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AN ICF CORE SET BASED INVESTIGATION OF THE EFFECTS OF GROSS MOTOR FUNCTIONS ON HEALTH IN CHILDREN WITH CEREBRAL PALSY

ORIGINAL ARTICLE

ABSTRACT

Purpose: The Gross Motor Function Measure (GMFM) is commonly used to assess gross motor functions in children with cerebral palsy (CP). Our aim was to investigate the relationship between gross motor function and health status in children with CP based on clinical types and functional levels.

Methods: This cross-sectional study included 75 children with CP (mean age ± SD 7.59 ±3.86 years). The 66-item Gross Motor Function Measure (GMFM-66) was used to measure the gross motor functions of children. The International Classification of Functioning, Disability and Health (ICF) CP Core Set was used to assess the general health status of children including body functions and structures, activity and participation, and environmental factors for obtaining a holistic framework.

Results: Of the children, 61 (81.3%) were spastic and 14 (18.7%) were dyskinetic. Children were divided into 3 groups based on the Gross Motor Function Classification System (GMFCS) level as mild (levels 1-2, n=28), moderate (level 3, n=16), and severe (levels 4-5, n=31). The GMFM-66 had moderate to strong correlations with body functions and structures (r=-0.811, p<0.001) and activity and participation (r=-0.862, p<0.001) domains of the ICF in severely affected children with CP although it had no strong correlation in any of the ICF domains in mildly or moderately affected children.

Conclusion: Although gross motor functions may reflect the health status holistically in severely affected children with CP, it seems not sufficient to reflect the health status in mildly or moderately affected children with CP.

Keywords: Cerebral palsy, Gross motor function, Health status, ICF

SEREBRAL PALSİLİ ÇOCUKLARDA KABA MOTOR FONKSİYONLARIN SAĞLIK ÜZERİNE ETKİLERİNİN ICF ÇEKİRDEK SETİ TEMEL ALINARAK ARAŞTIRILMASI

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ÖZ

Amaç: Kaba Motor Fonksiyon Ölçümü (GMFM), serebral palsili (SP) çocuklarda kaba motor fonksiyonların değerlendirilmesinde yaygın olarak kullanılmaktadır. Amacımız SP'li çocuklarda klinik tipe ve fonksiyonel seviyelere göre kaba motor fonksiyon ile sağlık durumu arasındaki ilişkiyi araştırmaktı.

Yöntem: Bu kesitsel çalışmaya SP'li 75 çocuk (ortalama±standart sapma yaş 7,59±3,86 yıl) dahil edildi. Çocukların kaba motor fonksiyonlarını ölçmek için 66 maddelik Kaba Motor Fonksiyon Ölçeği (GMFM-66) kullanıldı. Bütünsel bir çerçeve elde etmek amacıyla vücut yapı ve fonksiyonları, aktivite ve katılım düzeyi ve çevresel faktörler de dahil olmak üzere çocukların genel sağlık durumunu değerlendirmek için Uluslararası İşlevsellik, Engellilik ve Sağlık Sınıflandırması (ICF) SP Çekirdek Seti kullanıldı.

Sonuçlar: Çocukların 61'i (%81,3) spastik, 14'ü (%18,7) diskinetikti. Çocuklar Kaba Motor Fonksiyon Sınıflandırması (GMFCS) düzeyine göre hafif (seviye 1-2, n=28), orta (seviye 3, n=16) ve şiddetli (seviye 4-5, n=31) olmak üzere 3 gruba ayrıldı.GMFM-66 ağır etkilenimli SP'li çocuklarda ICF'in vücut yapı ve fonksiyonları (r=-0,811, p<0,001) ile aktivite ve katılım seviyesi (r=-0,862, p<0,001) ile orta-güçlü ilişkiye sahipken, hafif veya orta şiddetli etkilenimi olan SP'li çocuklarda ICF'in hiçbir alanı ile güçlü ilişkisi bulunmadı.

