



Describing Effectiveness of Performing International Classification of Function, Disability and Health on Children with Cerebral Palsy

Uluslararası Fonksiyonellik, Özur ve Sağlık Sınıflandırması Kodlama Sisteminin Serebral Palsili Çocuklarda Uygulanarak Etkinliğinin Belirlenmesi

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ABSTRACT

Objective: Aim of this study was to investigate the effectiveness of performing the International classification of functioning, disability and health: children and youth version (ICF-CY) on the description of functioning, disability and health in children with cerebral palsy (CP).

Methods: Thirty children with diplegic or hemiplegic CP (13 girls: 17 boys) with a mean age of 9.13±2.2 years (6-13 years) participated in the study. For ICF core set, 35 categories were selected which were most suitable for children with CP. In addition, gait and balance tests, gross motor function measurement, Wee-FIM for Children Scale and Child Health Questionnaire-Mother/Father Report (CHQ-PF50) were also used. Body structure and function, activity and participation of each child and limiting and facilitating factors of their environment were coded.

Results: The ICF core set body functions, activity-participation, walking and balance tests, Gross Motor Function Measure-88 (GMFM-88), Pediatric Functional Independence Measure (WEEFIM) were found to be moderately correlated ($p<0.05$). There was a weak to moderate correlation between ICF core set body functions and activity-participation and CHQ-PF50 ($p<0.05$). There was a weak correlation between ICF core set environmental factors and walking and balance tests, GMFM-88, WEEFIM, and CHQ-PF50 ($p<0.05$).

Conclusion: We think that the ICF is an effective conceptual framework for defining functioning, disability and health in children with CP, that ICF system can be used as a reference

ÖZ

Amaç: Bu çalışmanın amacı serebral palsili (SP) çocuklarda fonksiyonellik, özur ve sağlığın tanımlanmasında İşlevsellik, Yeti Yitimi ve Sağlığın Uluslararası Sınıflandırması-Çocuklar ve Gençler (ICF-CY) versiyonunun kullanım etkinliğini incelemektir.

Yöntemler: Çalışmaya yaş ortalaması 9,13±2,2 yıl olan (6-13 yıl) 30 diplejik veya hemiplejik SP'li çocuk (13 kız; 17 erkek) katılmıştır. Oluşturulan ICF Kısa Set için SP'li çocuklarda sağlık ve fonksiyonelliğin tanımlanmasında en uygun olan 35 kategori seçilmiştir. Değerlendirmede ayrıca yürüme ve denge testleri, kaba motor fonksiyon ölçümü, Çocuklar İçin Bağımsızlık Ölçeği (Wee-FIM) ve Çocuk Sağlık Anketi-Anne/Baba Raporu da (CHQ-PF50) kullanılmıştır. Her bir çocuğun vücut yapısı ve fonksiyonu, aktivite ve katılımı ile çevresine ait kısıtlayıcı ve kolaylaştırıcı faktörleri kodlanmıştır.

Bulgular: Çalışmanın sonucunda ICF kısa set vücut fonksiyonları ve aktivite-katılım ile yürüme ve denge testleri, Kaba Motor Fonksiyon Ölçümü-88 (KMFÖ-88), Pediyatrik Fonksiyonel Bağımsızlık Ölçütü (PFBÖ) genel olarak orta düzeyde ilişki bulunmuştur ($p<0,05$). ICF kısa set vücut fonksiyonları ve aktivite-katılım ile CHQ- PF50 arasında zayıf-orta düzeyde ilişki bulunmuştur ($p<0,05$). ICF kısa set çevresel faktörler ile yürüme ve denge testleri, KMFÖ- 88, PFBÖ, CHQ- PF 50 arasında genel olarak zayıf düzeyde ilişki bulunmuştur ($p<0,05$).

Sonuç: Serebral palsili çocuklarda fonksiyon, özur ve sağlığın tanımlanmasında ICF'nin etkili bir kavramsal çerçeve olduğu, ICF sisteminin referans bir değerlendirme ölçütü olarak

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assessment criterion and that it will guide physiotherapists working with children with CP.

Keywords: Cerebral Palsy, ICF, motor activity, activity-participation

kullanılabileceğini ve SP'li çocuklarla çalışan fizyoterapistlere yol gösterici olacağını düşünmekteyiz.

Anahtar Sözcükler: Serebral palsi, ICF, motor aktivite, aktivite-katılım

Introduction

Cerebral palsy (CP) is defined as a group of motor disorder syndromes that develop secondary to brain anomalies or lesions that develop in the early stages of development and are not progressive, but often change (1,2).

The World Health Organization (WHO) gives the disability rate as 10%. Of disabled people, 80% live in low income countries. In our country-Turkey- the disability rate is 29%. The rate of disability is increasing in the world. The incidence of CP has been reported to be 1.5-2.5 per 1000 live births in many populations. In epidemiological studies conducted in Turkey, the frequency of CP has been reported as 4.4/1,000 (3). CP can affect the child's motor and sensory systems, as well as can cause many deformities and deficiencies. In parallel with these developments, it became necessary to establish a common language for functioning, disability and health classification.

In this context, international classification studies initiated by Philip Wood in 1973 for the first time in the USA have developed and reached its current level (4). The revisions continued over the years and in 1993 the Classification of Impairments, Disabilities and Handicaps System was published. In the 54th World Health Assembly, ICF (International Classification of Functioning, Disability and Health), which was a conceptual framework that assessed health and disability on an individual and social level, was formally structured with the participation of 191 member countries. ICF is an integrative holistic approach based on the bio-psycho-social model (5).

According to ICF system; there are Structural and Functional Disabilities Disorder (spasticity, muscle weakness, contracture joint movement limitation), Activity (inability to walk, stairs, difficulty eating), Participation (difficulty in going to school, not visiting friends, not going to the cinema), Personal factors (gender, age, education level, motivation), and Environmental Factors (physical environment, social environment, social security, economic conditions) (2).

