Are the Domains Considered by ICF Comprehensive Enough to Conceptualize Participation in the Patient with Hand Injuries?

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Abstract

Background Although participation is a core concept in multiple models of disability, there is no consensus on its definition.

Objective The aim of this study was to extract participation domains based on review of theories, available outcome measures, and interviews with experts and the person with hand injuries to compare with the ICF domains of participation.

Methods A qualitative approach using a deductive content analysis was employed to extend definitions of participation from theories. Later on, inductive qualitative method using semistructured interview with five experts in different fields and 30 patients with different hand injuries was used. Coding was performed with extracted domains from the content of data, and finally, the extracted domains were compared with the ICF domains of participation.

Results Some of the extracted domains were not considered in ICF.

Conclusion Subjective participation is the main forbearance part. Role, leisure, domestic life, environment, and others are also main missing meanings. This limitation can hinder measuring disability and health.

Keywords

- participation
- ICF
- disability
- hand injuries

Introduction

Participation is a significant long-term outcome of medical, rehabilitation, and social service programs. Leading patients to normal life and promoting their participation level are the final goals of rehabilitation and social services.¹ It is proved to be a central construct in health care, rehabilitation, and, particularly, in occupational therapy,² and as a key rehabilitation outcome, it has been the focus of extensive efforts to become operationalized and measured. This focus results in many reviews, and much research is rooted in a new paradigm of disability.³

While participation is a core concept in multiple models of disability, there is no consensus on its definition. Upon the sources from prior models of disability, different approaches were employed in defining it. Wood⁴ and Nagi⁵ defined participation as a social role and hereby distinguished performance at the societal level from other levels. For Wood,⁴ participation, named handicap back then, was the fulfillment of a role quite normal for an individual. In the most recent model, International Classification of Functioning, Disability and Health (ICF) of the World Health Organization (WHO),⁶ participation focuses on the person's involvement in society (i.e., social functioning), and it would be more likely to be performed with others.⁷

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Some authors believe that participation is characterized by specific chapters of ICF, including Assisting others (d660), Particular interpersonal relationships (d730–d779), Education (d810–d839), Work and employment (d840–d859), Economic life (d860–d879), Community life (d910), Recreational and leisure (d920), Religion and spirituality (d930), and Political life and citizenship (d950).^{8,9} However, a detailed model of the construct of participation has not been articulated.¹⁰

Significant variations in definition of the construct resulted in instruments purporting to measure the same construct and yield significantly different findings, making it difficult to compare populations or research results. Therefore, it is crucial to know the definition and main domains of participation. One of the most common definitions of participation, used worldwide, is the ICF definition “involvement in a life situation.”¹¹ However, the ICF definition of participation has been criticized due to its lack of conceptual clarity and for providing little specificity about what type of involvement or life situation is meant.¹² Consequently, there is a knowledge gap regarding the clarification of the definition of this concept for clinical purposes. There is still debate about its construct. The main questions that still should be answered include What are the major aspects of participation that should be measured? Is the ICF a useful framework for instrument construction? What alternatives to the ICF should be considered?

The main question of this study was whether the domains considered by ICF are comprehensive enough to conceptualize participation.

Methods

To answer the main question about the conceptualization of participation and explore its domains, three steps were followed.

In the first step, directed or deductive approach to content analysis was used. This step was done by systematic search of the theories and definitions of participation and also questionnaire that claimed that measure participation (general questionnaire and hand-specified outcome measure). Open coding method was used for this step.¹³

In the second step, inductive qualitative method was used by interview with five experts in different fields holding experience with measuring participation (two hand surgeons, two hand therapists, and one social worker) with at least 10 years of experience in working with hand-injured patients, and 35 patients (24 men and 11 women) with mean age of 44 years who had hand injuries were included. Purposeful samplings were used for interviews. Sampling continued until saturation.

All individuals gave research authorization to participate in this study. The medical ethics committee of the university approved the study protocol. Lastly, the interviews were taped and transcribed.