Tartışma: Kaba motor fonksiyonlar, ağır etkilenmiş SP'li çocuklarda sağlık durumunu bütünsel olarak yansıtabilse de, hafif veya orta derecede etkilenmiş SP'li çocuklarda sağlık durumunu yansıtmada yeterli görünmemektedir.

Anahtar Kelimeler: Serebral palsi, Kaba motor fonksiyonlar, Sağlık durumu, ICF

INTRODUCTION

Cerebral Palsy (CP) is a neurodevelopmental, non-progressive condition that occurs in infancy and continues throughout the life and is the most common cause of motor disability in childhood (1, 2). Although the lesion in the brain is not progressive, secondary musculoskeletal problems occur in the following years, which may affect participation. Motor problems such as hypertonia and dyskinesia adversely affect the mobility of children with CP and severely limit the functional independence and participation in the community (3, 4).

Children with CP have many significant obstacles to participation in daily activities and social roles (5). For example, children with CP have lower levels of participation in play activities than their peers as they have difficulties in mobility and have poorer fitness than their peers (6). Therefore, an impairment of physical movement does not limit only body structures and functions, but also activity and participation. Another example for an obstacle to participation in children with CP is that they have impairments in ability to interact with people and to adapt to the environment. In this case, children experience limitations in participating in activities of daily living and social roles, even if their physical conditions allow it. In the long term, it can yield developmental delays in other aspects of health, such as cognition, sensory function, or self-esteem. Depending on the children's impairments of body functions and structures, both of their activity and participation levels and their general health status are limited at varying degrees (7).

The main purpose of holistic treatment programs is to support activity and participation. Therefore, one of the main goals of treatment in CP is to increase the child's mobility to increase functional independence and participation in society as much as possible (4). The World Health Organization (WHO) created the International Classification of Functioning, Disability and Health Child and Youth (ICF-CY) as a classification of health and health-related domains, to standardize the description of functional abilities, health, and disabilities of individuals in a context of a health condition (8). The ICF offers a comprehensive framework for understanding functioning and disability from a dynamic biopsychosocial perspective. Activity and participation have been a focus of studies about childhood disability after the introduction of the ICF-CY. In the ICF-CY model, participation is a key element and is considered the result of the interaction between body functions, structures, activities, and environment (9). Therefore, the main purpose of pediatric rehabilitation should be holistically encouraging the child's participation, and this is also dependent on holistic assessment.

The most widely used, valid, and reliable method to evaluate motor functions in children with CP is the Gross Motor Function Measure (GMFM) The GMFM assesses the extent to which a child with CP can perform an activity, focusing on the level of completion rather than the quality of the activity execution. It scores each activity on a range from 0 (activity cannot be started) to 3 (activity can be completed successfully) regardless of how well the child performed the activity. Therefore, because it is an easy-to-score tool, the GMFM has become the most common functional outcome to evaluate the change in gross motor function of a child with CP among both clinicians and researchers.

On the other hand, there are various other measurement tools assessing other dimensions of participation, similar to GMFM. However, these tools are not used commonly in clinics as much as GMFM. Therefore, the holistic assessment recommended by WHO is not fully implemented. There is also no information about the relationship between gross motor functions and the general health status in children with cerebral palsy. The aim of our study was to investigate the association between gross motor level assessed with the GMFM and the general health status assessed by the ICF CP core set in children with CP. We hypothesized that the general health status of children with CP cannot be reflected when only the gross motor functions are assessed.

METHODS

Participants

This is a cross-sectional observational clinical study and was carried out at the Faculty of Physical Therapy and Rehabilitation, Hacettepe University.

Ethical approval for the study was obtained from the local ethics committee (GO 17/900-29). Before starting the study, written informed consent was obtained from each child's parent.

Children were recruited through the Department of Cerebral Palsy and Pediatric Rehabilitation, Faculty of Physical Therapy and Rehabilitation, Hacettepe University. Children were included into the study using census method. Children were enrolled if they were diagnosed with CP and aged between 6 and 12 years. Children having congenital or genetic disorders or having any orthopedic surgery and/or botulinum toxin injections in last 6 months were excluded from the study.