A version of ICF used in children and youth (ICF-CY) with special content and additional details was developed to create a common language on functional and participation problems in children and young people (3,6,7). ICF-CY can be used to guide functional status assessment, goal achievement, treatment planning and control, as well as for classification and outcome measurements. Additional information provided by profiling the child's functionality within and between its components provides a more rational and more meaningful basis for identifying treatment needs, using resources, and evaluating outcomes through assessments based on ICF-CY (8,9).

The aim of this study is to determine the effectiveness of ICF System in children with diparetic or hemiparetic CP with different assessments and scales.

Methods

The study was carried out in Denizli Yağmur Çocukları Special Education and Rehabilitation Center between 01.01.2016-01.12.2016.

Participants

Thirty diplegic or hemiplegic children aged between 6-14 years living in Denizli were included in the study. As a result of the power analysis, the effect size of the correlation was assumed to be moderate and it was determined that it was sufficient to involve 26 people in the study in order to obtain 80% power with 95% confidence. For the study, approval was obtained from Pamukkale University Medical Ethics Committee with 16,733 number and 10.03.2016. It was also supported by the Scientific Research Projects Coordination Unit of Pamukkale University (2016SBE006). Informed consent forms were obtained from families of children with CP for the study.

Inclusion Criteria for Volunteers

- Children with CP aged between 6-14 years old
- Clinical type of diparetic and hemiparetic
- Children who can walk independently or using auxiliary devices
- Children who meet level I, II or III according to the GMFCS

Exclusion Criteria for Volunteers:

- The presence of a secondary disability other than CP
- Difficulty in communication and cooperation

Descriptive Data

A form was created in which the socio-demographic characteristics of the patients were recorded. This form also contained the data recording section of the tests and scales used during the evaluation phase.

Assessment Methods

ICF Core Set

Core ICF Set is used to describe the functional skills and difficulties that children with CP use to perform daily activities. Core ICF Set: body structures: 1 item, body functions: 10 items, activities and participation: 13 items, environmental factors: 11 items consisting of 35 ICF categories (10-14).

Gross Motor Function Measure (GMFM- 88)

The GMFM- 88 was used to determine functional skill level. GMFM- 88, which has 5 sub-dimensions, evaluates the child with CP in terms of lying-rolling (dimension A), sitting (dimension B), crawling-kneeling (dimension C), standing (dimension D) and walking activities (dimension E). It is a scale that measures the rate of performing activities. Accordingly, the multiplication of the maximum score of the patient's score in each dimension by 100 represents the percentage score obtained for that dimension. The total GMFM- 88 score is obtained by dividing the sum of the scores obtained from the dimensions by 5 (dimensions A-E). The higher the score, the higher the level of performance of gross motor skills of the patient with CP (15,16).

Balance Assessment Tests

Pediatric Berg Balance Scale (PBBS)

The Pediatric Berg Balance Scale (PBBS), a child version of the Berg Balance Scale, was developed by Franjoine et al. (17) The scale consists of 14 sections and each section is scored between 0-4. The highest score that can be obtained from the scale is 56. The higher the score, the higher the level of balance (17,18).

Minute Walking Test (1MWT)

Testing a child at maximum gait speed is considered to be a better assessment of the functional ability for dynamic balance, muscle performance and endurance compared to the gait speed of his/her choice, and may allow many children with CP to walk 1 minute. 1-Minute Walking Test (1MWT) is an easy-to-use, inexpensive functional ability assessment method in clinical trials when time constraints and other necessary testing procedures make it difficult to perform an overall functional assessment (19,20).

Pediatric Functional Independence Measure (WeeFIM)

Pediatric Functional Independence Measure (WeeFIM) was modeled from Functional Independence Measure (FIM), the FIM used as an adult rehabilitation assessment method. It is used to determine the level of functional independence of children and changes in time-dependent functions (21).

Child Health Survey-Mother/Father Report (CHQ-PF50)

It is one of the tests used in children with disabilities to evaluate the quality of life of children with CP. The Child Health Questionnaire-The Mother/Father Report (CHQ-PF50) is an assessment method developed to assess the health-related quality of life of children aged 5 to 18 years. The family version of the CHQ-PF50 was culturally adapted to ensure its validity in Turkish. The CHQ-PF50 consists of 14 subsections and contains a total of 50 question items. Measured concepts are: general health (GGH), physical function (PF), role/social constraints (RP) due to emotional or behavioral difficulties, role/social constraints due to physical health, pain and discomfort, behavior, mental health (MH), self-esteem (SE), general health perception (GH), emotional impact on the parent (PE), time effect on the parent, family activities, family adjustment. It also includes the section on change in health, which compares the health change in a child to a year earlier. The best total score that can be obtained

from the departments is "100" and the worst score is "0... In this study, the scores obtained from all sub-sections were summed and the evaluations were made on the total score. Families were informed about the content of the survey. They were told about the expectations and asked to answer the questions in the survey (22).

Statistical Analysis

Data were analyzed by SPSS (21.0 version) package program. Continuous variables mean \pm standard deviation, median (minimum-maximum values) and categorical variables are given as number (n) and percentage (%). Spearman Correlation Analysis was used to examine the relationships between the scales. Significance level was accepted as $p \leq 0.05$ (23).

Results

Thirty children with CP (14 hemiparesis, 16 diparesis) participated in the study. The mean age of the children was 9.13 ± 2.21 years, the mean body weight was 31.43 ± 11.37 kg, the average length was 132.73 ± 15.86 cm, and the duration of treatment was 6.15 ± 2.75 years (Table 1).

Table 2 shows the mean Gross Motor Function Measure-88 (GMFM-88) total score, WeeFIM total score, PBBS and 1MWT scores.

The average values of the CHQ-PF50 sections of the patients are shown in Table 3.

The relationships between PBBS total score, GMFM-88 total score, WeeFIM total score, 1MWT score and Body Function parameters are shown in Table 4.

There was a statistically significant negative correlation between PBBS, GMFM-88 and WeeFIM total scores and b134, b167 and motivation b1301 of mental related functions and b710 (Mobility functions of joints, easy movement of arms and legs), b735 (Muscle tone function, hypertonus or hypotonus) and b760 (Control of voluntary movement functions) parameters of neuromusculoskeletal and movement related functions.

