ISSN 2526-8910
Cad. Bras. Ter. Ocup., São Carlos, v. 26, n. 3, p. 538-557, 2018
https://doi.org/10.4322/2526-8910.ctoAO1183

Original Article

Characterization of the neuropsychomotor development of children up to three years old: the ICF model in the context of the Family Health Support Center[1]

Luize Bueno de Araujo, Karize Rafaela Mesquita Novakoski, Marina Siqueira Campos Bastos, Tainá Ribas Mélo, Vera Lúcia Israel

Universidade Federal do Paraná – UFPR, Curitiba, PR, Brasil.

Abstract: Introduction: The neuropsychomotor development (NPMD) is dynamic and complex, explained by the contextual model, which can be discussed with an expanded view of health through the International Classification of Functioning, Disability, and Health (ICF). Objective: To characterize the NPMD of children up to 3 years old participating in the "Children's Milk Program" (CMP) from the ICF model in the context of the Family Health Support Center (FHSC) and to relate to individual, family, socioeconomic aspects and stimulation of the child in different environments. Method: In this study, 19 volunteer children, 10 (52.63%) boys and 9 girls (47.37%), aged 7-35 months old (19.42 ± 9.11), duly authorized by the person responsible participated in the study, evaluated through a semi-structured interview, and ABEP socioeconomic questionnaire, Denver Developmental Screening Test and Affordances in the Home Environment for Motor Development test. The instruments were related to ICF components for Children and Young People. The study was performed at the FHCS of a metropolitan city of Curitiba/PR, Brazil. Statistical analysis was performed using the Spearman's rô (rs) for non-parametric correlation, Mann-Whitney in quantitative comparison and Fisher's Exact Test in categorical data for occurrence probability. Results: Regarding the Denver II test, 9 (47.37%) children had questionable NPDM, and the language area was the most compromised (88.88%), 7 families (36.84% were classified in C1 by ABEP and 6 children (54.5%) up to 18 months old received adequate stimulation in the home environment and all the kids (n=8) over 19 months old, presented reasonable stimulation. The model proposed in this study responded to contextual approach of the ICF. Conclusion: It is necessary to use appropriate instruments to plan actions in basic care so children at risk to NPMD can be included in programs of early intervention, to enable the FHCS as a space for monitoring and promoting the NPMD. The ICF has proved to be an adequate and valid classification instrument for this context.

Keywords: *International Classification of Functioning, Disability, and Health, Public Health, Child, Family Health, Primary Health Care.*

Caracterização do desenvolvimento neuropsicomotor de crianças até três anos: o modelo da CIF no contexto do NASF

Resumo: Introdução: O desenvolvimento neuropsicomotor (DNPM) é dinâmico e complexo, explicado pelo modelo contextual, que pode ser discutido com visão ampliada de saúde por meio da Classificação Internacional de Funcionalidade, Incapacidade e Saúde (CIF). Objetivo: Caracterizar o DNPM de crianças com até três anos participantes do Programa Leite das Crianças (PLC) a partir da abordagem contextual por meio da CIF, no contexto do Núcleo de Apoio à Saúde da Família (NASF), e relacionar com aspectos individuais, familiares, socioeconômicos e

Corresponding author: Luize Bueno de Araujo, Universidade Federal do Paraná, Rua Coração de Maria, 92, Jardim Botânico, CEP 80210-132, Curitiba, PR, Brasil, e-mail: luizebueno@hotmail.com

Received on July 2, 2017; 1st Revision on Feb. 8, 2018; 2nd Revision on Mar. 6, 2018; Accepted on June 18, 2018.

