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ORIGINAL ARTICLE

Validity and application of the international classification of functioning, disability and health core set for stroke in Thailand

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Abstract

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The latest version of disability model, the International Classification of Functioning, Disability and Health (ICF) has been adopted by rehabilitation professionals for presenting health status of patients with stroke. The objective of this study was to explore the content validity of the comprehensive ICF stroke core set in Thai patients. The responsive patterns in different rehabilitation settings were also compared. The participants were 80 individuals affected by stroke with variety of chronicity and severity. These patients were receiving rehabilitation program in two physical therapy clinics and two communities. Four physical therapists evaluated the patients by performing interview and physical examination. These evaluators received a specific training session to use the ICF core set in patients with stroke. Standard evaluation form with description of assessment guideline was also provided.

The results showed that 36 and 26 categories of the "Body Functions" domain and 50 and 39 categories of the "Activity and Participation" domain were validated with responses of having problem in more than 10% and 20% of participants respectively. All of eight categories of "Body Function" and five of "Activity and Participation" were movement and mobility related, reported as having problem in more than half of participants. The response patterns of 12 categories of "Body Function" and 13 "Activity and Participation' were different between clinic and community groups. The set of validated categories was similar to ones previously validated in other four countries. With Thai cultural concern, two items related with sexual function and intimate relationship were largely unresponsive. Some items were also very specific to sub-groups of sex and working status.

Authors recommended more emphasis on more effective treatment plan for stroke patients to be movement related in impairment level and mobility related in activity and participation level. The different sets of ICF categories are recommended in different stages of stroke as well as different rehabilitation settings.

Keywords: stroke, ICF core set, rehabilitation, functioning, content validity

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ความตรงและการใช้บัญชีสากลการทำงาน ความพิการและสุขภาพเพื่อแสดงภาวะสุขภาพของผู้ป่วยโรคหลอดเลือดสมองในประเทศไทย

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บทคัดย่อ

มัณฑนา วงศ์ศิรินวรัตน์ และ ขนิษฐา จิตรอารี ความตรงและการใช้บัญชีสากลการทำงาน ความพิการ และสุขภาพเพื่อแสดงภาวะสุขภาพของผู้ป่วยโรคหลอดเลือดสมองในประเทศไทย
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บุคลากรด้านการฟื้นฟูสภาพมักใช้บัญชีสากลการทำงาน ความพิการ และสุขภาพเพื่อแสดงภาวะสุขภาพของผู้ป่วยโรคหลอดเลือดสมอง การศึกษานี้มีวัตถุประสงค์เพื่อสืบค้นการใช้บัญชีหลักของผู้ป่วยโรคหลอดเลือดสมองในคนไทย โดยประเมินความตรงเชิงเนื้อหา และเปรียบเทียบแบบแผนการตอบของผู้ป่วยจากคลินิกและชุมชน ผู้เข้าร่วมการศึกษาคือผู้ป่วย 80 คนที่รับการฟื้นฟูสภาพในคลินิกสองแห่งและชุมชนอีกสองแห่ง โดยมีความเรื้อรังและความรุนแรงของอาการต่างกัน นักกายภาพบำบัดที่ได้รับการฝึกเฉพาะ4 คนประเมินผู้ป่วยโดยการสัมภาษณ์และตรวจร่างกายด้วยแบบประเมินมาตรฐานและคู่มือ

ผลการศึกษาพบว่า หัวข้อในหมวด“การทำหน้าที่ร่างกาย” 36 และ 26 หัวข้อและหมวด “กิจกรรมและการมีส่วนร่วม” 50 และ 39 หัวข้อมีความตรง โดยถูกระบุว่าเป็นปัญหาในผู้ป่วยร้อยละ 10 และ 20 ตามลำดับ ผู้ป่วยเกินครึ่งมีปัญหาการเคลื่อนไหว 8 หัวข้อในหมวด “การทำหน้าที่ร่างกาย”และ 5 หัวข้อในหมวด “กิจกรรมและการมีส่วนร่วม” ผู้ป่วยจากคลินิกและชุมชนรายงานปัญหาด้วยสัดส่วนต่างกันใน 12 หัวข้อของหมวด “การทำหน้าที่ร่างกาย” และ 13 หัวข้อของหมวด “กิจกรรมและการมีส่วนร่วม”ชุดหัวข้อที่มีความตรงเชิงเนื้อหานี้คล้ายคลึงกับการศึกษาก่อนหน้าใน 4 ประเทศ หัวข้อเกี่ยวกับเพศและความสัมพันธ์ใกล้ชิดไม่ถูกถามและตอบในผู้ป่วยส่วนใหญ่ตามบริบทวัฒนธรรมไทย และบางหัวข้อก็เจาะจงมากสำหรับเพศและสถานะการทำงาน