Coding

A content analysis using constant comparison was performed for transcribed interviews. To identify key domains

as initial coding categories, the transcripts were read and all of the sentences holding the concept of participation were highlighted. The next step in the analysis was to code all highlighted passages (meaning unit) based on the experience of participants or concepts, coming from disciplines and theories. Explored codes were grouped together upon their homogeneity. Through this process, different categories and subcategories were identified.¹⁴ Coding was done based on manifest content analysis.¹⁵

Any text not to be categorized into the initial coding scheme was assigned a new code¹⁶ (creating categories). Then, each category was named using content-characteristic words, and hereby subcategories with similar events and incidents were grouped together as categories and they were grouped as main ones named domains.¹⁷

Strategies used to assess trustworthiness included member check, peer check, and expert check, and prolonged engagement was used for each step. The authors read the papers independently and discussed them frequently with experts during the analysis of the categories and meaning units, until consensus was reached.

Finally, in the third steps, the extracted domains were compared with the ICF domains of participation by focus group and were afterward regarded as main domains of participation.

Results

Extracted Domains Based on Deductive Content Analysis

Literature Review

Thirty articles were reviewed in this phase. Out of them, 10 were related to disability models. The remaining articles were mostly about definitions of participation or defining its domains or offering ways of differentiating it from activity. After content analysis of the extracted definitions, four main domains were labeled and appeared in ►Table 1. The first and the most mentioned was “environment and societal interaction.” Based on ICF definition, participation is a person’s involvement in society (i.e., social functioning) and performing with others.¹¹ Many disability models also emphasize social interaction as the main domain of participation in their definitions. These descriptions are varied with fitting person into environment,¹⁸ occupational, or recreational activities occurring in community settings,¹⁹ and active involvement in intrinsic activities.²⁰

Role fulfillment, domestic life, environment, context, and leisure were considered as subdomains of social interaction. Because societal role is frequently mentioned in most models and definitions, seemingly this factor must be the most important one that can accentuate the meaning of participation. As performing roles were highlighted in many definitions, it became a separate domain. The third domain was the presence of others in doing an act. It means that participation cannot be done alone and requires interaction with others.

The last domain, not considered in disability models including the ICF, was subjective participation with the

Table 1 Extracted domains of participation from theories

Domain	Meaning unit	Code	Definition
Environment and social interaction	Socializing Active involvement in activities	Social	Need mobility in the community and socializing with more people active involvement in activities that are intrinsically social and either occur outside of the home or are part of a nondomestic role ^{8,44–47}
	Work outside of the household	Domestic life	Engagement in vocational, social (outside of the household), and other community roles
	Person-environment fit	Environment	Dynamic interaction between individuals and their environments over the lifespan Person-environment fit ^{5,8,46,48}
		Context	Doing tasks and acts in context ^{43,49}
	Nonobligatory activity	Leisure	Freely chosen activity that require control and commitment/nonobligatory activity that intrinsically motivated and engaged during discretionary time ⁵⁰
Others	Cannot be done alone	Other person	Participation cannot be done alone and need interpersonal relation Interaction with other people ^{12,50,51}
Roles	Social and familiar roles	Role	Ability to performs social and familiar roles; includes one's role as a worker, a friend, a neighbor, or a community member Fulfilling roles outside of the household ^{4,5,46}
Subjective participation	Satisfaction of doing	Satisfaction	Satisfaction of doing roles Insider perspective of participation ⁵²
		Quality of life	Give meanings to life ²⁶
	Individual's internal experience and autonomy	Subjective perception	Perception of involvement or sense of belonging and satisfaction with engagement in community activities; addresses the individual's internal experience and autonomy ²²
		Engagement	⁵³

subdomains of satisfaction, quality of life, perception of involvement (or sense of belonging), and engagement in community activities, which addresses an individual's internal experience and autonomy (► **Table 1**).

Participation Outcome Measures

In this step, 20 general outcome measures (► **Appendix 1**), developed to evaluate participation, and hand-specified outcome measures, which had the items that measure participation, were identified. The items of all above questionnaire were linked to ICF based on linking rules (► **Appendixes 2 and 3**). After content analysis of the general participation outcome measures, 17 meanings were extracted (► **Table 2**).