There was a statistically significant negative correlation between 1MWT score and b134 in mental functions and b710, b735 and b760 in neuromusculoskeletal and movement related parameters.

The relationship between CHQ-PF50 and Body Function parameters are shown in Table 5.

The relationship between PBBS and GMFM-88 total score and ICF components Activities and Participation parameters (performance-capacity) are given in Table 6.

There was a statistically significant negative correlation between the total score of the WeeFIM and the 1MWT score, all of the Activity and Participation parameters (except the d530 of the WeeFIM and d175 of the 1MWT), which were components of the ICF ($p < 0.05$) (Table 7 I-II).

The relationship between CHQ-PF50 and ICF components Activities and Participation (performance-capacity) is given in Table 8 I-II-III.

Table 1. Demographic and clinical characteristics of children with CP

Parameter	X ± SD	Median (min-max)
Age (year)	9.13±2.21	9 (6-13)
Height (cm)	132.73±15.86	131.5 (109-176)
Weight (kg)	31.43±11.37	29 (13-75)
Birth weight (kg)	2517.33±985.82	2750 (700-4,200)
Incubation time (weeks)	16.8±22.3	7.5 (0-90)
Rehabilitation time (years)	6.15±2.75	6 (1-12)
	n	%
Gender		
Girl	13	43
Boy	17	57
Delivery method		
Cesarean	19	63
Normal	11	37
Dominant hand		
Right	13	43
Left	17	57

X: Mean, SD: Standard deviation, Min: Minimum, Max: Maximum

Table 2. GMFM-88, WeeFIM, PBBS and 1MWT scores

Parameter	X ± SD	Median (min-max)
GMFM-88-TS	80.46±20.51	89.8 (18.88-99.44)
WeeFIM-TS	101.63±26.75	113.5 (16-126)
PBBS-TS	38.4±20.51	50 (4-56)
1MWT (m)	45.87±20.72	48 (2-80)

GMFM-88-TS: GMFM-88 total score, WeeFIM-TS: WeeFIM total score, PBBS- TS: PBBS total score, 1MWT: 1-Minute Walking Test, X: Mean, SD: Standard deviation, Min: Minimum, Max: Maximum

Table 3. CHQ-PF 50 scores

CHQ-PF 50	X ± SD	Median (min-max)
GGH	45±18.89	46.0 (0-60)
PF	48.75±36.36	46.80 (0-100)
REB	49.25±37.33	41.97 (0-100)
RP	48.30±39.94	45.83 (0-100)
BP	70.00±25.99	75.71 (20-100)
BE	67.54±23.52	69.44 (0-100)
GBE	51.00±32.86	52.50 (0-100)
MH	61.83±20.73	60.71 (15-95)
SE	64.71±20.31	69.99 (0-100)
GH	43.74±16.04	42.70 (13.3-76.6)
PE	39.22±21.83	40.38 (0-75)
PT	48.14±34.19	48.14 (0-100)
FA	61.27±23.29	64.28 (8.3-100)
FC	68.83±24.76	72.50 (0-100)

X: Mean, SD: Standard deviation, Min: Minimum, Max: Maximum

GGH: General health, PF: Physical function, REB: Emotional or behavioral difficulties due to role/social restrictions, RP: Physical health role/social restrictions, BP: Pain and discomfort, BE: Behavior, MH: Mental health, SE: Self-esteem, GH: General health perception, PE: Emotional effect on parents, PT: Time effect on parents, FA: Family activities, FC: Family adjustment, GBE: Global behavior

The relationship between GMFM-88-TS, WeeFIM-TS, PBBS and 1MWT score and Environmental Factors from ICF Components is shown in Table 9.

There was a statistically significant negative (facilitating) relationship between PBBS score, GMFM-88 total score and 1MWT and e150 parameter from Environmental Factors ($p < 0.05$).

There was a statistically significant negative (facilitating) relationship between WeeFIM total score and e150, e460 and e580 parameters of Environmental Factors ($p < 0.05$).

The relationship between the parameters of CHQ-PF50 and Environmental Factors from ICF Components is shown in Table 10.

Discussion

The ICF coding system provides a framework for measuring, classifying and conceptualizing the disability and functioning. It aims to create a common and standard language for defining health and health-related situations (24). In this study, which was initiated in 1973, WHO requested that the concepts of impairment, disability and handicap be dealt with in a multidimensional way. These steps paved the way for the ICF classification system, which led to an international dimension by spreading the issue (3,25).

In recent years, the bio-psychosocial system, which advocates that individuals with permanent or temporary disability or handicap should be examined with a holistic point of view as well as their medical conditions, has advocated the establishment of new registration and identification systems. In this context, ICF-CY systems have been developed in the last 15 years. International classification studies initiated by Philip Wood in 1973 for the first time in the USA have developed and reached their present level. The first studies on this issue in Turkey were initiated by the Administration of Disabled People. In the first step studies, the Turkish translation of ICF was made (25).

Participation is defined by the International Classification of Functioning, Disability and Health (ICF) as “involvement in a life situation” and encompasses, among others, the domains: domestic life, education and employment, interpersonal interactions and relationships, and community, social, and civic life. According to the ICF, participation performance can be qualified objectively by

the experienced difficulty or the use of assistive devices for human assistance needed in performing life habits (3).

The results of this study, which was planned to demonstrate the effectiveness of ICF in children with CP, by correlating them with different tests and scales, showed that ICF sub-components could be used to identify problems of children with CP, determine activity and participation levels, and determine the impact of environmental factors.

In their systematic review of adults with CP using the International Classification of Functioning, Disability and Health, (26) identified the most commonly used results in studies of adults with CP. The most common ones were pain, mobility, self-care, employment, and recreation. It has been stated that the broad ICF categories defined in this study emphasize the heterogeneity of functionality and disability in adults with CP. However, it was stated that there was a limited focus on environmental and personal factors.

Children’s participation in various activities during the daytime is important for their development. Participation in activities is known to increase children’s creativity and to integrate them into social life where they develop their skills. Physiotherapy and occupational therapy are applied to children with CP for a long time in order to increase their mobility and to gain independence in self-care, school, play and leisure activities. According to Pihlar (27), occupational therapy should be within the framework of multiple sources, theories and models and should include many functions. In parallel with this idea of Pihlar (27), ICF has been considered to evaluate the individual from a multifaceted perspective.