Study Design

All evaluations of the children included in the study were carried out by the researcher physiotherapist in our clinic. First, the functional level of the children was classified by observing them and asking their parents. Then, the children's gross motor functions were evaluated. Finally, the general health status of the children was determined using the ICF CP core set. All evaluations were completed in a single session. The obtained findings were analyzed and the relationships between general health status and gross motor functions were examined based on the children's functional level and clinical type.

Measurements

The Gross Motor Function Classification System-Expanded Revision (GMFCS, kappa 0.55-0.75) was used to determine the gross motor function level of the children (10, 11). The GMFCS is a valid and reliable tool to classify the gross motor function of children with CP (12, 13). It has a series of five distinct but comprehensive levels from level I (most independent) to level V (fully dependent). Then, the children were divided into three groups based on their functional level according to the GMFCS level as mildly affected children (GMFCS levels 1-2), moderately affected children (GMFCS level 3), and severely affected children (GMFCS levels 4-5).

The 66-item GMFM (GMFM-66) is a practical version of the original 88-item GMFM, and both of them measure children's gross motor functions (14). The GMFM-66 was developed to increase the usefulness of the original GMFM as it has fewer items to evaluate the child's gross motor functions. The GMFM-66 assesses children's activities in 5 different positions: (1) lying and rolling, (2) sitting, (3) crawling and kneeling, (4) standing, and (5) walking, running, and jumping. It classifies the children with CP into four groups depending on their achievement in specific items of GMFM-66. To determine the child's GMFM total score, only the performance of the items in the group in which the child was classified is evaluated, not all 66 items. The items are scored from 0 (cannot initiate) to 3 (completed independently). The GMFM-66 score, obtained by taking the average of the evaluated items and multiplying by 100, ranges from 0 to 100. Higher scores indicate better capacity. We used the Gross Motor Ability Estimator (GMAE), a computer program, to obtain the total score. Russell et al. found the test–retest reliability for the GMFM-66 to be high with an intraclass correlation coefficient of 0.99 (15).

The CP Core Set is a short form of the ICF consisting of 25 items specific to CP. The Core Set offers the opportunity to evaluate the child in a holistic frame (16). The Brief Core set consists of 25 domains, including body structure (s), body function (b), activity and participation (d), and environmental factors (e). The domains of the CP Brief Core Set and a total of 25 items contained in the domains are shown in Appendix. The scoring of the core set is done separately for each item in the domain (s), (b), and (d). It is determined if it is facilitating or barrier to the participation in the domain (e). The item identified as a facilitator is scored (+), while the item determined as a barrier is scored (-). After observing children or asking their parents and examining their medical reports, we scored each item between 0 (no problem) and 4 (complete problem) as indicated in its manual (17).

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics 26.0 (SPSS, Chicago, IL, USA), with the significance level set at 0.05. Demographic and clinical characteristics of the participants are presented as mean ± standard deviation (SD) or median, interquartile range (IQR), and frequency. Spearman correlation coefficient (r) was used to examine

Table 1. Descriptive Information of Children in the Study

	X	SD
Age (years)	7.59	3.86
	n	**%**
Sex		
Girl	38.00	49.35
Boy	39.00	50.65
CP Type		
Spastic Hemiplegic	17.00	22.07
Spastic Diplegic	26.00	33.76
Spastic Quadriplegic	20.00	25.99
Dyskinetic	14.00	18.18
Functional Level		
Mild (GMFCS 1-2)	28.00	36.36
Moderate (GMFCS 3)	18.00	23.37
Severe (GMFCS 4-5)	31.00	40.27

X: Mean, SD: Standard Deviation, n: Count, %: Percent, CP: Cerebral Palsy, GMFCS: Gross Motor Function Classification System.

the relationships between variables. Correlation coefficient was interpreted as follows: |r|>0.8 very strong relationship; 0.6<|r|<0.8 strong relationship; 0.4<|r|<0.6 moderate relationship; 0.2<|r|<0.4 weak relationship; and |r|<0.2 very weak relationship (18).