ผู้วิจัยแนะนำการเน้นแผนการรักษาที่มีประสิทธิภาพสำหรับผู้ป่วยโรคหลอดเลือดสมองให้เกี่ยวกับการเคลื่อนไหวในระดับความบกพร่อง และการไปไหนมาไหนในระดับการจำกัดกิจกรรม โดยควรใช้ชุดหัวข้อต่างกันในกลุ่มที่อยู่ในระยะโรค และสถานที่รับการฟื้นฟูต่างกัน

คำสำคัญ: โรคหลอดเลือดสมอง บัญชีสากลการทำงาน ความพิการและสุขภาพ การฟื้นฟูสภาพ การทำหน้าที่ความตรงเชิงเนื้อหา

Introduction

World Health Organization (WHO) proposed the International Classification of Functioning, Disability, and Health (ICF) since the year 2001[1]. This model was recommended for health personnel to use as a common language to present the health status of clients across disciplines and cultures as well as to encourage holistic health viewpoint[2-3]. Codes according to ICF are suggested to be used as the evaluation tool in patients especially ones who required rehabilitation. Using the codes listed could direct the view of health problems in various domains, including impairments of body function and body structure, activity limitations, participation limitations, and environment factors. The implementation of the ICF in rehabilitation settings was confirmed to improve the quality of interdisciplinary practice[4-5] and reinforced the goal setting[6]. Many authors proposed ways for using the ICF codes to evaluate, record, as well as linking the ICF codes with the available evaluation tools[7-11]. The selected lists known as extended and brief ICF core sets for the large burden conditions including stroke are available for used[12-14]. The evaluation method of scoring each category is also suggested.

Since there were many advantages of ICF, health professionals have adopted the ICF for clinical application. Many studies suggested the use and application of ICF according to the contexts and health system of each country. In Thailand, the National Rehabilitation Agency, Sirindhorn National Medical Rehabilitation Institute, Ministry of Public Health has advocated the use of ICF in health professionals especially ones who allied to rehabilitation. The ICF manual was translated into Thai and the list for disability persons was proposed to be used in persons with disability in Thailand[15]. However, there were limited research reports of the use of ICF in Thai context.

WHO ICF Research Branch has been reported the development of the first version of extended and brief ICF core sets for stroke since 2004[12-14]. Both core sets were formed by the consensus of the international experts using Delphi technique. The extended version consisted of 130 specific categories including 41 Body functions, 5 Body structures, 51 Activity and Participation and 33 Environmental factors. They endorsed that these categories were crucial for the identification of problems in stroke[12].

The core set for stroke has been verified and reported its content validity in various contexts[13,16-20]. These studies notified several concerns before application including minimizing the number of items according to the context of stroke stages and culture. For example, in subacute stages at both 6 weeks and 3 months, problems of Swedish stroke patients could be thoroughly identified by 28 categories of Body Functions and 41 categories of Activity and Participation. The patients who were independent, had problems of 17 categories and the dependent ones had 34 categories[16].

To ensure the application in Thai patients with stroke, the validity of the ICF core set for stroke is needed to be tested. Therefore, the objective of this study was firstly to explore the application of ICF stroke core set in Thai patients. The empirical validity of content of the codes of ICF in stroke patients was evaluated. The relevance therefore was reported by the frequencies of ICF categories identified as having and not having problems. The second objective

was to compare the patterns of problems in stroke patients who were receiving treatments in clinics and in communities. This study focused on the domains of Body Function as well as Activity and Participation of the ICF scheme since they are greatly relevant to the physical therapy care plan.

