



Applying the International Classification of Functioning, Disability, and Health in children with low vision: differences between raters

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Background/aim: This study was conducted to analyze the agreement between International Classification of Functioning, Disability, and Health (ICF) raters and to show its applicability in children with low vision.

Materials and methods: Twenty children (mean age: 11.70 ± 1.92 years) were included. To evaluate the independency of the sample, the Northwick Park Activities Daily Living questionnaire was used. The Low Vision Quality of Life Scale was used to evaluate quality of life. An ICF core set was developed to be used in this study. The core set consisted of 13 items for body functions, 3 items for body structures, 36 items for activity and participation, and 12 items for environmental factors.

Results: High agreement was found between two raters in terms of subparameters of the ICF core set for activity and participation ($r = 0.880$, $P = 0.000$).

Conclusion: The findings indicate that the raters showed strong agreement in terms of the ICF core set used in this study. This shows that the core set can be used to evaluate activity and participation of children with low vision.

Key words: Low vision, children, disability, activity and participation, core set

1. Introduction

Low vision (ICD-10: H54.2; <http://www.icd10data.com/>) is defined as visual acuity of $<6/12$ that is not correctable by refraction or treatment (1). Low vision impacts several aspects of functioning and quality of life (QoL) (2). Although individuals with low vision have some usable vision, many experience a range of vision-functioning restrictions associated with reading, mobility, leisure, and personal care (3,4).

The World Health Organization (WHO) defines the International Classification of Functioning, Disability, and Health (ICF) as a comprehensive classification system for how health-related conditions, including disabilities, affect people's lives (5,6).

The ICF aims at generating a uniformed language and a standardized coding scheme for the description and classification of health and health-related states to develop and improve the communication among health professionals, researchers, and the public. It also provides a universal framework for health information systems and health outcome measurements (6).

The ICF examines individuals' activities and their limitations both in their own residency and in society. The ICF has two parts dealing with physical functioning and

disability level [Body Functions (b) and Body Structures (s)], while the second part of the ICF focuses on activity participation level (d), environmental factors (e), and personal factors (7,8).

The ICF consists of 1454 codes: 1) body structures, 493 codes; 2) body functions, 310 codes; 3) activities and participation, 393 codes; and 4) environmental factors, 258 codes (8).

ICF codes could also be used in pediatric practice (4). The ICF for disabled children has not been studied sufficiently, but it can also be used to plan their progress from early stages to school programs (9,10).

The pragmatic aim of this study was to analyze agreement between ICF raters and to show the ICF's applicability in children with low vision.

2. Materials and methods

Twenty children (10 girls and 10 boys) with low vision living at a school for children with low vision were included in this study. Participants were using glasses and hand glasses. The study was conducted between September 2010 and July 2011. A core set for children with low vision was created by two physiotherapists (PTs) with 6 years of experience in the field about rehabilitation for children

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with low vision (Appendix). The two PTs evaluated the 20 children with low vision from the Denizli Primary School for Blind Children. The two PTs had 2 years of experience regarding ICF application and had ICF certificates. The Ethics Committee of the Pamukkale University Faculty of Medicine, Denizli, Turkey, approved the study protocol (B.30,2.PAU.0.01.00.00.400-3/68). This study was supported by the Pamukkale University Scientific Research Projects Department (2010SBE014). The evaluation was carried out on two occasions: the first evaluation and the second evaluation, 1 week later. Evaluation of each subject was completed within 30 min.

For receiving the consent of the volunteers, before participating in this study they were informed about all details and procedures. Children between 7 and 14 years old who had at least one disability were included in this study. Children with secondary disabilities were excluded. Thirty children were asked to participate in this study. Five of them refused. Five children were excluded as they did not meet the criteria given above. Thus, the final number of children participating in this study was 20. All participants had moderate low vision. The sociodemographic data of the children are given in Table 1.

2.1. Outcome measures

ICF coding provides general information about the person and the person's disorder. Body functions (mental functions, sensory functions and pain, neuromusculoskeletal and movement-related functions), body structures (structures related to movement), activities and participation (learning and applying knowledge, general task and demands, communication, displacement, self-care, interpersonal interactions and relationships), and environmental factors (products and technologies, support and relationship) subparameters were included in the core set. An ICF core set was developed to be used in this study. The core set consisted of 13 items for body functions, 3 items for body structures, 36 items for activity and participation, and 12 items for environmental factors.

Identifiers to determine the status of a person's disability are important (7). General information about identifiers are shown in Table 2.