Hurley et al. (28), in their studies examining how generalized data obtained from CP records can be generalized in order to fully understand CP, they emphasized that the kept records contain important information about how CP affects the person, family and society. Also; they stated that the rate of record keeping increased, the cost decreased and the transfer of information between the researcher, the individual and the society became easier thanks to technological developments. In a study examining the status of reflecting physiotherapy goals of the two most commonly used scales [GMFM-88 and Pediatric Evaluation of Disability Inventory (PEDI)] to evaluate the disability status of children with CP, it was seen that the individual goals determined in the children’s physiotherapy program were met by the activities in these scales.

Table 4. Relationship between Body Functions and PBBS, GMFM, WeeFIM and 1MWT

Body functions		b117	b1301	b134	b140	b167	b210	b280	b710	b735	b760
PBBS-TS	r	-0.289	-0.428*	-0.492**	-0.044	-0.500**	0.145	-0.077	-0.756**	-0.496**	-0.765**
	p	0.121	0.018	0.006	0.817	0.005	0.444	0.685	0.000	0.005	0.000
GMFM- 88-TS	r	-0.403*	-0.427*	-0.406*	-0.105	-0.405*	0.005	0.058	-0.790**	-0.542**	-0.720**
	p	0.027	0.019	0.026	0.580	0.026	0.980	0.762	0.000	0.002	0.000
WeeFIM-TS	r	-0.439*	-0.578**	-0.609**	-0.293	-0.419*	-0.044	-0.039	-0.737**	-0.603**	-0.819**
	p	0.015	0.0001	0.000	0.116	0.021	0.816	0.840	0.000	0.000	0.000
1MWT(m)	r	-0.216	-0.336	-0.498**	-0.275	-0.241	0.085	0.310	-0.513**	-0.409*	-0.592**
	p	0.253	0.069	0.005	0.141	0.200	0.656	0.096	0.004	0.025	0.001

GMFM-88-TS: GMFM-88 total score, WeeFIM-TS: WeeFIM total score, PBBS- TS: PBBS Total Score, 1MWT: 1-Minute Walking Test, * $p < 0.05$, ** $p < 0.01$

Table 5. Relationship between CHQ-PF50 and body functions

Body functions										
CHQ- PF 50	b117	b1301	b134	b140	b167	b210	b280	b710	b735	b760
r	.111	.102	.163	-.022	.234	-.046	.080	-.070	.160	.068
GGH										
p	.558	.590	.389	.906	.214	.811	.672	.712	.399	.721
r	-.411 *	-.456 *	-.360	-.220	-.363 *	-.183	-.097	-.696 **	-.315	-.568 **
PF										
p	.024	.011	.051	.242	.049	.334	.610	.000	.090	.001
r	-.489 **	-.664 **	-.513 **	-.112	-.365 *	.033	-.170	-.661 **	-.148	-.427 *
REB										
p	.006	.000	.004	.555	.047	.862	.369	.000	.434	.018
r	-.411 *	-.600 **	-.437 *	-.064	-.371 *	.113	-.145	-.581 **	-.083	-.377 *
RP										
p	.024	.000	.016	.738	.044	.554	.444	.001	.664	.040
r	-.278	-.424 *	-.413 *	-.235	-.307	.337	-.195	-.246	.167	-.056
BP										
p	.136	.020	.023	.211	.099	.069	.302	.190	.377	.768
r	-.424 *	-.461 *	-.457 *	-.423 *	-.353	.087	-.238	-.211	.071	-.117
BE										
p	.020	.010	.011	.020	.056	.648	.205	.263	.711	.538
r	-.254	-.414 *	-.451 *	-.273	-.419 *	-.008	-.132	-.314	-.100	-.389 *
GBE										
p	.175	.023	.012	.145	.021	.964	.488	.091	.600	.034
r	-.543 **	-.607 **	-.659 **	-.560 **	-.525 **	.403 *	-.316	-.370 *	-.173	-.287
MH										
p	.002	.000	.000	.001	.003	.027	.089	.044	.361	.124
r	-.468 **	-.573 **	-.536 **	-.295	-.510 **	.331	-.273	-.416 *	-.061	-.306
SE										
p	.009	.001	.002	.114	.004	.074	.145	.022	.748	.101
r	.043	-.004	.011	.074	-.086	-.064	.270	-.133	-.162	-.377 *
GH										
p	.820	.982	.955	.698	.650	.735	.149	.483	.393	.040
r	.067	.040	-.109	-.077	-.103	.097	.099	-.120	.085	-.140
PE										
p	.731	.837	.573	.693	.596	.615	.609	.536	.662	.470
r	-.137	-.174	-.190	.025	-.237	-.097	-.130	-.300	-.066	-.324
PT										
p	.470	.358	.315	.898	.206	.611	.495	.107	.731	.080
r	-.312	-.414 *	-.388 *	-.321	-.403 *	-.085	-.206	-.320	-.107	-.354
FA										
p	.093	.023	.034	.084	.027	.657	.274	.084	.574	.055
r	-.099	-.157	-.359	-.206	-.227	.127	-.225	-.049	.007	-.126
FC										
p	.602	.408	.052	.274	.227	.502	.233	.795	.972	.507

*p<0.05, **p<0.01, r: Correlation coefficient, GGH: General health, PF: Physical function, REB: Emotional or behavioral difficulties due to role/social restrictions, RP: Physical health role/social restrictions, BP: Pain and discomfort, BE: Behavior, MH: Mental health, SE: Self-esteem, GH: General health perception, PE: Emotional effect on parents, PT: Time effect on parents, FA: Family activities, FC: Family adjustment, GBE: Global behavior

The work of Engelen et al. (29) supports the ICF as an important source of information collection.