estimulação da criança nos diferentes ambientes. Método: Participaram deste estudo 19 crianças, 10 (52,63%) meninos e 9 meninas (47,37%), com idade entre 7 e 35 meses (19,42 ± 9,11), devidamente autorizadas pelo responsável, avaliadas por meio de entrevista semiestruturada, questionário socioeconômico da ABEP, teste de triagem de Denver II e questionário de oportunidades no ambiente domiciliar para o desenvolvimento motor. Os instrumentos foram relacionados com os componentes da CIF para crianças e jovens (CIF-CJ). O estudo foi realizado no NASF de uma cidade da região metropolitana de Curitiba/PR, Brasil. Para análise estatística utilizou-se rô de Spearman (rs) para correlação não-paramétrica, Mann-Whitney na comparação quantitativa e o Exato de Fisher em dados categóricos para probabilidade de ocorrência. Resultados: Com relação à triagem, 9 (47,37%) crianças apresentaram o DNPM questionável, sendo a área da linguagem a mais comprometida (88,88%), 7 famílias (36,84%) foram classificadas em C1 pela ABEP. Para a estimulação recebida no ambiente domiciliar, 6 crianças (54,5%) com até 18 meses tiveram estimulação adequada e todas (n=8) as crianças maiores de 19 meses apresentaram estimulação razoável. O modelo proposto neste estudo respondeu à abordagem contextual da CIF. Conclusão: É necessária a utilização de instrumentos adequados para planejar ações na atenção básica, para que crianças que apresentem risco ao DNPM possam ser incluídas em programas de intervenções precoces, para viabilizar o NASF enquanto espaço de acompanhamento e promoção do DNPM. A CIF mostrou-se um instrumento de classificação adequado e válido para este contexto.

Palavras-chave: *Classificação Internacional de Funcionalidade, Incapacidade e Saúde, Saúde Pública, Criança, Saúde da Família, Atenção Primária à Saúde.*

1 Introduction

The Neuropsychomotor Development (DNPM) is complex, dynamic and influenced by several factors, currently explained by the contextual/ecological theoretical model (HWANG et al., 2014). This explanation is due to the theories of development, which receive different names, biopsychosocial, contextual, bioecological or ecological model, which are contemplated in the model proposed by the World Health Organization (WHO) through the International Classification of Functioning, Disability, and Health (CIF). Grantham-McGregor et al. (2007) and Walker et al. (2007) highlighted the risk of 200 million children under 5 years old in developing countries, such as Brazil, being prone to delays in the NPMD due to poverty, poor health and nutrition, and lack of appropriate care and stimulation.

In the current literature to date, despite the growth of studies with the use of the spiritual biopsychosocial model of functionality as health information proposed in the ICF, epidemiological studies are scarce and in populations without a specific disease (CASTANEDA; BERGMANN; BAHIA, 2014; SILVA; ENGSTRON; MIRANDA, 2015).

This is in line with this research since the first years of life of a child are considered as critical periods, with intense cerebral plasticity and subject to future repercussions, such as learning difficulties and motor coordination (MACY, 2015; JOHNSON, 2016). Brain plasticity consists of the capacity for morphological and/or functional changes in which neuronal cells alter for more or for less their connectivity capacity, depending on whether there are situations of stimulation or restriction (ISMAIL; FATEMI; JOHNSTON, 2017). In this context, prevention and health promotion actions with early practices are justified, with the need for approaches that consider this development in its complexity of factors.

Interventions for screening, identification, evaluation, follow-up of development and stimulation of child development at an early stage, avoid future complications for children at risk and/or atypical development. The systematization of these evaluations can be easily applied in public health, which will allow the implementation of public health care and surveillance policies (AMORIM et al., 2009).

Consistent with these strategies, and developed by WHO (ORGANIZAÇÃO..., 2015), the ICF is an epidemiological tool for individual and population health classification based on evidence and development of programs that evaluate the efficiency, efficacy and effectiveness of actions in the scope of collective health. In its new edition, some peculiarities applied to the child population were incorporated (ORGANIZAÇÃO..., 2015).

To follow up the child development and to stimulate a biopsychosocial-spiritual contextual approach, considering the individual (child), environment (family and health unit) and task triad (evaluation or child stimulation activity), the federal government needs to move forward with family actions. In this perspective, the Brazilian Ministry of Health created the Family Health Support Centers (FHSC) in 2008

to support the consolidation of basic health care, expanding the health services network, as well as the actions. The FHSC multi-professional team works together with the Family Health Strategy team (FHS) with a priority focus on health promotion and prevention actions (BRASIL, 2011a).