Interpersonal interactions and relationships, work and employment, and assisting others were the only components of ICF covered by the identified instruments.

Caring for household objects, moving around, looking after one's health, and doing housework were considered as subdomains of domestic life. In addition, some of the measures had some items, which could not be linked to ICF components, and hence the authors considered them as extra domains (recreation and leisure).

Emotional, appearance, independence and autonomy, role, adaptation, satisfaction, and physical and compensa-

tory behavior, which are subdomains of subjective participation, were not considered in ICF.

Extracted Domains Based on Inductive Content Analysis

Interviews

Nine domains were extracted from the interviews. Except interpersonal relationship, none of the other extracted meanings could be linked with ICF. Emotional, adaptation, satisfaction, and compensatory behavior were considered as subdomains of subjective participation. Role was the only meaning that was considered as an independent domain (► **Table 3**).

After considering all extracted domains and their overlapping and comparing with ICF, finally 14 domains were considered as the main domains of participation in hand-injured patients; five of them were not considered in ICF (10–14):

1. Assisting others (d660)
2. Interpersonal relationship and communications (d730–d779)
3. Education (d810–d839)
4. Work and employment (d840–d859)

Table 2 Extracted domains of participation from measures

Domains	Meaning units	Codes	Scale
Emotional/psychological	Psychological health	Expectations, aspirations, and needs. Do you feel confident to try to learn new things (Participation scale)?	WHODAS II, ³⁶ WHOQOL, ³⁷ KAP, participation scale
Interpersonal interactions and relationships	Difficulty communicating with other people, visiting friend and relative, maintaining a relationship	Social integration, community integration, relation with others (IPA), participation in society, community life, use of communication devices and techniques (IMPACT-S) Formal relationships (IMPACT-S) Get-togethers with family and friends (CIQ)	LIFE-H, ⁵⁴ IPA, ³¹ CIQ, ³³ WHODAS II, ³⁶ ROPP, WHOQOL, PM-PAC, CHART, ²⁷ IMPACT ⁹
Independence and autonomy	Doing works alone	Physical independence, independence in one's own living situation and meaningful activities (CHART)	CHART, ²⁷ PHQ, ²⁸ LHS, ²⁹ CIQ ³³
Role	Role functioning	Physical role functioning	IPA, ³¹ ROPP, PM-PAC, IMPACs, SF36 ³⁸
Physical	Problems due to physical impairment	Pain Appearance	LHS ²⁹
Adaptation	Getting along with problems	Coping skills, getting along, special equipment (PARTS-M)	WHODAS II, ³⁶ RNL-index, ³⁰ PARTS-M
Satisfaction	Satisfaction with activity level	How satisfied are you with your participation (PARTS-M)	POPS, ROPP, USER-P ³⁹
Environment, context			WHODAS II, ⁴⁰ WHOQOL
Recreation and leisure	Recreational	Recreational activity, movies, sports, restaurants (CIQ), leisure (IPA), religious festivals (participation scale)	CIQ, MHQ, DASH, HAT, IPA, ³¹ LIFE-H, IPA, WHODAS II, ³⁶ RNL-index, ³⁰ participation scale
Looking after one's health	Caring of others in home such as child and also self-care	Who usually cares for the children in your home? (CIQ), do you help other people (e.g., neighbors, friends or relatives)? (participation scale)	CIQ, WHODAS II ³⁶ late-life IMPAC, RNL-index, ³⁰ CIQ, ³³ participation scale
Domestic life	Doing housework and daily activity Activity of daily living, transport	Indoor occupation, life area, domestic life, housing (LIFE-H), household tasks (IMPACT-S), caring for household objects (IMPACT-S), indoor community (CIQ) Grocery shopping, laundry, housekeeping, or infrequent medical needs (CHART-1)	CIQ, WHODAS II, ³⁶ IMPACs, DASH, RNL-index, ³⁰ NHP, ³² LIFE-H
Compensatory behavior	Change in speed and ability in doing	Do you work as hard as your peers do (participation scale)	WHODAS II, ³⁶ participation scale