In a systematic review examining the studies using the ICF-CY coding system to compare and identify the most frequently mentioned functional areas of outcome measures used for children with CP, 161 systematic categories associated with ICF-CY were found. Of the 161 categories, 53 (33.5%) were associated with body functions, 75 (46%) activity/participation, 26 (16.1%) environmental factors, and 7 (4.3%) related to body structures. The content of outcome measures selected for use in clinical

practice and studies in children with CP is important in guiding the clinician and the researcher (13).

Jeglinsky et al. (30) included 70 children between the ages of 1-16 with CP, and stated that there were some deficiencies in determining the relationship between children's needs, functional deficiencies and treatment goals. They therefore emphasize the need to develop basic ICF-CY subgroups that can serve as a framework to help identify the needs of the child and the needs of professionals and parents.

Table 6 I-II. Relationship between activity-participation and PBBS and GMFM-88 scores

I		d175 p	d175 c	d230 p	d230 c	d350 p	d350 c	d415 p	d415 c	d440 p	d440 c	d450 p	d450 c	d460 p	d460 c
PBBS-TS	r	-.398*	-.350	-.696**	-.692**	-.456*	-.442*	-.693**	-.657**	-.573**	-.590**	-.817**	-.786**	-.807**	-.814**
	p	.030	.058	.000	.000	.011	.015	.000	.000	.001	.001	.000	.000	.000	.000
GMFM-TS	r	-.389*	-.309	-.653**	-.623**	-.430*	-.358	-.764**	-.654**	-.685**	-.643**	-.740**	-.687**	-.749**	-.719**
	p	.034	.097	.000	.000	.018	.052	.000	.000	.000	.000	.000	.000	.000	.000

II		d530 p	d530 c	d550 p	d550 c	d710 p	d710 c	d760 p	d760 c	d820 p	d820 c	d920 p	d920 c
PBBS-TS	r	-.664**	-.638**	-.598**	-.572**	-.460*	-.441*	-.504**	-.461*	-.692**	-.692**	-.776**	-.724**
	p	.000	.000	.000	.001	.011	.015	.004	.010	.000	.000	.000	.000
GMFM-TS	r	-.661**	-.598**	-.540**	-.490**	-.392*	-.358	-.426*	-.334	-.638**	-.610**	-.695**	-.663**
	p	.000	.000	.002	.006	.032	.052	.019	.071	.000	.000	.000	.000

*p<0,05, **p<0,01, p: Performance, k: Capacity, r: Correlation Coefficient, GMFM-88-TS: GMFM-88 Total Score, PBBS- TS: PBBS Total Score, **Activity-Participation Parameters:** d175: Problem solving, d230: Performing daily routines, d350: Conversation, d415: Maintaining body position, d440: Fine hand skills, d450: Walking, d460: Walking around, d530: Toilet, d550: Eating, d710 : Basic interpersonal interactions, d760: Family relations, s820: School education, d920: Fun and leisure

Table 7 I-II. Relationship between Activity-Participation and Wee-FIM and 1MWT scores

I		d175 p	d175 c	d230 p	d230 c	d350 p	d350 c	d415 p	d415 c	d440 p	d440 c	d450 p	d450 c	d460 p
WeeFIM-TS	r	-.541**	-.491**	-.871**	-.824**	-.584**	-.556**	-.716**	-.624**	-.740**	-.691**	-.830**	-.781**	-.831**
	p	.002	.006	.000	.000	.001	.001	.000	.000	.000	.000	.000	.000	.000
1MWT	r	-.337	-.274	-.687**	-.619**	-.440*	-.340	-.630**	-.447*	-.499**	-.381*	-.628**	-.557**	-.685**
	p	.068	.143	.000	.000	.015	.066	.000	.013	.005	.038	.000	.001	.000

II		d460 c	d530 p	d530 c	d550 p	d550 c	d710 p	d710 c	d760 p	d760 c	d820 p	d820 c	d920 p	d920 c
WeeFIM-TS	r	-.819**	-.819**	-.760**	-.695**	-.652**	-.524**	-.489**	-.565**	-.444*	-.757**	-.743**	-.856**	-.822**
	p	.000	.000	.000	.000	.000	.003	.006	.001	.014	.000	.000	.000	.000
1MWT	r	-.615**	-.643**	-.570**	-.469**	-.392*	-.353	-.304	-.330	-.169	-.764**	-.697**	-.755**	-.695**
	p	.000	.000	.001	.009	.032	.055	.102	.074	.373	.000	.000	.000	.000

*p<0.05, **p<0.01, p: Performance, k: Capacity, r: Correlation Coefficient, WeeFIM-TS: WeeFIM Total Score, 1MWT: 1-Minute Walking Test, **Activity-Participation Parameters:** d175: Problem solving, d230: Performing daily routines, d350: Conversation, d415: Maintaining body position, d440: Fine hand skills, d450: Walking, d460: Walking around, d530: Toilet, d550: Eating, d710 : Basic interpersonal interactions, d760: Family relations, s820: School education, d920: Fun and leisure

Ogonowski et al. (31) examined the compatibility of ICF coding system between the evaluators in children with disabilities and included 60 children from different disability groups. In the ICF coding of children, 40 parameters were evaluated by coding the sub-components of learning and applying knowledge and activities, general tasks and demands, communication, displacement, self-care, interpersonal interaction and relations from activity and participation component. PEDI, Vineland Behavior Scale, School Achievement Scale were used together with ICF coding. As a result of ICF coding, the agreement between the evaluators was found to be low in general tasks and demands, interpersonal interaction and relationships, learning and knowledge application, communication, displacement, and high level of self-care. There was a positive correlation between PEDI and ICF codes, but no correlation was found between the Vineland Behavior Scale, School Achievement Scale and ICF codes.

Cerebral palsy is a heterogeneous condition with different clinical outcomes and potential disorders (32). This diversity is likely to

be reflected in the evaluation choices used in studies conducted with children with CP. In a systematic review, it was seen that the ICF-CY scopes of the measurements used in the studies reflected CP diversity in the study and clinical applications (33).

Core sets also promote multidisciplinary cooperation by encouraging all members of the team to use the same language “ICF-CY” classes in the definition of function in children with CP (34).