Methods

The Mahidol University Center of Ethical Reinforcement for Human Research approved the protocol of the study (MU-CIRB 2014/089.0707). All participants provided a written informed consent prior to the data collection process. The participants in this study were individuals affected by stroke with variety of chronicity and severity. They were enlisted from four different settings to reflect the variability of context. Two physical therapy sites were used for the recruitment, one was the clinic of Physical Therapy Faculty located in Bangkok and another was the physical therapy clinic in a middle side government hospital in Ayutthaya province. Two community settings which these two clinics providing physical therapy home visit program were also used for the recruitment, i.e., the communities in Bangkok and in Ayutthaya province. All participants were diagnosed as having cerebrovascular lesion and had stable vital signs. They were receiving physical therapy program for rehabilitation in different phases.

Four physical therapists, two from each setting were the assessors in this study. All of them received one-day training session before evaluating the patients. In the training, the first author explained about the ICF concept and introduced the ICF core sets for stroke. For practice, therapist had to assess a patient in their setting by using this ICF. During the session, they discussed the methods of scoring and evaluation with the author until they felt thoroughly understood and confident in using the coreset for evaluation. A handout for reviewing and guiding the evaluation of each item was also provided.

The evaluation was performed by interview and physical examination. A standardized evaluation form including the list of categories in the core sets and scaling for each domain was provided. For validity testing, the assessors recorded the grading results of each item according to the guideline by WHO[1]. The qualifiers were graded according to the WHO definition as follows: Level 0 indicated "no problem"; 1 "mild problem"; 2 "moderate problem"; 3 "severe problem" and 4 "complete problem". Level 8 was "not specific" i.e., the information did not avail to quantify the severity of the problem and 9 was "not applicable". To identify the relevant categories, the scores were recategorized to be “no problem” for response of level 0 and having problem for responses of 1 to 4 and 9. The level 8 was identified as missing data.

The data analysis was performed using SPSS version 19. The patterns of health condition in two domains according to ICF core set was reported as descriptive statistics with mean, SD and range. The content validity of the core set was determined by two thresholds of 10%[1] and 20%[18] of the frequency and percentage of patients who had a problem for each category. The data were compared the pattern of responses between participants in clinics and communities. The Fisher’s exact test for two by two table was used to determine the different of proportions of having and not having problem between two groups

of patients. Independent t-test was used to compare means between two groups. Chi-square test was also performed to compare the proportions between groups.

Results

The participants in this study were 80 patients with stroke receiving physical therapy in four settings. There were 45 participants in clinic group (25 from Bangkok and 20 from Ayutthaya) and 35 patients in community group (15 from Bangkok and 20 from Ayutthaya) agreed to participate the study. The average age of all participants was 61.5 years, with average 3.2 years duration after stroke. As shown in Table 1, there were no significant differences of age, gender and marital status between patients in the clinics and communities. However, year of education, working status and durations of stroke were different between both groups. Generally, the patients from clinics had more chronic condition and higher educated than ones from communities. However, the proportion of ones with paid job seemed to be higher in community group than clinic group.

Tables 2 and 3 show the percentages of participants presenting problems in the domains of Body Functions and Activity and Participation respectively. Out of 41 categories of Body Function domain, five categories were reported as "having problem" in less than 10% of all participants. Fifteen categories were reported as "having problem" in less than 20% of all participants. Seven categories were reported to have problems in more than 50% of participants. For total 51 categories of Activity and Participation domain, only one category was reported to have problem in less than 10% and 12 categories in less than 20% of participants. Eight categories of body function reported having problem in more than 50% of participants.

Comparing between groups of patients receiving treatment in clinic and in community, the response patterns of 12 categories of Body Function and 13 Activity and Participation were different between groups as shown in Tables 2 and 3 respectively. The participants in communities seemed to have higher proportion of reporting the problems in 11 Body Function categories including four mental functions, two sensory functions and three cardio-vascular functions. For Activity and Participation domain, different patterns were observed in four categories related to communication, three categories of self-care, and five categories related to independent living in community.