The body functions (b), the body structures (s), and the environmental factors (e) of the participants were recorded

Table 1. The sociodemographic data of the sample population.

Variables	Mean \pm SD	Min-max
Age (years)	11.70 \pm 1.92	7-14
Weight (kg)	39.20 \pm 11.95	24-62
Height (cm)	143.55 \pm 11.45	122-162
Educational level (years)	5.05 \pm 2.08	1-8

Table 2. General identifiers of the ICF.

Descriptor	Existence of problem	Severity of problem
xxx.0	No problem	0%-4%
xxx.1	Small problem	5%-24%
xxx.2	Moderate problem	25%-49%
xxx.3	Strong problem	50%-95%
xxx.4	Complete problem	96%-100%
xxx.8	Undefined	
xxx.9	Impracticable	

and their percentages were calculated by the raters of this study. The percentages are shown in Table 3.

2.2. Northwick Park Index of Independence (NPI)

Activities of daily living for children with low vision were assessed with a nonspecific test. The NPI is a common activity rating scale used to evaluate the level of independence of children (11). This index consists of 17 subtests: 1- bed, transfer to chair; 2- dressing; 3- bath, in and out movement; 4- showering; 5- using the toilet; 6- continence; 7- self-maintenance: teeth; 8- self-care: other; 9- transfer to the ground; 10- tea preparation; 11- use of faucets; 12- cooking; 13- eating; 14- indoor mobility; 15- down stairs; 16- up stairs; 17- mobility outdoors.

Scoring of the NPI is as follows: 0 points- full dependence, 1 point- partial dependence, 2 points- total independence. The highest score achievable from the whole test is 34 points (2,11,12).

2.3. Low Vision Quality of Life (LVQoL) Questionnaire

LVQoL is used for assessing the quality of life of children with low vision. This questionnaire is applied only to children with low vision. This survey consists of four sections and 25 items. The test section are distance vision, mobility, and lighting (highest possible points: 55); adjustment (highest possible points: 20); reading and fine work (highest possible points: 25); and activities of daily living (highest possible points: 20). The test is completed within 5-10 min in total (13).

2.4. Statistical analysis

All data were computed and calculated using SPSS 20.0 for Windows. $P < 0.05$ was accepted as statistically significant. Descriptive results are given as min-max, mean \pm standard deviation (SD), and percentage (%) (14). Spearman correlation analysis was used to show the relation between the two raters' scores. According to Spearman correlation analysis, relation scores were accepted as follows: 0-0.49, weak; 0.50-0.74, moderate; 0.75-1.00, high (15).

3. Results

The results obtained from this study consisted of demographics belonging to the sample population,

Table 3. The details of ICF parameters of the sample population.

ICF subparameters	(%)						
	0	1	2	3	4	8	9
Body functions							
b140	75	5	5	5	5	-	-
b147	70	20	10	10	10	-	-
b152	85	10	5	-	-	-	-
b156	65	10	10	10	10	-	-
b176	85	5	-	5	5	-	-
b210	65	5	10	10	10	-	-
b215	40	30	10	10	10	-	-
b260	85	15	-	-	-	-	-
b265	95	5	-	-	-	-	-
b270	80	10	5	-	5	-	-
b760	95	5	-	-	-	-	-
b7653	85	10	5	-	-	-	-
b770	70	15	15	-	-	-	-
Body structures							
s710	30	55	15	-	-	-	-
s720	20	75	5	-	-	-	-
s760	30	65	5	-	-	-	-
Environmental factors							
e110	100	-	-	-	-	-	-
e115	65	30	5	-	-	-	-
e1251	75	15	-	5	5	-	-
e1301	80	10	-	-	10	-	-
e1401	75	20	-	-	5	-	-
e310	95	5	-	-	-	-	-
e315	40	20	10	20	10		
e320	70	-	10	10	10	-	-
e325	30	40	10	10	10		
e330	35	45	5	5	10	-	-
e340	75	5	-	-	20		
e355	35	45	5	5	10		

descriptive data including mean \pm SD and percentage (%) of the raters' scores, and the relation between the two raters' scores.

The mean age of the sample population ($n = 20$) was 11.7 ± 1.9 years. The other demographics of the participants are shown in Table 1.

Table 3 shows the percentages of the ICF subparameters such as body functions (b), body structures (s), and environmental factors (e) included in the core set used in this study.