Table 2 (Continued)

Domains	Meaning units	Codes	Scale
Learning and applying knowledge		Basic learning Applying knowledge (IMPACT-S)	
Task execution and its need		Task execution in quiet circumstances Task execution in stressful circumstances (IMPACT-S)	
Communication		Use of communication devices and techniques (IMPACT-S)	
Mobility	Lifting and carrying objects Moving around	Carrying, moving and handling objects moving around using transportation (IMPACT-S)	WHODAS II, ³⁶ IPA, LIFE-H
Self-care	Doing self-care activity	Self-care (IPA), washing and dressing (IMPACT-S) Personal care activities such as eating, bathing, dressing, toileting, and mobility? (CHART-1), personal care (LIFE-H)	CHART, ²⁷ IPA, LIFE-H
Major life areas	Economic self-sufficiency Education Work	Education, work and employment Work activity, employment Economic life (CHART-1), looks after your personal finances (CIQ) Paid or voluntary work (IPA)	CIQ, MHQ, IPA, ³¹ WHODAS II, ³⁶ PM-PAC, CHART, ²⁷ PHQ, ²⁸ LHS, ²⁹ ROPP

Abbreviations: CHART, Craig handicap assessment and reporting technique; CIQ, community integration questionnaire; DASH, disabilities of the Arm, Shoulder and Hand score; IMPACT, Measure of Participation and Activities questionnaire; IPA, impact on participation and autonomy; KAP, Keele Assessment of Participation; LHS, London handicap scale; LIFE-H, assessment of life habits; MHP, Michigan hand outcomes questionnaire; PHQ, perceived handicap questionnaire; PM-PAC, participation measure for post-acute care; POPS, participation objective participation subjective; ROPP, rating of perceived participation; RNL, reintegration to normal living; USER-P, Utrecht scale for evaluation of rehabilitation-participation; WHODAS II, World Health Organization disability assessment schedule II; WHOQOL, World Health Organization quality of life assessment.

Table 3 Extracted domains of participation based on interview with experts and patients

Domains	Meaning units	Codes	Definitions
Emotional/psychological	Subjective participation	Depression, pain, loneliness, fear of re impaired, satisfaction, maladaptation, bad appearance, try to keep independence, need to be care, depression, fear of loneliness, fear of re injuring, need to be independence	Patients cannot participate in social activities due to the abnormal appearance of their limb (E2)
Interpersonal relationship	Relation with family, friend, colleague, and social interaction	Other expectations, sympathizing, rejection by others, supports of others	They mostly are not accepted by family and friends (E1)
Environment	Physical, cultural	Workplace, home, school	Doing their jobs is the most part of participation in social (E3)
Role	Having different role in life	Being child, parents, student...	As a father, I cannot afford my family needs (P5)
Adaptation	Getting along with impairment and its limitation	Doing works or tasks in unusual manner, patience, diminishing speed and dexterity, usage, compensatory movement, help from other hand, assistive technology, coping	Mostly adapt with their disability level (E4)
Compensatory behavior	Doing compensatory behavior,	Change in speed and ability in doing	They participate any how, but with different shapes (E5)
Appearance	How the limb looks like	Hidden the impaired limb	I do not take part in parties due to shape of my hands (P5)
Behavioral		Doing in an unusual manner, self stem, compensatory movement	
Physical		Pain	
Satisfaction			

5. Economic life (d860–d879)
6. Religious and spirituality (d930)
7. Political and citizenship (d950)
8. Leisure and recreational (d920)
9. Community life (d910)
10. Role
11. Others
12. Domestic life: Self-care, looking after one's health
13. Subjective participation: Emotional/psychological, engagement, appearance, adaptation, compensatory behavior physical, independence and autonomy, personal reaction, satisfaction, and engagement.
14. Environment: Social, cultural temporal

Discussion

The findings from reviewing the literatures brought the authors to the conclusion that a big part of participation has been ignored: perceived participation and engagement

of a person in participation and also his/her satisfaction from participation. Perhaps, there is a need to reevaluate this construct. Some authors are argued that participation could not be measured as a unidimensional construct: performance- and social-based participation.²¹

By reviewing outcome measures, the authors again extracted some aspects of inner participation, such as compensatory behavior, autonomy, and physical conditions that can be all considered as satisfaction in participation.