Table 1 Distribution of patients with stroke by personal characteristics

	All (n=80)	Clinics (n=45)	Communities (n=35)	P-value
Age (years)				
Mean (SD)	61.5 (10.9)	60.9 (11.7)	62.4 (9.9)	.545
Range of age (Min-Max)	28-95	28-95	45-80	
Sex				.223
Male	55 (68.8)	33 (73.3)	22 (62.9)	
Female	25 (31.2)	12 (26.7)	13 (37.1)	
Marital status				.451
Single	14 (17.5)	8 (17.8)	6 (17.1)	
Married	56 (70.0)	33 (73.3)	23 (65.7)	
Divorce	5 (6.2)	3 (6.7)	2 (5.7)	
Widow	5 (6.2)	1 (2.2)	4 (11.5)	
Duration of study (years)				
Mean (SD)	9.7 (4.6)	10.7 (4.8)	8.4 (3.9)	.032*
Range of duration (Min-Max)	4-16	4-16	4-16	
Working status				.008*
Paid work	23 (28.7)	9 (20.0)	14 (40)	
Private business	13 (16.3)	7 (15.5)	6 (17.1)	
Housework	10 (12.5)	2 (4.5)	8 (22.9)	
Retired	14 (17.5)	10 (22.2)	4 (11.4)	
Unemployed from health reason	16 (20.0)	13 (28.9)	3 (8.6)	
Unemployed from other reasons	4 (5.0)	4 (8.9)	0 (0.0)	
Duration of stroke (years)				
Mean (SD)	3.2 (3.6)	4.3 (4.3)	1.8 (1.3)	.002*
Range of duration of stroke (Min-Max)	1-18	1-18	1-6	

Age, duration of study, duration of stroke are reported in mean (SD) and compared between groups with independent t-test.
Range of age and range of duration of stroke are reported with minimal and maximal values.
Gender, marital status, working status are reported in number (percentage) and compared between groups using Pearson Chi-Square test.
* statistically different between groups , p-value < 0.05

Table 2 Percentages of participants by not having and having problems in ICF categories of Body Function

	No problems			Having problems			P-value
	All settings	Clinics	Community	All settings	Clinic	Community	
Chapter 1 Mental functions							
b110 Consciousness functions	92.5	95.6	88.6	7.5	4.4	11.4	0.227
b114 Orientation functions	83.8	80.0	88.6	16.2	20.0	11.4	0.236
b117 Intellectual functions	80.0	86.7	68.6	20.0	13.3	31.4	0.046*
b126 Temperament and personality functions	68.8	75.6	60.0	31.2	24.4	40.0	0.107
b130 Energy and drive functions	70.0	75.6	62.9	30.0	24.4	37.1	0.163
b134 Sleep functions	80.0	82.2	77.1	20.0	17.8	22.9	0.387
b140 Attention functions	80.0	80.0	80.0	20.0	20.0	20.0	0.613
b144 Memory functions	71.3	80.0	60.0	28.7	20.0	40.0	0.044*
b152 Emotional functions	69.7	73.3	62.9	30.3	26.7	37.1	0.223
b156 Perceptual functions	92.5	93.3	91.4	7.5	6.7	8.6	0.536
b164 Higher-level cognitive functions	75.0	77.8	71.4	25.0	22.2	28.6	0.347
b167 Mental functions of language	87.5	95.6	77.1	12.5	4.4	22.9	0.016*
b172 Calculation functions	75.0	84.4	62.9	25.0	15.6	37.1	0.026*
b176 Mental function of sequencing complex movements	80.0	82.2	71.4	20.0	17.8	28.6	0.190
b180 Experience of self and time functions	90.0	93.3	85.7	10.0	6.7	14.3	0.226
Chapter 2 Sensory functions and pain							
b210 Seeing functions	77.5	82.2	71.4	22.5	17.8	28.6	0.190
b215 Functions of structures adjoining the eye	92.4	86.7	97.1	7.6	13.3	2.9	0.104
b260 Proprioceptive function	80.0	80.0	80.0	20.0	20.0	20.0	0.613
b265 Touch function	80.0	68.9	94.3	20.0	31.1	5.7	0.004*
b270 Sensory functions related to temperature and other stimuli	94.4	84.4	100	7.6	15.6	0	0.014*
b280 Sensation of pain	86.3	84.4	88.6	17.7	15.6	11.4	0.423

Table 2 Percentages of participants by not having and having problems in ICF categories of Body Function (cont.)