Currently, the FHSC can involve 18 health professions including physiotherapy and occupational therapy. These professionals have the skills to act in primary care through actions aimed at promoting health, preventing diseases, rehabilitating, guiding in several areas, including the health of children and adolescents (TOMASI; RIZZOTTO, 2013; DAVID et al., 2013; ROCHA; PAIVA; OLIVEIRA, 2012).

The Children's Milk Program (CMP), which is part of the actions carried out to promote food and nutritional security, was established by State Law 16,475/2010, as a right for children aged 6 to 36 months old whose family has up to 1/2 regional minimum wage per capita income, with the objective of helping to reduce the nutritional deficiencies of the population of Paraná (PARANÁ, 2010). However, the nutritional aspect is only one of the components of health that interfere in neuropsychomotor development, which shows the need to investigate environmental and personal factors that describe the context in which the individual lives (PILZ; SCHERMANN, 2007), health and functional conditions such as function and body structure, as well as repercussions on the activity and participation of the child.

The objective of this research was to characterize the NPMD of children up to three years old participating in the CMP from the contextual approach through the ICF in the context of the FHSC and to relate to individual, family, socioeconomic and child stimulation aspects in different environments.

2 Method

This is a descriptive and exploratory study, with a cross-sectional design (MARQUES; PECCIN, 2005) and quantitative data approach, approved by the Health Ethics Committee of the Federal University of Paraná (UFPR), CAAE: 57193516.6.0000.0102, protocol number 1,714. 810.

Initially, there was a contact made with the health team of the Family Health Support Center (FHSC) of a city in the Metropolitan Region of Curitiba/PR (MRC) to verify the demands of that public health service. Then, an authorization was requested from the municipal health department for data collection at the CMP, an existing program directed at the child population. The data collections were carried out in May 2017, and the evaluation instruments were applied with the child and the person in charge, who signed the Informed Consent Term (TCLE). After the evaluation, the person in charge received the evaluation feedback and stimulation tips from the NPMD and the health of the participating child. In cases where the need for follow-up or intervention in the development of the evaluated child was verified, the referral to the Basic Health Unit (BHU) was carried out.

The FHSC (place for the collection) is formed by a multidisciplinary team, which supports the actions in three Family Health Units (FHU). The data collections of this study happened in a unit, in a room available for the research. The evaluation time with each family/child lasted approximately 40 minutes.

As the inclusion criteria, the study participants should attend the CMP, be up to three years old, of both genders. The exclusion criteria were the non-authorization of those responsible for participation in the study, absence on the day of the evaluations and the refusal of the child. A total of 19 children, 10 (52.63%) boys and 9 girls (47.37%), aged 7-35 months old (19.42 ± 9.11) participated in the study.

The evaluators were professionals (two physiotherapists and one occupational therapist) familiar and trained for the application of the instruments. The evaluations were through the application of the instruments, chosen after analysis of the main domains to be classified by the ICF-CJ: semi-structured interview adapted from Araujo (2013), socioeconomic questionnaire of the Brazilian Association of Research Companies for Brazil (ASSOCIAÇÃO..., 2015), Denver Developmental Screening Test (Denver II Development Screening Test), (FRANKENBURG et al., 1992; DRACHLER; MARSHALL; LEITE, 2007), Affordability in the Home Environment for Motor Development (AHEMD - Opportunities in the Home Environment for Motor Development) from 3 to 18 months old (CAÇOLA et al., 2011, 2015a, 2015b) and from 18 to 42 months old (GIORDANI; ALMEIDA; PACHECO, 2013).