RESULTS

The study included 75 children with CP (mean ± SD age 7.59 ±3.86 years). Of the 75 children, 61 (81.3%) were spastic and 14 (18.7%) were dyskinetic type. Children were divided into 3 groups based on their GMFCS level as mild (level 1 and 2), moderate (GMFCS level 3), and severe (GMFCS level 4 and 5), and there are 28 (37.3%), 16 (21.3%), and 31 (41.3%) children in each group, respectively. The characteristics of the children are shown in Table 1.

Table 2 shows the GMFM-66 scores and the relationships between the sub-parameters of the CP

Table 2. Correlations between the GMFM-66 Score and ICF-CY Components According to Gross Motor Functional Levels

		GMFCS 1-2 (n=28)	GMFCS 3(n=16)	GMFCS 4-5(n=31)	All Population(n=75)
GMFM-66 Score (X±SD)		62.18±9.06	52.55±11.82	24.76±15.24	44.66±21.14
S1 – Structure of the nervoussystem	r	-0.153	-0.495	-0.756	-0.821
	p	0.438	0.051	<0.001**	<0.001**
B1 – Mental functions	r	-0.508	-0.367	-0.715	-0.740
	p	0.006**	0.162	<0.001**	<0.001**
B2 – Emotional functions	r	-0.005	-0.533	-0.812	-0.586
	p	0.982	0.034*	<0.001**	<0.001**
B3 – Movement relatedfunctions	r	-0.340	-0.196	-0.495	-0.772
	p	0.077	0.467	0.005*	<0.001**
B – Body structures andfunctions (total)	r	-0.458	-0.512	-0.811	-0.848
	p	0.014*	0.043*	<0.001**	<0.001**
D4 – Mobility	r	-0.521	-0.440	-0.845	-0.880
	p	0.004	0.088	<0.001**	<0.001**
D5 – Personal Care	r	-0.596	-0.342	-0.649	-0.860
	p	0.001**	0.195	<0.001**	<0.001**
D7 – InterpersonalCommunication	r	-0.464	-0.266	-0.843	-0.749
	p	0.013*	0.318	<0.001**	<0.001**
D – Activity and participation(total)	r	-0.594	-0.438	-0.862	-0.900
	p	0.001**	0.09	<0.001**	<0.001**
E1 – Products and Technology	r	0.387	0.150	0.347	0.326
	p	0.042*	0.580	0.056	0.004*
E3 – Support and Care	r	-0.183	0.114	0.111	-0.126
	p	0.350	0.675	0.554	0.283
E4 – Attitudes	r	0.369	0.130	0.356	0.696
	p	0.054	0.632	0.049*	<0.001**
E5 – Services	r	0.168	-0.457	0.430	0.336
	p	0.393	0.075	0.016*	0.003*
E – Environmental factors(total)	r	0.262	-0.025	0.469	0.416
	p	0.178	0.926	0.008*	<0.001**

X: Mean, SD: Standard Deviation, n: Count, r: Correlation Coefficient, *p<0.05, **p<0.001, GMFCS: Gross Motor Function Classification System, GMFM-66: The 66-Item Gross Motor Function Measurement, ICF: International Classification of Functioning, Disability and Health.

Table 3. Correlations between the GMFM-66 Score and ICF-CY Components According to Clinical Types of Cerebral Palsy