	No problems			Having problems			P-value
	All settings	Clinics	Community	All settings	Clinic	Community	
Chapter 3 Voice and speech functions							
b310 Voice functions	88.8	84.4	94.3	11.2	15.6	5.7	0.153
b320 Articulation functions	78.8	73.3	85.7	21.2	26.7	14.3	0.143
b330 Fluency and rhythm of speech functions	66.3	64.4	68.6	33.7	35.6	31.4	0.442
Chapter 4 Functions of the cardiovascular, hematological, immunological and respiratory systems							
b410 Heart functions	82.5	91.1	71.4	17.5	8.9	28.6	0.023*
b415 Blood vessel functions	92.5	95.6	88.6	7.5	4.4	11.4	0.227
b420 Blood pressure functions	63.7	80.0	42.9	36.3	20.0	57.1	0.001*
b455 Exercise tolerance functions	37.5	46.7	25.7	62.5	53.3	74.3	0.045*
Chapter 5 Functions of the digestive, metabolic and endocrine systems							
b510 Ingestion functions	86.3	88.9	82.9	13.7	11.1	17.1	0.324
b525 Defecation functions	86.3	91.1	77.1	13.7	8.9	22.9	0.048
Chapter 6 Genitourinary and reproductive functions							
b620 Urination function	85.0	93.3	74.3	15.0	6.7	25.7	0.020*
b640 Sexual functions	80.0	46.7	5.7	1.3	53.3	94.3	0.011*
Chapter 7 Neuromusculoskeletal and movement-related functions							
b710 Mobility of joint functions	55.0	62.2	45.7	45.1	37.8	54.3	0.106
b715 Stability of joint functions	82.5	68.9	74.3	17.5	31.1	25.7	0.392
b730 Muscle power functions	20.1	13.3	22.9	79.9	86.7	77.1	0.207
b735 Muscle tone functions	40.0	40.0	37.1	60.0	60.0	62.9	0.489
b740 Muscle endurance functions	30.0	33.3	20.0	70.0	66.7	80.0	0.142
b750 Motor reflex function	38.8	31.1	45.7	61.3	68.9	54.3	0.135
b755 Involuntary movement reaction functions	50.0	37.8	60.0	50.0	68.9	40.0	0.040*
b760 Control of voluntary movement functions	46.2	40.0	48.6	53.8	60.0	51.4	0.295
b770 Gait pattern functions	17.5	17.8	17.1	82.5	82.2	82.9	0.591

*significant difference of proportion compared between groups of patients in clinics and communities using Fisher's exact test, p-value < 0.05

Table 3 Percentages of participants by not having and having problems in ICF categories of Activities and Participation

	No problems			Having problems			P-value
	All settings	clinics	communities	All settings	clinics	communities	
d115 Listening	87.5	86.7	88.6	12.5	13.3	11.4	0.523
d155 Acquiring skills	72.6	75.6	65.7	27.4	24.4	34.3	0.237
d160 Focusing attention	75.0	82.2	65.7	25.0	17.8	34.3	0.076
d166 Reading	75.0	75.6	71.4	25.0	24.4	28.6	0.435
d170 Writing	66.3	71.1	57.1	33.7	28.9	42.9	0.144
d172 Calculating	70.0	77.8	57.1	30.0	22.2	42.9	0.042*
d175 Solving problems	73.8	80.0	65.7	26.2	20.0	34.3	0.118
d210 Undertaking a single task	85.1	86.7	80.0	14.9	13.3	20.0	0.308
d220 Undertaking multiple tasks	57.4	57.8	54.3	42.4	42.2	45.7	0.466
d230 Carrying out daily routine	67.5	66.7	68.6	32.5	33.3	31.4	0.525
d240 Handling stress and other psychological demands	71.3	64.4	80.0	28.7	35.6	20.0	0.100
d310 Communicating with receiving spoken messages	82.5	86.7	77.1	17.5	13.3	22.9	0.207
d315 Communicating with receiving non-verbal message	85.1	91.1	74.3	14.9	8.9	25.7	0.043*
d325 Communicating with receiving written messages	81.3	86.7	68.6	18.7	13.3	31.4	0.046*
d330 Speaking	76.3	80.0	71.4	22.7	20.0	28.6	0.264
d335 Producing non-verbal messages	88.8	91.1	80.0	11.2	8.9	20.0	0.135
d345 Writing messages	76.3	75.6	62.9	23.7	24.4	37.1	0.163
d350 Conversation	71.3	82.2	57.1	28.7	17.8	42.9	0.014*
d360 Using communication devices and techniques	75.1	80.0	65.7	24.9	20.0	34.3	0.118
d410 Changing basic body position	87.5	91.1	82.9	12.5	8.9	17.1	0.221
d415 Maintaining a body position	92.5	93.3	91.4	7.5	6.7	8.6	0.536
d420 Transferring oneself	67.5	68.9	65.7	32.5	31.1	34.3	0.475
d430 Lifting and carrying objects	47.5	51.1	42.9	52.5	48.9	57.1	0.306
d440 Fine hand use	31.3	33.3	28.6	68.7	66.7	71.4	0.417
d445 Hand and arm use	36.3	35.6	37.1	63.7	64.4	62.9	0.534