The evaluation instruments were classified according to the ICF-CJ model, relating them to the structures and/or functions, in activities and participation. The authors adapted the model of Figure 1 to organize the evaluations and systematize by the ICF-CJ, in which the evaluation tools (interview, ABEP, Denver II and AHEMD) distributed in the domains of the ICF-CJ as an interactive and evolutionary were observed. This proposal of evaluations and

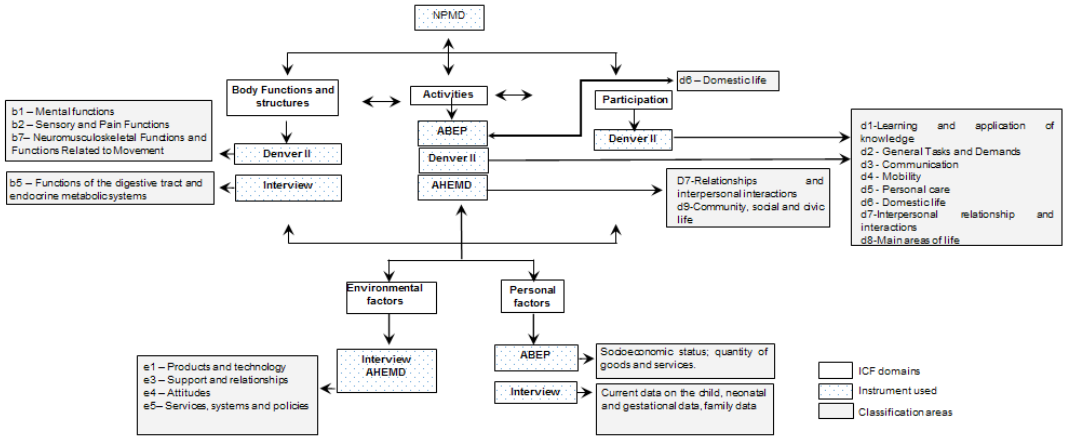

Figure 1. List of evaluation measures with the components of the ICF. Legend: NPMD = Neuropsychomotor development; ABEP = Brazilian Association of Research Companies for Brazil; AHEMD = Affordances in the Home Environment for Motor Development. Adapted from World Health Organization (2015).

classification can be used by all professionals involved in the health of the child (occupational therapists, physiotherapists, psychologists, speech therapists, among others) at different levels of health care.

2.1 ICF-CJ

The ICF is organized in the following areas: body functions and structures, activities and participation, environmental factors and personal factors. The body functions and structures are related to physiological and anatomical functions; the activities and participation indicate aspects of functionality, both individual and social; the contextual, environmental and personal factors are related to the physical, social and attitudinal environment. The components of the ICF are operationalized with the use of qualifiers, which are numerical codes that specify the extent or magnitude of the functionality, where 0 is no having disability and 4 is a complete disability, the value 8 is used in unspecified situations and 9 when not applicable (ORGANIZAÇÃO..., 2015).

This classification instrument guided the choice of evaluation instruments and indicated which specific domain of the ICF-CJ would be covered by the evaluations carried out.

2.2 Semi-structured interview × ICF-CJ

The semi-structured interview was applied with the child´s caregiver and questions about health conditions, environmental factors of the school and/or family and other activities and participation related to the domains of the child´s life and contexts were asked.

Anthropometric data were analyzed according to WHO guidelines (ORGANIZAÇÃO..., 2006), proposing parameters for monitoring the growth and development of children. For children 0 to 5 years old, the parameters used are weight for the age, weight for the height, height for the age and Body Mass Index (BMI) for the age. This index is the relationship between the child´s weight and the square of his height, to verify the nutritional status of the children (BRASIL, 2011b). There is a curve for each parameter, in which it is possible to classify each child according to gender and their anthropometric data. The curves consider the reference values for healthy children, and it is possible to identify nutritional status, that is, eutrophy, when there is a balance between consumption and nutritional needs; nutritional deficiency when general or energetic or nutritional deficiencies can lead to adverse organic processes; and nutritional disorder due to malnutrition or obesity (BRASIL, 2011b).

Through this interview, it was possible to investigate specific and peculiar issues of each family and child, related to the body functions and structures, activity and participation, contextual factors of the environment and the individual.

The socioeconomic Questionnaire of the Brazilian Association of Research Companies for Brazil (ABEP) allows the economic classification of the family and the function is to estimate the buying power of urban individuals and families. This classification divides the Brazilian population into six socioeconomic strata called A, B1, B2, C1, C2 and D-E (ASSOCIAÇÃO..., 2015).

This socioeconomic classification enables to understand the ICF-CJ in the domains of activity and participation, as well as environmental factors, which can be classified as barriers or facilitators for the child's functionality and contexts.