The most significant finding from interviews was that the meaning of participation revealed something more than just different than their impairment levels. The most important parts of participation were their satisfaction from how they performed their activities in a dynamic process.

Use of compensatory movement and change in speed and dexterity and adaption were the domains, which were mostly addressed by patients “in spite of less dexterity, I can participate in social roles” or “I can do my job with use of my intact limb” that were categorized as personal causation.

It seems this domain and subdomains are mostly barriers and facilitators of participation.

Furthermore, patients emphasized the importance of autonomy in the experience of participation. Autonomy covers aspects such as choice, control, independence, and self-determination. This empirical finding is in line with Cardol and colleagues²² who stress the concept of autonomy as crucial to the proper operationalization of participation and Perenboom and Chorus's²³ definition of participation as the involvement in life situations that also includes the concept of autonomy.

In this study, the authors also concluded that there are some domains of participation based on ICF, which are not included in any of questionnaires (economic life, political life and citizenship, religion and spirituality). Besides, some domains were extracted from theories and questionnaires that are not considered in ICF (such as, autonomy, personal causation, emotional status, and adaptation). By considering the critics about ICF,^{23–26} these results were not incredible.

The authors identified some extra domains, which could not be linked to chapters of participation in ICF, such as others (participation cannot be done alone), role, autonomy satisfaction, and perceived or subjective participation.

Perhaps, the authors can consider some extra dimensions for participation construct: subjective participation (engagement and satisfaction).

To understand the key participation-related domains for appraising the available outcome measures, this information can be used in conjunction with the findings from linking studies to determine whether a given measure has appropriate content coverage in the domain of participation.

As it seems, there are some important aspects of participation, which are not yet considered. There is an increasing need to develop a comprehensive questionnaire to evaluate participation accurately.

Study Limitations

The authors acknowledge that this review of measures, although very comprehensive, may not have included each and every aspect that assesses participation. The selected group of patients causing this can partly limit the generalization of results.

Conclusion

It is critical to know that disability is an umbrella term, which includes activity limitation and also participation restriction. Activity limitation is directly related to impairment level (a patient with median nerve palsy has difficulty in apposition), but participation is fully under control of personal and environmental factors. Two persons with the same impairment level do not necessarily have the same participation level (the injuries in median nerve can hinder the role of being a mother and caring in a woman). Therefore, as all surgical procedures are aimed to manipulate impairments and mostly they cannot improve all the impairments and the patients should live with some sequels, it is important to

evaluate their participation level truly to improve their engagement in society. Developing a specified participation measure for the patients with hand and upper extremity disorders is necessary.

Note

The ethics committee of the University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, approved this work.

Conflict of Interest

None.

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Appendix 1 Domains of participation in general questionnaires