Table 3 Percentages of participants by not having and having problems in ICF categories of Activities and Participation (cont.)

	No problems			Having problems			P-value
	All settings	clinics	communities	All settings	clinics	communities	
d450 Walking	28.8	17.8	42.9	71.2	82.2	57.1	0.014*
d455 Moving around	51.3	44.4	60.0	48.7	55.6	40.0	0.124
d460 Moving around in different locations	33.8	26.7	40.0	66.2	73.3	60.0	0.153
d465 Moving around using equipment	51.3	48.9	37.1	48.7	51.1	62.9	0.205
d470 Using transportation	46.3	35.6	37.1	53.7	64.4	62.9	0.534
d475 Driving	61.3	26.7	8.6	38.7	73.3	91.4	0.036*
d510 Washing oneself	65.8	60.0	80.0	26.2	40.0	20.0	0.046*
d520 Caring for body parts	75.0	60.0	77.1	25.0	40.0	22.9	0.082
d530 Toileting	76.0	66.7	82.9	24.0	33.3	17.1	0.083
d540 Dressing	58.8	57.8	60.0	41.2	42.2	40.0	0.512
d550 Eating	82.5	80.0	85.7	17.5	20.0	14.3	0.359
d570 Looking after one's health	65.1	66.7	60.0	34.9	33.3	40.0	0.351
d620 Acquisition of goods and services	57.6	64.4	40.0	42.4	35.6	60.0	0.025*
d630 Preparing meals	77.5	48.9	40.0	22.5	51.1	60.0	0.286
d640 Doing housework	48.8	53.3	25.7	31.2	46.7	74.3	0.011*
d710 Basic interpersonal interactions	72.6	71.1	65.7	27.4	28.9	34.3	0.391
d920 Recreation and leisure	70.1	57.8	48.6	29.9	42.2	51.4	0.277
d750 Informal social relationships	85.0	91.1	71.4	15.0	8.9	28.6	0.023*
d760 Family relationships	82.5	84.4	68.6	17.5	15.6	31.4	0.079
d770 Intimate relationships	43.8	44.4	42.9	10.1	55.6	57.1	0.534
d845 Acquiring, keeping and terminating a job	62.5	48.9	34.3	37.5	51.1	65.7	0.139
d850 Remunerative employment	71.3	51.1	25.7	28.7	48.9	74.3	0.019*
d855 Non-remunerative employment	76.6	40.0	25.7	22.4	60.0	74.3	0.135
d860 Basic economic transactions	81.9	57.8	42.9	18.1	42.2	57.1	0.136
d870 Economic self-sufficiency	73.8	66.7	37.1	26.2	33.3	62.9	0.008*
d910 Community life	60.0	66.7	40.0	40.0	33.3	60.0	0.015*

*significant difference of proportion compared between groups of patients in clinics and in communities with Fisher's exact test, p-value < 0.05

Discussion

This study has the objective to evaluate the content validity of the ICF extensive stroke core set using the frequency and percentage of Thai patients who reported problem for each category. The patterns of problems of stroke patients in clinic and community are also compared to comprehend if the different sets of category list are required.