In their studies on the application of ICF-CY in the evaluation of rehabilitation of patients with CP; Tomás et al (35). expressed the need for a systematic approach to CP rehabilitation and the importance of dynamic evaluation of the results. They stated that ICF-CY could be used to define and measure the extent of health disorders in children with CP, but there were no clear quantitative criteria that allowed the use of ICF-CY to determine the effectiveness of medical rehabilitation of patients with CP. In addition to general physical and clinical neurological examinations in various 29 children with CP who received medical

Table 8 I-II. Relationship between Activity-Participation and CHQ-PF50

I		d175	d175	d230	d230	d350	d350	d415	d415	d440	d440	d450	d450	d460	d460
		p	c	p	c	p	c	p	c	p	c	p	c	p	c
GGH	r	.222	.205	.081	.110	.212	.214	-.065	-.005	.146	.175	.195	.172	.221	.228
	p	.239	.278	.672	.564	.261	.256	.733	.978	.442	.355	.301	.364	.241	.226
PF	r	-.468**	-.396*	-.581**	-.536**	-.460*	-.445*	-.622**	-.528**	-.519**	-.519**	-.566**	-.561**	-.563**	-.563**
	p	.009	.030	.001	.002	.011	.014	.000	.003	.003	.003	.001	.001	.001	.001
REB	r	-.370*	-.330	-.483**	-.551**	-.359	-.386*	-.477**	-.420*	-.424*	-.461*	-.459*	-.490**	-.494**	-.484**
	p	.044	.075	.007	.002	.051	.035	.008	.021	.020	.010	.011	.006	.005	.007
RP	r	-.311	-.271	-.383*	-.450*	-.335	-.357	-.394*	-.336	-.279	-.333	-.367*	-.395*	-.413*	-.395*
	p	.094	.147	.037	.013	.071	.053	.031	.070	.136	.072	.046	.031	.023	.031
BP	r	-.310	-.274	-.265	-.365*	-.231	-.269	-.108	-.090	.108	.038	-.130	-.156	-.161	-.152
	p	.096	.143	.156	.047	.219	.151	.569	.635	.569	.842	.494	.411	.395	.424
BE	r	-.414*	-.377*	-.186	-.264	-.300	-.373*	-.273	-.321	-.057	-.126	-.150	-.199	-.134	-.182
	p	.023	.040	.324	.158	.108	.043	.145	.084	.766	.507	.429	.293	.481	.335
GBE	r	-.433*	-.390*	-.376*	-.365*	-.414*	-.445*	-.411*	-.417*	-.189	-.233	-.408*	-.416*	-.378*	-.419*
	p	.017	.033	.041	.047	.023	.014	.024	.022	.318	.215	.025	.022	.039	.021
MH	r	-.588**	-.622**	-.460*	-.578**	-.475**	-.538**	-.445*	-.483**	-.264	-.301	-.394*	-.419*	-.401*	-.433*
	p	.001	.000	.011	.001	.008	.002	.014	.007	.159	.106	.031	.021	.028	.017
SE	r	-.372*	-.346	-.303	-.416*	-.326	-.400*	-.388*	-.457*	-.114	-.216	-.305	-.332	-.272	-.318
	p	.043	.061	.104	.022	.079	.029	.034	.011	.550	.252	.101	.073	.146	.087
GH	r	-.076	-.015	-.127	-.069	-.105	-.077	-.145	-.130	-.130	-.126	-.177	-.139	-.181	-.168
	p	.692	.938	.502	.718	.579	.687	.446	.493	.494	.506	.350	.462	.338	.376
PE	r	-.183	-.121	-.179	-.066	-.274	-.194	-.139	.015	.050	.079	-.098	-.070	-.138	-.116
	p	.342	.532	.353	.734	.150	.313	.473	.940	.799	.684	.614	.720	.476	.550
PT	r	-.213	-.139	-.101	-.073	-.299	-.282	-.204	-.171	-.056	-.140	-.206	-.220	-.189	-.211
	p	.259	.465	.594	.700	.108	.131	.281	.367	.767	.462	.276	.243	.316	.264
FA	r	-.494**	-.432*	-.444*	-.418*	-.515**	-.520**	-.334	-.301	-.265	-.349	-.416*	-.426*	-.353	-.390*
	p	.005	.017	.014	.021	.004	.003	.071	.106	.156	.059	.022	.019	.056	.033
FC	r	-.243	-.195	-.249	-.263	-.215	-.231	-.204	-.242	.001	-.080	-.235	-.245	-.196	-.216
	p	.196	.302	.184	.161	.255	.219	.279	.198	.996	.675	.211	.192	.299	.252