According to the results of the NPI and LVQoL shown in Table 4, participants were independent in activities of daily living (31/34). In addition to this, their quality of life score was moderate (Table 4).

Percentages of activity and participation were calculated. The details can be seen in Table 5.

A strong agreement between the two raters was found in the activity and participation section of the core set used in this study ($r = 0.880$; $P = 0.000$) (Table 6).

4. Discussion

In the last decade, the clinical applicability of the ICF has been determined in many studies in European countries. Although there are many studies in terms of the validity of the ICF in the related literature, few such studies have been done in Turkey. Moreover, there is no study indicating the validity of the ICF's applicability in children with low vision. The pragmatic aim of this study was to analyze the agreement between ICF raters and to show the ICF's applicability in children with low vision.

Ogonowski et al. studied 60 disabled children in order to show the agreement between raters. In their study, they used 40 items (activity and participation), the Pediatric Evaluation of Disability Inventory, the Vineland Adaptive Behavior Scales, and School Function Assessment. The results obtained from their study showed high agreement between the raters in terms of self-care. On the other hand, moderate agreement was found in terms of learning and applying knowledge, communication, and displacement

Table 4. The details of NPI and LVQoL scores of the sample.

Variable	Mean \pm SD	(Min-max)
NPI	31.65 \pm 2.66	(26-34)
Low Vision Quality of Life		
Distance vision, mobility, and lighting	40.05 \pm 9.19	(27-54)
Adjustment	15.55 \pm 3.60	(8-20)
Reading and fine skills	14.40 \pm 8.02	(5-25)
Activities of daily living	14.25 \pm 5.65	(6-25)

Table 5. The details of ICF parameters of the sample population.

ICF subparameters	(%)						
	0	1	2	3	4	8	9
Activity and participation							
d110	95	5	-	-	-	-	-
d120	80	20	-	-	-	-	-
d130	60	20	10	-	10	-	-
d135	90	10	-	-	-	-	-
d155	90	5	-	5	-	-	-
d160	85	5	5	5	-	-	-
d163	50	25	5	5	5	-	-
d166	40	5	5	10	40	-	-
d170	55	-	5	5	35	-	-
d172	50	20	10	5	15	-	-
d175	85	-	5	5	5	-	-
d177	90	5	5	-	-	-	-
d210	100	-	-	-	-	-	-
d220	95	5					
d230	65	35	-	-	-	-	-
d240	90	5	-	5	-	-	-
d330	80	20	-	-	-	-	-
d345	35	15	-	10	40	-	-
d350	80	20	-	-	-	-	-
d360	85	15	-	-	-	-	-
d410	100	-	-	-	-	-	-
d420	100	-	-	-	-	-	-
d430	100	-	-	-	-	-	-
d440	40	20	5	10	25	-	-
d445	80	15	5	-	-	-	-
d450	90	10	-	-	-	-	-
d510	70	25	5	5	-	-	-
d520	100	-	-	-	-	-	-
d530	100	-	-	-	-	-	-
d540	100	-	-	-	-	-	-
d550	100	-	-	-	-	-	-
d560	100	-	-	-	-	-	-
d710	75	20	-	-	5	-	-
d720	60	30	5	-	5	-	-
d750	95	5	-	-	-	-	-
d760	90	10	-	-	-	-	-

(5). Our scores showed higher agreement in all parameters used in Ogonowski et al.'s study. The results indicate that the ICF can be easily used with disabled children to describe their activity and participation. The results of a study with 32 children with cerebral palsy by Brasileiro

et al. also support the results of our study and that of Ogonowski et al. (16).

In a systematic review by Magalhaes et al. from January 1995 to June 2008, the authors reported that the ICF can also be used in children with developmental coordination

Table 6. Activities and investigation of the relationship between coding belonging to the subparameters of participation in the assessment of low vision.*

ICF subparameters		Learning and applying knowledge 2nd rater	General tasks and demands 2nd rater	Communication 2nd rater	Displacement 2nd rater	Self-care 2nd rater	Interpersonal interaction and relationships 2nd rater	Activity and participation (total)
Learning and applying knowledge 1st rater	r P	0.915 0.000						
General tasks and demands 1st rater	r P		0.770 0.000					
Communication 1st rater	r P			0.757 0.000				
Displacement 1st rater	r P				0.753 0.000			
Self-care 1st rater	r P					0.970 0.000		
Interpersonal interaction and relationships 1st rater	r P						0.730 0.000	
Activity and participation (total)	r P							0.880 0.000

*Spearman correlation test.

disorder to describe the children's activity and participation levels (17).