Body Functions

The results of Body Functions assessment showed that 34 of 41 categories were identified as being a problem in the participants at least 10%. The seven excluded categories i.e., identified as problem in less than 10% of participants were mostly ones reflecting the patients in acute stage or very severe stroke, for example b110 Consciousness functions, b114 Orientation functions, and b510 Ingestion functions. The patients in this study were in chronic stage with average duration after having stroke of 3.2 years, so they were not likely to report these problems. The same trend was shown in a study in Sweden[16] which reported that 28 codes of body functions were not significantly identified with 10% threshold even at 6 weeks and 3 months after stroke. At discharge period of inpatients with stroke, 33 categories reached 10% of patients discharged in a report in Slovenia[17]. Interestingly, only one ICF category "b180 Experience of self and time functions" was reported as problem in less than 10% of the patients in the Chinese chronic stroke population[19]. However, the category "b435a Immunological system functions" was excluded with the same criteria in Brazilian chronic stroke patients[18]. These results emphasized the idea that the list of ICF categories should be more specific to different stages of stroke.

On the other hand, eight categories reported as problem in at least half of participants in this study were movement related including b770 Gait pattern functions (82.5%), b730 Muscle power functions (79.9%), b740 Muscle endurance functions (70.0%), b455 Exercise tolerance functions (62.5%), b750 Motor reflex function (61.3%), b735 Muscle tone functions (60.0%), b760 Control of voluntary movement functions (53.8%), and b755 Involuntary movement reaction functions (50.0%). This could be resulted from the nature of stroke in chronic stage. This also might be because the assessors in this study were physical therapists so these problems were dominated from the nature of work[21]. The same trend was observed in other validity studies of the stroke coreset[16-19]. At 3 months, more than 50% of Swedish patients reportedly had problem of 8 categories with the most frequent identified of b455 Exercise tolerance functions (94%)[16]. Interestingly, the study in China reported up to 25 categories to have problems in more than half of patients, with greatest frequency of b730 Muscle power function (98%) and up to six ICF categories reached over 90% of the patients[19]. Reported at the admission and discharged periods among Slovenian patients, 25 categories were reported in more than half and changes were observed in 13 categories of body functions between two periods with the most frequent observed of b770 Gait pattern functions[17]. The items of b770 Gait pattern as well as other categories of neuromusculoskeletal and movement-related functions were also most often identified as problem in Brazilian stroke population[18]. These results underlined the importance of movement evaluations in this patient population. Tools to link with these categories and use

for the effective evaluate are available and should be standardized for using among rehabilitation personnel[11].

Activity and participation

The results showed that 50 of 51 categories of the Activity and Participation domain were reported as having some problems in more than 10% of the patients in this study. Only one category of "d415 Maintaining a body position" was reported to have problem in less than 10 percent of participants. This reflected the stage of chronic stroke which patients already received some rehabilitation. The outpatients in clinic and patients receiving home rehabilitation were usually ones with stable medical conditions, so most of them were not bedridden and at least can maintain the position. In the study of Swedish patients, 41 ICF categories of Activity and Participation were significantly identified as problems at 6 weeks and 3 months after stroke[16]. While the study in Chinese patients identified problems in all 51 categories of this domain[19]. Twenty four items of Activity and Participation domain were changed during admit and discharged periods in Slovenian stroke patients[17].

Five categories of Activity and Participation having problem in more than 50% of participants in this study seemed to related with two matters, mobility and upper extremity uses. In particular, these five items included d450 Walking (71.2%), d460 Moving around in different locations (66.2%), d470 Using transportation (53.7%), as well as d440 Fine hand use (68.7%), and d445 Hand and arm use (63.7%). These two issues might be the main focus of physical therapy program of stroke and playing crucial part of goal settings[22-24]. Walking is the activity limitation being largely concerned in all previous validity studies of stroke ICF coreset[16-19].

Similar set of activity limitations were frequently reported in the previous validity studies. Four movement related activity limitation comprised of d450 Walking, d460 Moving around in different locations, d440 Fine hand use, and d220 Undertaking multiple tasks, were observed in both Swedish and our participants[16]. Four categories including d540 Dressing, d410 Changing basic body position, d415 Maintaining a body position, d450 Walking and d460 Moving around in different locations, were reported to have the responsiveness of functional changes in stroke during admitted and discharged periods[17].