II		d530 p	d530 c	d550 p	d550 c	d710 p	d710 c	d760 p	d760 c	d820 p	d820 c	d920 p	d920 c
GGH	r	.195	.176	.103	.104	.206	.162	.191	.154	.108	.086	.092	.090
	p	.301	.352	.587	.585	.275	.391	.312	.416	.571	.651	.628	.636
PF	r	-.629**	-.610**	-.582**	-.561**	-.440*	-.453*	-.438*	-.352	-.464**	-.472**	-.520**	-.549**
	p	.000	.000	.001	.001	.015	.012	.015	.056	.010	.008	.003	.002
REB	r	-.471**	-.508**	-.408*	-.406*	-.390*	-.435*	-.349	-.285	-.544**	-.546**	-.506**	-.569**
	p	.009	.004	.025	.026	.033	.016	.059	.127	.002	.002	.004	.001
RP	r	-.384*	-.427*	-.385*	-.383*	-.378*	-.423*	-.340	-.269	-.455*	-.455*	-.400*	-.434*
	p	.036	.018	.036	.037	.039	.020	.066	.151	.012	.011	.029	.017
BP	r	-.271	-.269	-.288	-.300	-.322	-.369*	-.293	-.264	-.307	-.334	-.222	-.327
	p	.148	.151	.123	.107	.083	.045	.117	.158	.099	.071	.239	.078
BE	r	-.267	-.320	-.313	-.361*	-.377*	-.427*	-.393*	-.383*	-.235	-.298	-.133	-.284
	p	.155	.084	.092	.050	.040	.019	.032	.036	.211	.110	.484	.128
GBE	r	-.393*	-.390*	-.341	-.353	-.410*	-.410*	-.419*	-.409*	-.465**	-.509**	-.401*	-.504**
	p	.032	.033	.065	.056	.024	.025	.021	.025	.010	.004	.028	.005
MH	r	-.542**	-.578**	-.581**	-.616**	-.599**	-.642**	-.608**	-.583**	-.572**	-.612**	-.469**	-.590**
	p	.002	.001	.001	.000	.000	.000	.000	.001	.001	.000	.009	.001
SE	r	-.310	-.349	-.412*	-.451*	-.430*	-.465**	-.488**	-.529**	-.366*	-.432*	-.314	-.391*
	p	.096	.058	.024	.012	.018	.010	.006	.003	.047	.017	.091	.033
GH	r	-.084	.024	-.049	-.018	-.044	.002	-.118	-.111	-.060	-.051	-.056	-.051
	p	.659	.901	.797	.924	.818	.993	.536	.561	.753	.788	.770	.787
PE	r	-.213	-.122	-.158	-.125	-.145	-.121	-.090	.069	-.212	-.173	-.190	-.209
	p	.268	.529	.412	.517	.454	.532	.644	.722	.269	.368	.325	.276
PT	r	-.203	-.144	-.117	-.122	-.241	-.241	-.182	-.124	-.173	-.186	-.136	-.166
	p	.281	.448	.539	.519	.199	.200	.337	.513	.361	.326	.475	.380
FA	r	-.477**	-.411*	-.320	-.328	-.408*	-.405*	-.442*	-.370*	-.402*	-.431*	-.377*	-.482**
	p	.008	.024	.085	.076	.025	.026	.015	.044	.028	.017	.040	.007
FC	r	-.235	-.154	-.116	-.138	-.195	-.181	-.235	-.204	-.246	-.285	-.195	-.276
	p	.212	.416	.542	.467	.303	.337	.212	.280	.189	.127	.301	.139

*p<0,05, **p<0,01, p: Performance, k: Capacity, r: Correlation Coefficient, **Activity-Participation Parameters:** d175: Problem solving, d230: Performing daily routines, d350: Conversation, d415: Maintaining body position, d440: Fine hand skills, d450: Walking, d460: Walking around, d530: Toilet, d550: Eating, d710 : Basic interpersonal interactions, d760: Family relations, s820: School education, d920: Fun and leisure, GGH: General health, PF: Physical function, REB: Role Social Restrictions Due to Emotional or Behavioral Difficulties, RP: Role Social Restrictions Due to Physical Health, BP: Pain and Unreliability, BE: Behavior, MH: Mental health, SE: Self-Esteem , GH: General Health Perception, PE: Emotional effect on parent, PT: Time effect on parent, FA: Family activities, FC: Family compliance

Table 9. Relationship between GMFM-88, WeeFIM, PBS and 1MWT scores

		e115	e120	e125	e130	e140	e150	e310	e320	e460	e580	e585
PBS	r	-.117	-.359	-.062	-.131	-.146	-.516**	-.223	-.262	-.340	-.312	-.174
	p	.539	.051	.745	.490	.440	.004	.237	.163	.066	.093	.359
GMFM	r	-.253	-.406*	-.018	-.082	-.203	-.603**	-.195	-.299	-.353	-.290	-.168
	p	.178	.026	.926	.667	.281	.000	.301	.108	.056	.121	.376
Wee-FIM	r	-.115	-.226	-.048	-.045	-.149	-.396*	-.136	-.204	-.433*	-.413*	-.325
	p	.545	.229	.802	.812	.433	.030	.475	.281	.017	.023	.079
1MWT	r	-.144	-.200	.216	.156	-.040	-.365*	.008	-.092	-.218	-.139	-.078
	p	.448	.290	.251	.409	.835	.047	.967	.630	.248	.464	.681

*p<0,05, **p<0,01, r: Correlation coefficient, Environmental Factors; e115: Products and technology for personal use in everyday life, e120: Products and technology for personal use in movement and transport, e125: Products and technology for communication, e130: Products and technology for education, e140: Culture, entertainment and sports e150: Design of public buildings, building and construction products and technology, e310: Close family, e320: Friends, e460: Social attitude, e580: Health care, systems and policies, e585: Education and training services, systems and policies.

GGH: General Health, PF: Physical Function, REB: Role Social Restrictions Due to Emotional or Behavioral Difficulties, RP: Role Social Restrictions Due to Physical Health, BP: Pain and unreliability, BE: Behavior, MH: Mental health, SE: Self-Esteem, GH: General health perception, PE: Emotional effect on parent, PT: Time effect on parent, FA: Family activities, FC: Family compliance

Table 10. Relationship between Environmental Factors and CHQ-PF50

CHQ- PF 50	e115	e120	e125	e130	e140	e150	e310	e460	e580	e585
GGH	r	-.040	-.064	-.208	-.126	-.130	-.082	-.023	-.139	-.164
	p	,833	,736	,261	,508	,494	,668	,904	,464	,386
PF	r	-.035	-.162	,030	-.004	-.454*	-.223	-.456*	-.494**	-.353
	p	,852	,392	,875	,985	,012	,237	,215	,005	,056
REB	r	,026	-.414*	-.047	-.029	-.524**	-.014	-.058	-.279	-.104
	p	,891	,023	,805	,804	,003	,940	,759	,135	,585
RP	r	-.053	-.505**	-.053	-.038	-.617**	-.113	-.290	-.257	-.069
	p	,780	,004	,779	,841	,501	,551	,403	,170	,717
BP	r	,158	-.057	,155	,244	-.210	,098	-.158	-.147	,028
	p	,405	,763	,414	,194	,870	,605	,576	,439	,885
BE	r	,251	,045	,307	,393*	-.066	,034	,168	-.089	-.043
	p	,180	,815	,099	,031	,104	,860	,375	,641	,822
GBE	r	-.020	-.235	,000	-.003	-.341	-.224	-.304	-.408*	-.355
	p	,919	,211	,998	,989	,065	,235	,103	,025	,054
MH	r	,515**	,179	,441*	,534**	,422*	,193	,090	-.034	,045
	p	,004	,345	,015	,002	,020	,308	,167	,857	,815
SE	r	,133	-.122	,026	,169	,097	,034	-.111	-.234	-.119
	p	,482	,519	,893	,371	,611	,857	,488	,214	,530
GH	r	-.444*	-.453*	-.177	-.282	-.256	-.484**	-.247	-.134	-.150
	p	,014	,012	,350	,131	,171	,007	,188	,482	,427
PE	r	-.005	-.147	,167	,061	-.042	-.148	-.022	,031	,153
	p	,980	,446	,386	,755	,829	,443	,911	,875	,429
PT	r	,045	-.232	-.014	-.022	-.102	-.113	-.147	-.125	,038
	p	,814	,218	,941	,909	,593	,554	,439	,512	,842
FA	r	,116	-.008	,171	,150	,007	-.102	-.096	-.257	-.078
	p	,541	,968	,367	,428	,971	,591	,612	,170	,681
FC	r	,205	-.003	,083	,173	,029	,079	,005	,037	,139
	p	,277	,989	,663	,359	,878	,678	,980	,846	,465