Instrument	Abbreviations	Domains	Population
Craig Handicap Scale and Reporting Technique	CHART ²⁷	Physical independence, mobility, occupation, social integration, economic self-sufficiency	General population
Perceived Handicap Questionnaire	PHQ ²⁸	Physical independence, mobility, independency, economic self-sufficiency, occupation	Spinal cord injury
London Handicap Scale	LHS ²⁹	Physical independence, mobility, independency, economic self-sufficiency, orientation, occupation	Several groups of patients with chronic diseases
Reintegration to Normal Living index	RNL index ³⁰	Indoor community, distance, self-care, daily activity, recreational and social activity, general coping skills relationships	Varied diagnoses
Impact on Participation and Autonomy	IPA ³¹	Social relation, autonomy of self-care, family role, mobility and leisure Mobility, family role, self-care finance, leisure, social relation, help and support, work, and education	Five diagnostic groups from outpatient clinics of two rehabilitation centers
Nottingham Health Profile	NHP ³²	Life areas	Patient's perceived emotional, social, and physical health problems
Community Integration Questionnaire	CIQ ³³	Community integration: relationships with others, independence in one's own living situation and meaningful activities	Brain injury
Activity Enumeration Index	AEI ³⁴		OA, RA
Lubben Social Network Scale	Lubben scale ³⁵		
WHO Disability Assessment Schedule II	WHODAS II ³⁶	Understanding and communication, getting around, self-care, getting along with people, life activities, work or education, participation in society	General population
World Health Organization Quality of Life	WHOQOL ³⁷	Physical health, psychological health, social relationship, environment	Level of satisfaction in carrying out these activities or in participating
SF36	SF36 ³⁸	Role functioning physical, role functioning emotional	General population
ICF Measure of Participation and Activities	IMPACT ⁹	Knowledge, general tasks, communication, mobility, self-care Domestic life, interpersonal, major life areas, community life	General population
LIFE-H	LIFE-H ⁴²	Nutrition/responsibility/fitness/interpersonal relationships/personal care/ community life/communication/education/housing/employment/mobility/recreation	Older adult
Utrecht Scale for Evaluation of Rehabilitation-Participation	USER-P ³⁹	Frequency, experienced restrictions, and satisfaction in time the respondent spends on paid work, unpaid work, study, and housekeeping in a typical week,	Objective and subjective participation

(Continued)

Appendix 1 (Continued)

Instrument	Abbreviations	Domains	Population
		frequency of leisure and social activity measuring the frequency of performing activities in the past 4 weeks such as visiting family or friends/satisfaction with participation is determined by asking the respondent to indicate the satisfaction with 9 aspects of life, such as contacts with family members	
Participation Measure for Post-Acute Care	PM-PAC ⁴⁰	Mobility; role functioning; community, social, and civic life; domestic life/self-care; economic life; interpersonal relationships; communication; work; and education	Postacute care
The Participation Scale	P-scale ⁴¹		People affected by leprosy or disability
Rating of Perceived Participation	ROPP ⁴²	Patient's satisfaction and desired, mobility; role functioning; community, social, and civic life; domestic life/self-care; economic life; interpersonal relationships; communication; work; and education	Neurologic rehabilitation
Participation Objective Participation Subjective	POPS ¹⁹	Frequency or hours of nonhousehold activities; wants to perform more, the same, or less of the activity, and the importance of the activity to well-being; for an objective component (PO), and a subjective component (PS) that reflects importance-weighted satisfaction with activity level	Traumatic brain injury (TBI)
Keele Assessment of Participation	KAP ⁴³	Individual's perception of their actual involvement in life situations, expectations, aspirations, and needs, as well as contextual factors	General population

Appendix 2 Participation items of general questionnaires

Items	Questionnaires	Domains	Codes	Domains
Problems due to barriers or hindrances in the world around	WHODAS II	Moving around	d455	
Time spent on health condition or its consequences	WHODAS II	Looking after one's health	d570	
Taking care of household responsibilities	WHODAS II	Doing housework	d640	
Doing most important household tasks well	WHODAS II	Doing housework	d640	
Getting all the household work done that needed to do	WHODAS II	Doing housework	d640	
Getting household work done as quickly as needed	WHODAS II	Doing housework	d640	
Dealing with people who do not know	WHODAS II	Interpersonal interactions and relationships	d7	
Maintaining a friendship	WHODAS II	Interpersonal interactions and relationships	d7	
Problems in joining in community activities (e.g., festivities, religious or other activities) in the same way as anyone else can	WHODAS II	Interpersonal interactions and relationships	d7	
Problem in living with dignity because of the attitudes and actions of others	WHODAS II	Interpersonal interactions and relationships	d7	
Emotionally affecting by health condition?	WHODAS II	Interpersonal interactions and relationships	d7	
Problem in family because of health problems?	WHODAS II	Interpersonal interactions and relationships	d7	
Day-to-day work/school	WHODAS II	Work and employment	d840–d859	
Doing most important work/school tasks well	WHODAS II	Work and employment	d840–d859	
Getting all the work done that are need to do	WHODAS II	Work and employment	d840–d859	
Getting works done as quickly as needed	WHODAS II	Work and employment	d840–d859	
Drain on the financial resources because of health problem	WHODAS II	Work and employment	d840–d859	
Unable to carry out usual activities or work because of any health condition	WHODAS II	Work and employment	d840–d859	
Problem in doing things for relaxation or pleasure	WHODAS II	Recreation and leisure	d920	
Traveling outside home	CIQ ^a	Moving around	d455	
Shopping household needs	CIQ	Caring for household objects	d650	