		Spastic Hemiplegic (n=17)	Spastic Diplegic (n=24)	Spastic Quadriplegic (n=20)	Dyskinetic (n=14)
GMFM-66 Score (X±SD)		63.77±8.87	58.58±8.37	27.17±15.09	22.60±12.71
S1 – Structure of the nervous system	r	0.000	-0.487	-0.793	-0.668
	p	1.000	0.016*	<0.001**	0.009*
B1 – Mental functions	r	-0.511	-0.197	-0.719	-0.743
	p	0.036*	0.357	<0.001**	0.002*
B2 – Emotional functions	r	-0.046	-0.039	-0.707	-0.693
	p	0.889	0.858	<0.001**	0.006*
B3 – Movement related functions	r	-0.195	-0.294	-0.753	-0.383
	p	0.454	0.163	<0.001**	0.176
B – Body structures and functions (total)	r	-0.279	-0.461	-0.817	-0.757
	p	0.278	0.024*	<0.001**	0.002*
D4 – Mobility	r	-0.489	-0.485	-0.852	-0.796
	p	0.046*	0.016*	<0.001**	0.001*
D5 – Personal Care	r	-0.648	-0.345	-0.728	-0.649
	p	0.005*	0.099	<0.001**	0.012*
D7 – Interpersonal Communication	r	-0.583	-0.328	-0.818	-0.806
	p	0.014*	0.117	<0.001**	<0.001**
D – Activity and participation (total)	r	-0.542	-0.481	-0.882	-0.868
	p	0.025*	0.017*	<0.001**	<0.001**
E1 – Products and Technology	r	0.468	0.402	0.391	0.400
	p	0.058	0.052	0.089	0.156
E3 – Support and Care	r	-0.037	-0.417	0.186	0.276
	p	0.887	0.043*	0.431	0.339
E4 – Attitudes	r	0.355	-0.457	0.329	0.182
	p	0.162	0.025*	0.157	0.533
E5 – Services	r	0.216	-0.309	0.516	0.299
	p	0.405	0.142	0.020*	0.299
E – Environmental factors (total)	r	0.440	-0.333	0.584	0.398
	p	0.077	0.112	0.007*	0.158

X: Mean, SD: Standard Deviation, n: Count, r: Correlation Coefficient, *p<0.05, **p<0.001, GMFCS: Gross Motor Function Classification System, GMFM-66: The 66-Item Gross Motor Function Measurement, ICF: International Classification of Functioning, Disability and Health.

Core Set and the GMFM-66. The GMFM-66 score decreased as the GMFCS level decreased. The GMFM-66 was strongly correlated with the body functions and structures (r=-0.848, p<0,001) and activity and participation level (r=-0.900, p<0.001), and weak-to-moderately correlated with the environmental factors (r=0.416, p<0.001). The GMFM-66 had the strongest correlation with the "d4-mobility" (r=-0.845, p<0.001) among all of the Core Set parameters (Table 2).

In the severely affected group, almost all of the sub-parameters (12 of the 14 parameters of the CP Core Set) were correlated with gross motor function measured by the GMFM-66. However, the GMFM-66 had no strong relationship with the Core Set in the mildly and moderately affected group (Table 2). No statistically significant relationship was found between the environmental factors and GMFM-66 score in the mildly and moderately affected group (p>0.05) (Table 2) and it was weak in the severely affected group.

Significant relationships were found also between

the Core Set and GMFM-66 when examined by the type of CP (Table 3). The GMFM-66 had strong-to-very strong correlation with Core Set parameters, except the environmental factors. The GMFM-66 had the strongest correlation with the "d-total activity and participation" in children with spastic quadriplegic CP and dyskinetic CP (r=-0.882, p<0.001 and r=-0.868, p<0.001, respectively).

DISCUSSION

The 88-item original GMFM-88 and the 66-item modified GMFM-66 are widely used in the field of pediatric rehabilitation to assess gross motor functions and sometimes the general condition of the children with CP. However, it was doubtful whether the GMFM could adequately reflect the general health status of children with CP as defined by the ICF. The purpose of this study was to explore if GMFM-66 is useful as an outcome tool to reflect the child's general health status in terms of ICF domains, body structure and functions, activity and participation, and environmental factors.