We also included some information from the NPI and the LVQoL questionnaire in our study. The results of our study showed that the children with low vision had high scores in terms of the NPI and LVQoL. Basakçı Çalık et al. showed that a 6-week "pay attention" program can improve the NPI and LVQoL scores of children with low vision. These findings indicated that a restorative and supportive rehabilitation program is vital for those with low vision (2).

The limitations of this study are as follows: it had a small sample population including low vision children, and all the children study and live at their school (a boarding school). Therefore, we could not compare our sample with children with low vision not attending boarding schools. Despite these limitations, the study has a major strength: it is the first one showing the ICF's applicability in children with low vision.

Keeping in mind the limitations of the present study, we plan to perform further research with a larger sample size so that we can make more general comments for these

children. Activity and participation are very important parts of daily living for disabled individuals. Activity and participation levels show the independency status in daily living activities of the disabled. That is why activity and participation levels of the disabled should be described before planning the most suitable rehabilitation program. Our study results indicate the ICF's applicability in children with low vision. In the literature, the ICF has not still been studied sufficiently for children with disabilities. In Turkey, there are few studies regarding the ICF for children with disabilities and none for children with low vision. However, studies regarding the ICF for children with low vision have already done by Rainey et al. and Van Leeuwen et al. These researchers tried to show the rehabilitation goals and needs for children with low vision using the ICF (18,19). Some other researchers studied the ICF for cerebral palsy and spina bifida (10,16). In Turkey, however, there is no previous study of ICF application in children with low vision. That is why further studies are needed to support and improve the ICF's applicability in this field.

References

1. Rees G, Xie J, Chiang PP, Larizza MF, Marella M, Hassell JB, Keefe JE, Lamoureux EL. A randomised controlled trial of a self-management programme for low vision implemented in low vision rehabilitation services. *Patient Educ Couns* 2015; 98: 174-181.
2. Basakçı Çalık B, Kitiş A, Cavlak U, Oğuzhanoglu A. The impact of attention training on children with low vision: a randomized trial. *Turk J Med Sci* 2012; 42: 1186-1193.
3. Lamoureux EL, Hassell JB, Keefe JE. The determinants of participation in activities of daily living in people with impaired vision. *Am J Ophthalmol* 2004; 137: 265-270.
4. Burmedi D, Becker S, Heyl V, Wahl H, Himmelsbach I. Emotional and social consequences of age-related low vision. *Vis Impair Res* 2002; 4: 47-71.
5. Ogonowski JA, Kronk AR, Rice CN, Feldman H. Inter-rater reliability in assigning ICF codes to children with disabilities. *Disabil Rehabil* 2004; 24: 353-361.
6. World Health Organization. *International Classification of Functioning, Disability and Health: ICF*. Geneva, Switzerland: WHO; 2001.
7. Okochi J, Utsunomiya S, Takahashi T. Health measurement using the ICF: test-retest reliability study of ICF codes and qualifiers geriatric care. *Health Qual Life Outcomes* 2005; 3: 46.
8. Karaduman AA, Özberk ZN. Uluslararası Fonksiyonellik, Özur ve Sağlık Sınıflandırması ICF. In: *Fizyoterapistler için ICF Temel Eğitim Çalıştayı*; Denizli, Turkey; 2010. p. 181 (in Turkish).
9. Beckung E, Hagberg G. Neuroimpairments, activity limitations, and participation restrictions in children with cerebral palsy. *Dev Med Child Neurol* 2002; 44: 309-316.
10. Kinsman SL, Levey E, Ruffing V, Stone J, Warren L. Beyond multidisciplinary care: a new conceptual model for spina bifida services. *Eur J Pediatr Surg* 2000; 10: 35-38.
11. Wade DT. *Measurement in Neurological Rehabilitation*. New York, NY, USA: Oxford University Press, NY, USA; 1992.
12. Akı E. *Occupational therapy in low vision*. PhD, Hacettepe University, Ankara, Turkey, 2002.
13. Wolffshon JS, Cochrane AL. Design of the low vision quality of life questionnaire (LVQOL) and measuring the outcome of low vision rehabilitation. *Am J Ophthalmol* 2000; 130: 793-802.
14. Sümbüloğlu V, Sümbüloğlu K. *Sağlık Bilimlerinde Araştırma Yöntemleri*. Ankara, Turkey: Hatiboğlu Yayınları; 2005 (in Turkish).
15. Ural A. *Bilimsel Araştırma Süreci ve SPSS ile Veri Analizi, SPSS 12.0 for Windows*. Ankara, Turkey: Detay Yayıncılık; 2005 (in Turkish).
16. Brasileiro IC, Moreira TM, Jorge MS, Queiroz MV, Mont'Alverne DG. Activities and participation of children with cerebral palsy according to the International Classification of Functioning. *Rec Bras Enferm* 2009; 62: 4: 503-511 (in Portuguese with English abstract).
17. Magalhaes LC, Cardoso AA, Missiuna C. Activities and participation in children with developmental coordination disorder: a systematic review. *Res Dev Disabil* 2011; 32: 1309-1316.
18. Rainey L, van Nispen, van Rens G. Evaluating rehabilitation goals of visually impaired children in multidisciplinary care according to ICF-CY guidelines. *Acta Ophthalmol* 2014; 92: 689-696.
19. van Leeuwen LM, Rainey L, Kef S, van Rens GH. Investigating rehabilitation needs of visually impaired young adults according to the International Classification of Functioning, Disability and Health. *Acta Ophthalmol* 2015; 93: 642-650.