(Continued)

Appendix 2 (Continued)

Items	Questionnaires	Domains	Codes	Domains
Care of children in home	CIQ	Assisting others	d660	
Visiting friends or relatives	CIQ	Interpersonal interactions and relationships	d7	
Getting around in house where wanted	IPA ^b	Moving around	d455	
Getting heavy tasks done around the house (e.g., cleaning),	IPA	Moving around	d455	
Minor repairs and maintenance work done in house and garden	IPA	Caring for household objects	d650	
Chances of visiting relatives and friends when wanted to	IPA	Interpersonal interactions and relationships	d7	
Chances of seeing people as often as wanted	IPA	Interpersonal interactions and relationships	d7	
Quality of relationships with people who are closed	IPA	Interpersonal interactions and relationships	d7	
Chances of fulfilling role at home as like	IPA	Work and employment	d840–d859	
Chances of getting or keeping a paid or voluntary job that like to do	IPA	Work and employment	d840–d859	
Chances of using leisure time the way wanted to	IPA	Recreation and leisure	d920	
Difficulty communicating with other people	LIFE-H	Moving around	d455	
Spending in recreational activities such as sports, exercise, playing cards, or going to movies	LIFE-H	Recreation and leisure	d920	
Go out to public places	Late-Life FDI	Interpersonal interactions and relationships	d7	
Visit friends and family	Late-Life FDI	Interpersonal interactions and relationships	d7	
Keep in touch with others	Late-Life FDI	Interpersonal interactions and relationships	d7	
Take care of own health	Late-Life FDI			
Provide meals	Late-Life FDI	—		
Assist others	Late-Life FDI	Assisting others	d660	
Take care of household finances	Late-Life FDI	Economic life	d860–d879	
Invite people for meal or entertainment	Late-Life FDI	Interpersonal interactions and relationships	d7	

Appendix 2 (Continued)

Items	Questionnaires	Domains	Codes	Domains
Take care of local errands	Late-Life FDI			
Take care of inside of home	Late-Life FDI	Caring for household objects	d650	
Take part in social activities	Late-Life FDI	Interpersonal interactions and relationships	d7	
Travel out of town for overnight stay	Late-Life FDI	Moving around	d455	
Work at volunteer job	Late-Life FDI	Work and employment	d840–d859	
1. Purposeful sensory experiences	IMPACT-S	Learning and applying knowledge		
2. Basic learning	IMPACT-S	Learning and applying knowledge		
3. Applying knowledge	IMPACT-S	Learning and applying knowledge		
4. Task execution in quiet circumstances	IMPACT-S	General tasks and demands		
5. Task execution in stressful circumstances	IMPACT-S	General tasks and demands		
6. Communicating, receiving	IMPACT-S	Communication		
7. Communicating, producing	IMPACT-S	Communication		
8. Use of communication devices and techniques	IMPACT-S	Communication		
9. Changing and maintaining body position	IMPACT-S	Mobility		
Carrying, moving and handling objects	IMPACT-S	Mobility		
10. Lifting and carrying objects	IMPACT-S	Mobility		
11. Moving objects using lower extremities	IMPACT-S	Mobility		
12. Fine hand use	IMPACT-S	Mobility		
13. Gross movements of hand and arm	IMPACT-S	Mobility		
14. Walking and moving	IMPACT-S	Mobility		
15. Moving around using transportation	IMPACT-S			
16. Washing and dressing	IMPACT-S	Self-care		
17. Caring for body parts and toileting	IMPACT-S	Self-care		
18. Eating, drinking, maintaining good health	IMPACT-S	Self-care		
19. Acquisition of necessities	IMPACT-S	Domestic life		
20. Household tasks Caring for household objects and assisting others	IMPACT-S	Caring for household objects	d650	
21. Caring for household objects	IMPACT-S	Caring for household objects	d650	
22. Assisting others	IMPACT-S	Assisting others	d660	

