knee osteoarthritis in a focus group study could be successfully linked with at least one category of the ICF with generally very good interobserver agreement. The majority of the items (69 of 74) could be linked at the third or fourth levels (that is, highly specific). To the best of our knowledge, this is the first such study in Asia. The findings show that all of the items reported by patients with knee osteoarthritis can be mapped to the standardised, widely accepted rubric of the ICF. This raises the exciting and useful possibility of comparing health related quality of life measures using the ICF as a rubric, especially in situations where different instruments are used in different socio-cultural contexts. Our findings also provide some insight into the ICF core sets for osteoarthritis from the perspective of patients. First, it is of note that the core sets for osteoarthritis did not capture several categories linked with items of importance for one or more ethnic groups in Singapore. A similar finding has recently been reported in a validation study of ICF core set for rheumatoid arthritis.²¹ This is not surprising as most of the experts and all the patients involved

in developing the core sets are from western Europe. Some disparities would be expected between Eastern and Western patients' preference for the ICF core sets owing to geographic and cultural differences, as has been the case with other chronic conditions.¹¹ A good example in this study is that religion and spirituality (d930) linked with the item reported as important by 60% of Malay subjects (who are all Muslims), which was not covered by the comprehensive core set. This underscores the importance of including input from patients from different sociocultural contexts to improve the coverage (and thus utility) of the ICF core sets. Second, as shown in table 2, 69 of 74 items were linked with the ICF at the third or fourth level. This may complement the development of both core sets for osteoarthritis which are developed only at the second level of the ICF towards the direction of the third level (that is, highly specific). This may also increase the sensitivity in global comparison. For example, although walking (linked with d450) is important for all ethnic groups and is included in the core sets, after examining the data we found walking after a period of inactivity (linked with d4509) was of more concern for Chinese subjects, while getting on a bus (linked with d4502) and walking for a long period (linked with d4508) were of more concern to Malay and Indian subjects. This raises the issue that some important information might be lost if comparisons are made only at the second level.

The comprehensive core set for osteoarthritis has shown good content validity as it includes 17 second level categories linked with the items reported by subjects with knee osteoarthritis. Although there remain 12 different second level categories linked with the items that are not covered by the core set, this observation does not reduce the validity of the comprehensive core set, for several reasons. First, among the 12 categories, five are related to the "unspecified" option in the ICF, where the contents of the items linked with these categories are more general, with related aspects of the concept incorporated in one or more other ICF categories (for example, doing exercise). However, this may also suggest that descriptors under some categories of the ICF may need to be refined and detailed so that linkage can be made in a more precise and accurate way. Second, most of these categories (for example, b126, b140, b160, d750, and d760), although not captured by the comprehensive core set, were reported by only a few subjects, and are all related to mental and social functions. They may thus not be generalisable to other patients with osteoarthritis unless they are reported by patients in additional studies.

Several categories identified as important by subjects in all ethnic groups were not included in the current ICF brief core set for osteoarthritis. These categories include changing basic body position (d410), maintaining a body position (d415), lifting and carrying objects (d430), and moving around (d455), and were linked with items reported as important by over 30% of subjects across all three ethnic groups (table 3). As these categories are closely related to the common daily activities, they are expected to be important for most patients

with osteoarthritis despite geographical and cultural differences. If this observation is confirmed in similar studies carried out in a wide range of sociocultural contexts (for example, Africa, Latin America), these categories could be considered for inclusion in a revised version of the brief core set for osteoarthritis.

We recognise several limitations in this study. First, the environmental factor is specifically included in both core sets as it is conceived that a person's functioning and disability are a dynamic interaction between health condition and contextual factors. However, these factors did not receive too much attention from subjects in this focus group study. The possible reason might be we did not explicitly ask patients to report possible environmental factors which might be important for them throughout the focus group discussion. Nevertheless, the impact of these external factors on a patient could be either positive or negative.²² Thus, it will be worth noting the important role of environmental factors as a two edged sword on the outcome of treatment and rehabilitation of patients with osteoarthritis and other chronic diseases in clinical practice. Second, only patients with knee osteoarthritis were studied, which may explain why a number of categories in the both core sets could not be linked with items reported as important by patients. This highlights the importance of including patients with other types of osteoarthritis (for example, hip, hand, and spine) in such studies to evaluate the ICF core sets for osteoarthritis more comprehensively,

Conclusions

All items reported as important by subjects with knee osteoarthritis in a focus group study could be successfully linked with the ICF. The ICF comprehensive core set showed good content validity, while the brief core set needs to be supported by more empirical evidence in various socio-cultural contexts. This is the first such study in Asia. This study specifically complemented the development and refinement of both core sets from the perspective of patients with knee osteoarthritis. Future studies from the perspective of health care professionals and by employing widely used generic and osteoarthritis specific instruments for comprehensive evaluation of the core sets are in progress.

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Authors' affiliations

F Xie, S-C Li, Department of Pharmacy, National University of Singapore, Republic of Singapore
J Thumboo, K-Y Fong, Department of Medicine, National University of Singapore
J Thumboo, K-Y Fong, Department of Rheumatology and Immunology, Singapore General Hospital

N-N Lo, S-J Yeo, K-Y Yang, Department of Orthopaedic Surgery, Singapore General Hospital

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