Environmental Factors; e115: Products and technology for personal use in everyday life, e120: Products and technology for personal use in movement and transport, e125: Products and technology for communication, e130: Products and technology for education, e140: Culture, entertainment and sports e150: Design of public buildings, building and construction products and technology, e310: Close family, e320: Friends, e460: Social attitude, e580: Health care, systems and policies, e585: Education and training services, systems and policies.
 GGH: General Health, PF: Physical Function, REB: Role Social Restrictions Due to Emotional or Behavioral Difficulties, RP: Role Social Restrictions Due to Physical Health, BP: Pain and Unreliability, BE: Behavior, MH: Mental health, SE: Self-Esteem , GH: General health perception, PE: Emotional effect on parent, PT: Time effect on parent, FA: Family activities, FC: Family compliance

rehabilitation in hospital and outpatient clinics for 12 months in their study, all patients were tested using special questionnaires and scales before and after rehabilitation treatment, and also a brief ICF -CY core set. As a result, they suggested that the sensitivity of ICF-CY use to evaluate the effectiveness of medical rehabilitation of patients with CP was 89% and the specificity was 91% and it could be used to evaluate the effectiveness of medical rehabilitation.

When the effects of different treatment techniques were examined, ICF model showed that it provided a good model for measuring the effects of different physiotherapy techniques for CP (33).

Mutlu et al. (36) evaluated 448 children with CP ranging in age from 4 to 15 years. Children's performance test was evaluated using GMFM-88 and Manual Ability Classification System (MACS). In this study, ICF was used to evaluate activity limitations. Overall agreement of GMFM-88 and MACS with ICF was found to be 41%. Spastic children's compliance rate was 42%, 40% in dyskinetic children, 50% in ataxic children and 28% in mixed type children. They reported that ICF was an easy-to-use and fast classification tool for identifying activity limitations in children with CP.

In the above-mentioned studies, ICF coding system was found to be effective in determining the conditions of children with CP and young people with different disabilities and disabilities. In our study, a core set covering all sub-parameters of ICF-CY was used in parallel with the literature and a moderate agreement was found between the other tests and measurements used.

Although the studies agreed on some parts of the function, each study used its own classification set. In addition, the fact that each perspective emphasizes or prioritizes different areas of function has shown the importance of the coexistence of health care workers and families in the discussion of functional goals and in planning goal-oriented approaches. Therefore, ICF is not a classification and identification system that should be used only by health professionals. In order to improve the quality of life for disabled and handicapped people, other disciplines should also make training in this field.

In our study, the ICF core set for children with CP was found to be appropriate for the disability levels of the children evaluated and was compatible with the results of other selected evaluation tests and scales. In addition, the medium-level significant correlation between ICF results and the results of other selected tests and scales showed that ICF was effective in level definition of children with CP and its results were clinically important. The data obtained at the end of our study confirmed the hypothesis that performing ICF-CY in children with CP (Diparetic and Hemiparetic) is effective. Because all the results were compared with the results of previous studies and published studies, it was observed that there were parallel ideas.

Although our study was a cross-sectional study, the limitations of the study were that it was conducted with a small number of disabled children and that children with hemiparetic and diparetic CP were included in the study. Despite this, it yielded

important results in terms of applicability of the ICF short set chosen in defining the functionality of children with CP. The strength of our study was that the validity and reliability of the tests and scales used in our study and associated with the ICF short set were determined.

In the light of our findings, the results of our study can be summarized as follows: The ICF core set for children with CP was found to be appropriate for the disability levels of the children evaluated and consistent with the results of other selected tests and scales.

In our study, a moderate relationship was found between the ICF core-set body functions and activity participation parameters and the assessment scales used in children with CP (walking, balance, GMFM-88, PBBS and CHQ-PF50, Wee FIM tests). A weak correlation was found between ICF core-set environmental factors and gait, balance, GMFM-88, PBBS and CHQ-PF50 tests.

The concordance of other test and scale results selected with the ICF core set for children with CP showed that the ICF system could be used as a reference evaluation criterion.

Conclusion

As a result, it is important that other tests and scales to be used with the ICF core set are selected in accordance with the ICF sub-parameters. The core set of ICF system is thought to be a guide for physiotherapists who work with children with CP especially in the field of pediatric rehabilitation in terms of evaluating body functions, activity-participation levels and environmental factors of children with CP in the ages between 6 and 14 years.

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Ethics

Ethics Committee Approval: For the study, approval was obtained from Pamukkale University Medical Ethics Committee with 16,733 number and 10.03.2016. It was also supported by the Scientific Research Projects Coordination Unit of Pamukkale University (2016SBE006).

Informed Consent: A consent form was completed by all participants.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: E.K., Design: U.C., E.K., Data Collection or Processing: A.H.A.S., E.K., Analysis or Interpretation: A.H.A.S., U.C., E.K., Literature Search: A.H.A.S., U.C., E.K., Writing: A.H.A.S., U.C., E.K.

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