2.3 Denver II development screening test × ICF-CJ

The Denver II test is considered adequate to evaluate the NPMD of children from zero to six years old. It has 125 items divided into four domains: social-personal (aspects of child socialization inside and outside the family environment), fine- adaptive (coordination and manipulation of small objects), language (sound production, comprehension and use of language) and gross motor (body motor control, sit, walk and jump). These items are recorded through direct observation of the child and for some of them, the responsible person can be asked whether the child performs a particular task or not (FRANKENBURG et al., 1992).

The performance classification of Denver II test is done according to the number of failures (delay and caution). This is considered as questionable when the evaluated child presented only one delay or two or more cautions, and it is considered as typical when the evaluated child did not present any delay and at most a caution/attention (FRANKENBURG et al., 1992; ARAUJO, 2013).

The items of this evaluation instrument allow the systematization of the ICF-CJ classification in the domains of body functions and structures, activities, and participation, since, through the scale, it is possible to observe the physiological functions of the body systems; the anatomical parts of the body as organs, limbs, and their components; the execution of a task or action by the child and the involvement in situations of daily life.

2.4 Opportunities in the home environment for motor development (AHEMD) × ICF-CJ

This questionnaire evaluates the opportunities for motor development in the context of the home environment.

The scale for children aged 3 to 11 months old has 26 questions divided into four dimensions, physical space, stimulation variety, gross motor toys and fine motor toys. The score is calculated by the sum of the points obtained for all questions within each dimension. The total score of the instrument is obtained by the sum of the four dimensions. For this range, the classification is performed as follows: less than adequate (0-18 points), moderately adequate (19-23 points), adequate (24-27 points) and excellent (28-49) (CAÇOLA et al., 2015b).

The scale for children from 12 to 18 months old has 35 questions, with the same dimensions and scale classification for children up to 11 months old, which changes the score for: less than adequate (0-27 points), moderately adequate (18-33 points), adequate (34-40 points) and excellent (41-67) (CAÇOLA et al., 2015b).

For children over 18 months old, the scale has 67 questions that include the characterization of the child and family, physical space of the residence (interior and exterior), daily activities and toys and materials in the room. The organization of the questionnaire is based on five dimensions: outer space, interior space, variety of stimulation, materials of fine motor and materials of gross motor. Each dimension receives the classification as follows: very weak, weak, good and very good. In addition to the scores of each dimension, there is a global indicator made up of the sum of the previous ones, where the higher the score, the greater the opportunities for motor development (GIORDANI; ALMEIDA; PACHECO, 2013).

Through the opportunities available to the child, this questionnaire encompasses the contextual factors of the environment and the person, and it is possible to classify the home environment as a barrier or facilitator for the activities and participation of the child.

2.5 Associations and correlations between variables × ICF-CJ

For the association and correlation analysis, 26 variables were distributed as follows: current child characteristics (gender, age, daycare, current weight, BMI and nutritional classification), neonatal and gestational characteristics (prematurity, type of birth, birth weight, height at birth) family characteristics (monthly income declared, head of household, absentee father, single mother). All variables are evaluated by the semi-structured interview. The stratified income stratum was evaluated by ABEP, the physical space, stimulation variety, global motricity, fine motor and overall score were scored by AHEMD; and the NPMD (questionable or typical) result, as well as the four areas of NPMD (personal-social, fine-adaptive motor, language and coarse motor), were obtained by the Denver II test.

The association and correlation allow an analysis of the association of the factors investigated for the sample studied, with an extended reflection of the different domains proposed by the ICF-CJ and justifying its use in the study of children´s health.

2.6 Data analysis

The nominal and/or ordinal variables were described in absolute frequency and percentage, and the numerical variables were described in mean and standard deviation by the Microsoft Excel® 2013 program. For non-parametric correlation, the Spearman's rô was used (rs), being considered correlation very weak if rs <0.25; weak if rs ≥ 0.25 <0.5, moderate if rs ≥ 0.5 <0.75 and strong if rs ≥ 0.75 <1 (VIEIRA, 2015). For categorical data, the Fisher Exact Test was used to calculate the probability of occurrence of characteristic association and the non-parametric Mann-Whitney test in the performance comparison in the AHEMD test. Data were analyzed in the SPSS Statistics® program 22.