According to our results the GMFM-66 was strongly correlated with both the "b- body structures and functions" and "d- activity and participation". However, its correlation with the "e- environmental factors" was weak. These findings were similar with Tofani et al.'s study stating that ICF Core Set items have a limited usage, especially for evaluating environmental factors (19). They stated that the limited usage of the ICF Core Set to evaluate the environmental factors was due to both the complexity of environmental factors and the complexity of the patients. In the scoring of the environmental factors sub-dimension, unlike the body structure and functions and the activity and participation sub-dimension, the total score usually approaches 0 because there are both barriers (negative effect on the total score, minus score) and facilitators (positive effect on the total score, positive score). In this case, the overall score of the environmental factors sub-dimension is generally low, regardless of the child's motor functions. Therefore, we think that the relationship between gross motor functions and environmental factors is weak. On the other hand, it seems that the GMFM-66 is better correlated with the health status if the child has severe mobility limitations or severe impairment. These results suggest that the GMFM-66 may not be successful to reflect the environmental factors, which may affect participation, but reflect the body structure and functions and activity and participation. In their study on the CP Core Set, Noten et al stated that environmental factors are essential for participation. However, they also stated that environmental factors should be thought a different part of ICF and the tools in the literature is not sufficient to holistically evaluate environmental factors (20).

The main findings in the present study also revealed that the gross motor function level is not successful to reflect the global health in children with mild/moderate CP. We did not find any strong relationship between the GMFM score and ICF-CY components in children with GMFCS levels 1-3. Although only some parameters of the ICF were associated with the GMFM score, and these were weak correlations. A strong correlation was reported between functions such as communication, feeding, fine motor, or gross motor that may affect

participation in severely affected children (21). In severely affected children, all functional skills that may affect the child's participation level decrease as the gross motor functions worsen. That is why it is thought that the relationships between GMFM and ICF-CY are strong in these children. Findings that could explain our results were also reported in studies examining the relationships between different functional levels such as gross motor, fine motor, communication, and eating and drinking, which can be among some areas focused on by the ICF Core Set (22-24). It was shown in children with CP that both hemispheres of the brain are affected (bilateral CP) and all functions are adversely affected. Therefore, there may be a strong relationship between these functions (22). On the other hand, it was reported that the relationship among these functional levels are reduced as the influence on the brain decreases. Because the severity of the functions will also differ (22). In conclusion, the GMFM better reflects the child's general health status in children with severely affected CP than in children with mild and moderate involvement. We think that this is not because the GMFM reflects general health in children with severely affected CP, but because the lesion that causes a decrease in the GMFM level in these children also causes a decrease in all sub-dimensions of the ICF CP Core Set. Another possible explanation of these weak correlations might be relatively small sample size after dividing the sample into three groups. This factor can also be shown as a limitation of the current study.

Since the publication of the GMFM, it has become the most common functional outcome measure used among pediatric physiotherapists over the past 25 years (25). The international acceptance of the tool is noted with many translations like Turkish, Spanish, French, Dutch, German, and Japanese (26-28). Additionally, in a study that examined many factors affecting participation, it was stated that a primary focus should be on gross and fine motor skills to increase participation (3, 29). However, our result showed that gross motor functions are not successful to reflect the general health status. On the other hand, the framework of the ICF-CY is relatively new and is not common in clinics, even though WHO suggests using this framework

when a child's health status is assessed (30). The participation in activities of daily living is multifactorial in nature. That is why WHO suggest using the ICF-CY. Our results highlighted the importance of the lack of various assessment tools that can be used commonly in clinical settings as well as the GMFM.

The study has several limitations. First one of these is relatively small sample size of the study. The study sample was divided into groups based on GMFCS or clinical types. For this reason, the number of children in each group may have been insufficient. This may have caused the relationships between the examined parameters to be weak. Secondly, the environmental factors domain of ICF Core set consists of barriers that is scored negatively and facilitators that is scored positively. Therefore, mostly obtained zero on the total score of the environmental factors due to facilitators and barriers. Due to this situation, relationships with environmental factors may have been weak.

In conclusion, a child with CP, depending on the extent of damage, will experience varying levels of restrictions to participation in activities of daily living. The GMFM may not be sufficient to meet the needs of holistic assessment based on the ICF-CY, especially when assessing a child with mild CP. There is a need for tools that evaluate other sub-dimensions of participation and environmental factors that can be used commonly among clinicians like GMFM. Then, the holistic framework offered by the ICF-CY can be achieved and the general health status might be fully reflected. Similarly, intervention should target the affected components of the ICF-CY, rather than on gross motor function alone. Therefore, when establishing a treatment plan for a child with CP, it is important to identify not only the child's physical ability and development, but also factors restricting activity and participation, using the ICF-CY function as a reference.