(Continued)

Appendix 2 (Continued)

Items	Questionnaires	Domains	Codes	Domains
23. General interpersonal interactions Particular interpersonal relationships	IMPACT-S	Interpersonal interactions and relationships	d7	
24. Formal relationships	IMPACT-S	Interpersonal interactions and relationships	d7	
25. Informal and family relationships	IMPACT-S	Interpersonal interactions and relationships	d7	
26. Intimate relationships	IMPACT-S	Interpersonal interactions and relationships	d7	
27. Education, work, and employment economic life	IMPACT-S	Economic life	d860–d879	
28. Basic economic transactions	IMPACT-S	Economic life	d860–d879	
29. Managing long-term financial situation	IMPACT-S	Economic life	d860–d879	
30. Community life	IMPACT-S			
31. Recreational and leisure	IMPACT-S	Recreation and leisure	d920	

Abbreviations: Late-Life DFI, late-life function and disability instrument; FDI, IMPACT-S, Measure of Participation and Activities questionnaire-S; LIFE-H, assessment of life habits; WHODAS II, World Health Organization disability assessment schedule II.

^aCommunity Integration Questionnaire.

^bImpact on participation and autonomy.

Appendix 3 Participation items in hand questionnaires

Item	Test	Component	Codes
Using usual technique for your work	DASH	Work and employment	d859
Doing usual work in spite of arm, shoulder or hand pain	DASH	Work and employment	d859
Doing work as well as every one would like	DASH	Work and employment	d859
Spending usual amount of time in doing work	DASH	Work and employment	d859
Limitation in work or other regular daily activities as a result of arm, shoulder, or hand problem	DASH	–	d850/d
arm, shoulder, or hand problem interfered with your normal social activities with family, friends, neighbors, or groups	DASH	Recreation and leisure	d9205
Manage transportation needs (getting from one place to another)	DASH	–	d489
Recreational activities in which you move your arm freely (e.g., playing Frisbee, badminton, etc.)	DASH	Recreation and leisure	d9201
Recreational activities in which take some force or impact through arm, shoulder or hand (e.g., golf, hammering, tennis, etc.)	DASH	Recreation and leisure	d920
Recreational activities, which require little effort (e.g., card playing, knitting, etc.)	DASH	Recreation and leisure	d920
Unable to do work because of problems in hand(s) and/or wrist(s)	MHQ	Work and employment	d839/d859
Shorten workday because of problems with hand(s)	MHQ	Work and employment	d839/d859
Take it easy at work because of problems with hand(s) or wrist(s)	MHQ	Work and employment	d839/d859
Less accomplish in work because of problems with hand(s) or wrist(s)	MHQ	Work and employment	d839/d859
Take longer to do the tasks in work because of problems with hand(s) or wrist(s)	MHQ	Work and employment	d839/d859
the pain in hand(s) and/or wrists(s) interfere with your daily activities (e.g., eating or bathing)	MHQ	–	d
The appearance (look) of hand that interfered with normal social activities.	MHQ	–	d9
No question	MAM-16	–	–
No question	POS-Hand/Arm	–	–
Perform normal leisure activities without difficulty	HAT	Recreation and leisure	d920

Abbreviations: DASH, Disabilities of the arm, shoulder and hand score; HAT, hand assessment tool; MAM-16, manual ability measure; MHQ, Michigan hand outcomes questionnaire; POS-Hand/Arm, patient's outcome of surgery hand/arm.