3 Results

3.1 ICF-CJ

Through this study, it was possible to elaborate a systematization of the relation of the evaluation instruments with the classification by the checklist of the ICF-CJ. The child´s health condition and its contexts were recorded by selecting appropriate health information codes for each category, allowing the addition of qualifiers, numerical coding that specifies the extent or magnitude of the functionality or disability in that category or to what extent an environmental factor facilitates or constitutes an obstacle (barrier). This systematization is presented in Table 1. It is emphasized that the Denver II test is a screening test, used for an initial look at the development of the child and when necessary, referrals to specialized professionals should be performed to complement the evaluation with more specific instruments. The ICF is a classification that allows changes in certain domains to be identified by non-specialist professionals and classified as "unspecified", requiring referral and expert evaluations if such changes are identified. The other instruments used are applied through parent/family reports, without a direct observation of the family context, being a limitation of this study, but it can be part of an initial screening of a primary care program and subsidize secondary and tertiary actions, when necessary.

3.2 Semi-structured interview × ICF-CJ

The characterization of the sample is described in Table 1. There were 19 children participating, 10 (52.63%) were boys and 9 were girls (47.37%), aged 7-35 months old (19.42 ± 9.11). Only 7 of them (36.84%) attended day care centers, all full time. As for anthropometric measures, the mean weight among the participating children was 10.31 kg, the lowest weight was 7.9 kg and the highest was 19.4 kg (11.91 ± 3.24). The mean height of these children was 82.18 cm, the shortest was 70 cm and the highest was 97 cm (46.91 ± 5.64).

For the analysis of the anthropometric data, the age, weight and height values obtained on the CMP card were collected, and they were subsequently analyzed according to the parameters described in the method. In the "weight-for-length" parameter, most children (n = 15) presented a risk of overweight, while in the "BMI by age" parameter, there were 14 children with a risk of overweight, two were overweight, one was thin, one had accentuated thin and one had obesity.

The type of delivery reported of the mothers and/or relatives interviewed, most (12 - 63.16%) had a normal delivery. The declared average income of the family was R$ 1732.16, the lowest income was R$ 97.00 and the highest income was R$ 4,000.00 (1732.16 ± 97.00). The head of the family did not have complete Primary Education in nine families (47.37%). There were reports of the absence of the father in four families (21.05%) and five single mothers (26.32%).

Among the extracts from ABEP, the average income was mostly distributed among categories C1 (R$ 2409.01) and C2 (R$ 1446.24), as described in Table 2.

3.3 Denver II Development Screening Test × ICF-CJ

Regarding to the developmental screening, conducted through the Denver Developmental Screening Test (Denver II), nine children (47.37%) presented the questionable NPMD and 10 (52.63%) presented the typical NPMD. Among the four areas evaluated by the test (personal-social, fine-adaptive motor, language and gross motor), the language area was the most compromised (88.88%).

3.4 Opportunities in the home environment for motor development (AHEMD) × ICF-CJ

The AHEMD scale analysis was divided into two classifications, one for children up to 18 months old and the other for children aged 19-42 months old.

Table 1. CIICFF-CJ checklist relationships with the instruments used.

CLASSIFICATION BY ICF-CJ		EVALUATION INSTRUMENTS							
				DENVER II					
		Interview	ABEP	GENERAL DENVER II	PERSONAL -SOCIAL	LANGUAGE	GROSS MOTOR SKILL	FINE-ADAPTIVE MOTOR SKILL	AHEMD
	BODY FUNCTIONS								
Chapter 1 - Mental Functions	b110 - Consciousness functions			**X**					
	b114 - orientation in space and time functions			**X**					
	b117 - Intellectual functions			**X**					
	b122 - Global psychosocial functions				**X**				
	b125 - Intrapersonal Functions			**X**					
	b126 - Temperament and personality functions			**X**					
	b140 - Attention Functions			**X**					
	b144 - Memory functions			**X**					
	b147 - Psychomotor functions			**X**					
	b156 - Perception functions			**X**					
	b163 - Basic cognitive functions			**X**					
	b167 - Mental language functions					**X**			
Chapter 2 Sensory and Pain Functions	b210 - Vision Functions			**X**					
	b230 - Hearing functions			**X**					
	b235 - Vestibular Functions			**X**					
	b260 - Proprioceptive function			**X**					
Chapter 3 Voice and Speech Functions	b310 - Voice functions					**X**			
Chapter 5 Functions of the digestive tract and metabolic and endocrine systems	b530 - Weight Maintenance Functions	**X**							
	b560 - Growth Maintaining Functions	X							