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Appendix Table. Brief Common ICF Core Set for Children and Youth with Cerebral Palsy

Body Structures (n=1)		Score
s110	Structure of brain	

Body Functions (n=8)		Score
b117	Intellectual functions	General mental functions, required to understand and constructively integrate the various mental functions, including all cognitive functions and their development over the life span.
b134	Sleep functions	General mental functions of periodic, reversible and selective physical and mental disengagement from one's immediate environment accompanied by characteristic physiological changes.
b167	Mental function of language	Specific mental functions of recognizing and using signs, symbols and other components of a language.
b210	Seeing functions	Sensory functions relating to sensing the presence of light and sensing the form, size, shape and color of the visual stimuli.
b280	Sensation of pain	Sensation of unpleasant feeling indicating potential or actual damage to some body structure.
b710	Mobility of joint functions	Functions of the range and ease of movement of a joint.
b735	Muscle tone functions	Functions related to the tension present in the resting muscles and the resistance offered when trying to move the muscles passively.
b760	Control of voluntary movement functions	Functions associated with control over and coordination of voluntary movements.

Activities and Participation (n=8)		Score
d415	Maintaining a body position	Staying in the same body position as required, such as remaining seated or remaining standing for work or school.
d440	Fine hand use	Performing the coordinated actions of handling objects, picking up, manipulating and releasing them using one's hand, fingers and thumb, such as required to lift coins off a table or turn a dial or knob.
d450	Moving	Moving along a surface on foot, step by step, so that one foot is always on the ground, such as when strolling, sauntering, walking forwards, backwards or sideways.
d460	Moving around in different locations	Walking and moving around in various places and situations, such as walking between rooms in a house, within a building, or down the street of a town.
d530	Toileting	Indicating the need for, planning and carrying out the elimination of human waste (menstruation, urination and defecation), and cleaning oneself afterwards.
d550	Eating	Indicating need for, and carrying out the coordinated tasks and actions of eating food that has been served, bringing it to the mouth and consuming it in culturally acceptable ways, cutting or breaking food into pieces, opening bottles and cans, using eating implements, having meals, feasting or dining.
d710	Basic interpersonal interactions	Interacting with people in a contextually and socially appropriate manner, such as by showing consideration and esteem when appropriate, or responding to the feelings of others.
d760	Family relationships	Creating and maintaining kinship relationships, such as with members of the nuclear family, extended family, foster and adopted family and step-relationships, more distant relationships such as second cousins or legal guardians.

Environmental Factors (n=8)		Score
e115	Products and technology for personal use in daily living	Equipment, products and technologies used by people in daily activities, including those adapted or specially designed, located in, on or near the person using them.
e120	Products and technology for personal indoor and outdoor mobility and transportation	Equipment, products and technologies used by people in activities of moving inside and outside buildings, including those adapted or specially designed, located in, on or near the person using them.
e125	Products and technology for communication	Equipment, products and technologies used by people in activities of sending and receiving information, including those adapted or specially designed, located in, on or near the person using them.
e150	Design, construction and building products and technology of buildings for public use	Products and technology that constitute an individual's indoor and outdoor human-made environment that is planned, designed and constructed for public use, including those adapted or specially designed.
e310	Immediate family	Individuals related by birth, marriage or other relationship recognized by the culture as immediate family, such as spouses, partners, parents, siblings, children, foster parents, adoptive parents and grandparents.
e320	Friends	Individuals who are close and ongoing participants in relationships characterized by trust and mutual support.
e460	Social attitudes	General or specific opinions and beliefs generally held by people of a culture, society, subcultural or other social group about other individuals or about other social, political and economic issues that influence group or individual behavior and actions.
e580	Health services, systems and policies	Services, systems and policies for preventing and treating health problems, providing medical rehabilitation and promoting a healthy lifestyle.