Appendix. ICF core set for children with low vision.

Name	Year	Weight	Height	Dominant Extremity	Educational Year	SCORE						
THE CORE SET						0	1	2	3	4	8	9
BODY FUNCTIONS												
MENTAL FUNCTIONS												
b140	Attention Functions											
b147	Psychomotor Functions											
b152	Emotional Functions											
b156	Perceptual Functions											
b176	Mental Function of Sequencing Complex Movements											
SENSORY FUNCTIONS AND PAIN												
b210	Seeing Functions											
b215	Functions of Structures Adjoining the Eye											
b260	Proprioceptive Function											
b265	Touch Function											
b270	Sensory Functions Related to Temperature and Other Stimuli											
NEUROMUSCULOSKELETAL AND MOVEMENT-RELATED FUNCTIONS												
b760	Control of Voluntary Movement Functions											
b7653	Stereotypies and Motor Perseveration											
b770	Gait Pattern Functions											
BODY STRUCTURES												
STRUCTURES RELATED TO MOVEMENT												
s710	Structure of Head and Neck Region											
s720	Structure of Shoulder Region											
s760	Structure of Trunk											
ACTIVITIES AND PARTICIPATION												
LEARNING AND APPLYING KNOWLEDGE												
d110	Watching											
d120	Other Purposeful Sensing											
d130	Copying											
d135	Rehearsing											
d155	Acquiring Skills											
d160	Focusing Attention											
d163	Thinking											
d166	Reading											
d170	Writing											
d172	Calculating											
d175	Solving Problems											
d177	Making Decisions											
GENERAL TASKS AND DEMANDS												
d210	Undertaking a Single Task											
d220	Undertaking Multiple Tasks											
d230	Carrying out Daily Routine											

Appendix. (Continued).

d240	Handling Stress and Other Psychological Demands								
COMMUNICATION									
d330	Speaking								
d345	Writing Messages								
d350	Conversation								
d360	Using Communication Devices and Techniques								
MOBILITY									
d410	Changing Basic Body Position								
d420	Transferring Oneself								
d430	Lifting and Carrying Objects								
d440	Fine Hand Use								
d445	Hand and Arm Use								
d450	Walking								
SELF-CARE									
d510	Washing Oneself								
d520	Caring for Body Parts								
d530	Toileting								
d540	Dressing								
d550	Eating								
d560	Drinking								
INTERPERSONAL INTERACTIONS AND RELATIONSHIPS									
d710	Basic Interpersonal Interactions								
d720	Complex Interpersonal Interactions								
d750	Informal Social Relationships								
d760	Family Relationships								
ENVIRONMENTAL FACTORS									
PRODUCTS AND TECHNOLOGY									
e110	Products or Substances for Personal Consumption								
e115	Products and Technology for Personal Use in Daily Living								
e1251	Assistive Products and Technology for Communication								
e1301	Assistive Products and Technology for Education								
e1401	Assistive Products and Technology for Culture, Recreation, and Sport								
SUPPORT AND RELATIONSHIPS									
e310	Immediate Family								
e315	Extended Family								
e320	Friends								
e325	Acquaintances, Peers, Colleagues, Neighbors and Community Members								
e330	People in Positions of Authority								
e340	Personal Care Providers and Personal Assistants								
e355	Health Professionals								