ICF-CJ = International Classification of Functioning, Disability, and Health for Children and Young People; ABEP = Brazilian Association of Research Companies for Brazil; AHEMD = *Affordances in the Home Environment for Motor Development*.

Table 1. Continued...

CLASSIFICATION BY ICF-CJ		EVALUATION INSTRUMENTS							
				DENVER II					
		Interview	ABEP	GENERAL DENVER II	PERSONAL -SOCIAL	LANGUAGE	GROSS MOTOR SKILL	FINE-ADAPTIVE MOTOR SKILL	AHEMD
Chapter 7 Neuromusculoskeletal and Motion Related Functions	b710 - Functions related to joint mobility			X					
	b730 - Functions related to muscular strength			X					
	b735 - Functions related to muscle tone			X					
	b755 - Functions related to involuntary movement reflexes			X					
	b760 - Functions related to motion control. volunteers			X					
	b765 - Functions related to involuntary movements			X					
	b770 - Functions related to the gait pattern						X		
	ACTIVITY AND PARTICIPATION								
Chapter 1 - Learning and application of knowledge	d110 – Observing			X					
	d115 – Hearing			X					
	d130 – Imitating			X					
	d131 - Learning through interaction with objects			X					
	d133 - Acquiring language					X			
	d155 – Acquiring skills							X	
	d160 - Focusing attention			X					
	d161 - Driving attention			X					
	d163 - Thinking			X					
	d175 – Solving problems			X					
	d177 – Taking decisions			X					

ICF-CJ = International Classification of Functioning, Disability, and Health for Children and Young People; ABEP = Brazilian Association of Research Companies for Brazil; AHEMD = *Affordances in the Home Environment for Motor Development*.

Table 1. Continued...

CLASSIFICATION BY ICF-CJ										
		EVALUATION INSTRUMENTS								
				DENVER II						
		Interview	ABEP	GENERAL DENVER II	PERSONAL -SOCIAL	LANGUAGE	GROSS MOTOR SKILL	FINE-ADAPTIVE MOTOR SKILL	AHEMD
Chapter 2 - General Tasks and Demands	d210 - Performing a single task			**X**					
	d220 - Performing multiple tasks			**X**					
Chapter 3 - Communication	d330 – Talking					**X**			
	d331 - *Pre-talking*					**X**			
	d335 - Production of non-verbal messages			**X**					
Chapter 4 - Mobility	d410 - Changing the basic body position					**X**			
	d415 - Maintaining body position					**X**			
	d420 - Transferring the own position						**X**		
	d430 - Lifting and loading objects			**X**					
	d435 - Moving objects with the lower limbs						**X**		
	d440 - Fine use of hand							**X**	
	d445 - Hand and arm use							**X**	
	d450 - Walking						**X**		
	d455 - Moving						**X**		
Chapter 5 - Personal Care	d510 - Washing				**X**				
	d540 – Dressing up				**X**				
	d550 – Eating				**X**				
	d560 - Drinking				**X**				
Chapter 6 - Domestic Life	d620 - Acquisition of goods and services		**X**						
	d630 - Meal preparation				**X**				
	d650 - Caring for household objects				**X**				

ICF-CJ = International Classification of Functioning, Disability, and Health for Children and Young People; ABEP = Brazilian Association of Research Companies for Brazil; AHEMD = *Affordances in the Home Environment for Motor Development*.

Table 1. Continued...