Interestingly, four categories of 630 Preparing meals, d640 Doing housework, d910 Community life, and d920 Recreation and leisure were reported as being problems in 100% of Chinese participants[19]. The authors postulated that activity limitation reported was largely due to the specific characteristics of patient group and cultural concerns[19]. The same explanation might be applicable to this study which some Activity and Participation categories considered as subgroup specific had high response rates as "not applicable". The tasks specific to subgroups apparent in this study including d630 Preparing meals, d640 Doing housework, d475 Driving d850 Remunerative employment were considered not relevant to large number of participants such as male or elderly who already retired.

Two categories of "b640 Sexual functions" and "d770 Intimate relationship" were also noted as unspecified in more than half of patients in this

study due to the cultural concern. All assessors did not acquire information about these problems from many participants during the interview. The therapists and patients thought that it was not appropriate for discussing sexual problem in a general physical therapy visit. Therapists need to use time to be acquainted with patient or waiting for the patient to express these concerns before evaluating the intimate issues. The "b640 Sexual functions" was also suggested to be removed in the study in Chinese patients[19] with a similar reason as this study.

Comparing between the patients from clinic and communities, the patterns of responses were different in many categories. Of 12 categories of Body Function having differences, higher proportions of community group were reported in four mental functions (b117 Intellectual functions, b144 Memory functions, b167 Mental functions of language, b172 Calculation functions), and three cardiovascular functions (b410 Heart functions, b420 Blood pressure functions, b455 Exercise tolerance functions), two genitourinary and reproductive functions (b620 Urination functions, b640 Sexual functions). Three categories, two sensory functions (b265 Touch function, b270 Sensory functions related to temperature and other stimuli) and one Neuromusculoskeletal functions (b755 Involuntary movement reaction functions) were observed more in the clinic group. For Activity and Participation, the community group also tended to report more problems (11 out of 13 items) including five categories related to communication (d172 Calculating, d315 Communicating with receiving non-verbal message, d325 Communicating with receiving written messages, d350 Conversation, d750 Informal social relationships), one categories of self-care (d640 Doing housework), and five categories related to independent living in community (d475 Driving, d620 Acquisition of goods and services, d850 Remunerative employment, d870 Economic self-sufficiency, d910 Community life). Interestingly, higher proportion of the group from clinic reported problems of d450 Walking and d510 Washing oneself. The explanation of these differences might be the different characteristics of these two groups. The patients from communities in this study, although were less chronic, were less educated and might have lower socioeconomic level as well as family support. More of them reported the need to keep paid works after the illness which might make them had higher expectation of independent living and community life. Moreover, the nature of concerns between patients receiving rehabilitation in clinic and community might be essentially different and was reflected in the responses of the Activity and Participation domain of ICF. These different patterns of problem emphasize the different focus and plan among patients who receiving rehabilitation program in clinic and community.

This study has some important limitations needed for consideration. First, the comprehensive core set for stroke was validated by empirical data. The assessors were four physical therapists with specific training of using the standard form to interview and examination the patients. However, their personal judgment based on specific clinical experiences could influence the determinations both the presence of problem and the choice of qualifier. Secondly, the representativeness of the sample studied was also the concern. Although the study was undertaken in both clinic and community settings to include patients with varieties of disease stages, most of the participants were chronic

with some ability to communicate and participate the interview and physical examination. Therefore, they might not reflect stroke patients with all stages of diseases. Therefore, the application of the finding of this study to other context might be limited. Further studies testing reliability and other types of validity of these ICF categories in stroke patients are also warranted.

Recommendations

In conclusion, using 10% threshold five categories of Body Function and one category of Activity and Participation were not validated in our participants. However, 15 categories in body function and 12 categories in Activity and Participation were not validated if using 20%. The Body Function categories relevant to large proportion of patients with chronic stroke were mostly movement related. The Activity and Participation reported problem were related to mobility and hand uses. There were also cultural and subgroup specific of applicable categories. The lists including validated categories according to both thresholds could be constructed as appropriated. Standard set of ICF categories specific for different stages of disease as well as different rehabilitation settings are recommended. The further recommendations of the standard examination tools to use for evaluating each item of ICF category would also be beneficial for rehabilitation practice.

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