CLASSIFICATION BY ICF-CJ		EVALUATION INSTRUMENTS							
				DENVER II					
		Interview	ABEP	GENERAL DENVER II	PERSONAL -SOCIAL	LANGUAGE	GROSS MOTOR SKILL	FINE-ADAPTIVE MOTOR SKILL	AHEMD
Chapter 7 - Interpersonal Relationships and Interactions	d710 - Basic interpersonal interactions			**X**					**X**
Chapter 8 - Main Areas of Life	d815 - Pre-school education	**X**							
	d880 - Involvement in games or playing			**X**					**X**
Chapter 9 - Community, social and civic life	d920 - Recreation and leisure								**X**
	ENVIRONMENTAL FACTORS								
Chapter 1 - Products and technology	e110 - Products or substances for personal use	**X**							
	e115 - Products and technology for personal use in daily life								**X**
	e120 - Products and technology for indoor and outdoor personal mobility and transportation								**X**
	e155 - Products and technology used in private use building design, architecture and construction								**X**
Chapter 3 - Support and relationships	e310 - Family	**X**							**X**
	e320 - Friends	**X**							**X**
	e325 - Acquaintances, companions, colleagues, neighbors, and members of the community	**X**							**X**
Chapter 4 - Attitudes	e410 - Individual attitudes of immediate family members	**X**							**X**
Chapter 5 - Services, Systems, and Policy.	e575 - General social support services, systems, and policies	**X**							
	e580 - Health services, systems, and policies	**X**							

ICF-CJ = International Classification of Functioning, Disability, and Health for Children and Young People; ABEP = Brazilian Association of Research Companies for Brazil; AHEMD = *Affordances in the Home Environment for Motor Development*.

Table 2. Characterization of the sample.

	Variables	Categories	Frequencies (n)	%
Child's current characteristics	Gender	Male	10	52.63
		Female	9	47.37
	Age	7 to 12 months old	5	26.23
		13 to 24 months old	7	36.84
		25 to 36 months old	7	36.84
	Attending school	Yes	7	36.84
		No	12	63.16
	Anthropometric data	Risk of overweight	15	78.96
	Weight per length	Overweight	1	5.26
		Obesity	1	5.26
		Thinness	1	5.26
		Severe thinness	1	5.26
		Eutrophy	0	0
	Anthropometric data	Risk of overweight	14	68.44
	BMI by age	Overweight	2	10.52
		Obesity	1	5.26
		Thinness	1	5.26
		Severe thinness	1	5.26
		Eutrophy	0	0
Neonatal and gestational characteristics	Premature	Yes	1	5.26
		No	18	94.74
	Type of birth	Normal	12	63.16
		Cesarean section or other	7	36.84
	Weight at birth	</= 2.500Kg	1	5.26
		> 2.500Kg	18	94.74
Family Characteristics	Monthly family income	< R$ 2.000,00	12	63.16
		>/= R$ 2.000,00	7	36.84
	Education of the head of the family	< Complete elementary school	9	47.37
		>/= Complete elementar school	10	52.63
	Absent father	Yes	4	21.05
		No	15	78.95
	Single mother	Yes	5	26.32
		No	14	73.68
	Strata of ABEP	B2	4	21.05
		C1	7	36.84
		C2	6	31.58
		D-E	2	10.53

ABEP = Brazilian Association of Research Companies for Brazil, 2015.

Regarding the stimulation received, only one (9%) of the 11 participants aged up to 18 months presented an excellent classification regarding the stimuli received in the home environment. Six children (54.5%) had adequate stimulation, two (18.2%) presented moderate adequate stimulation according to the age group they were, while two (18.2%) had less than adequate stimulation for the age (Figure 2).

There were no differences in the AHEMD scale when comparing different genders, comparing children attending and not attending nursery schools and comparing children born to term and premature. Also, there were no differences in performance in the screening test when comparing children with absence of the father and with the father present and also was not significantly different between the evaluation between children with single mother and with partner.

Regarding to the eight children from 19 to 42 months old, as shown in the graph below (Figure 3), the stimulation received was divided into five areas: outer space, internal space, stimulation variety, fine motor and gross motor. These two last areas were the most affected, which received classification of

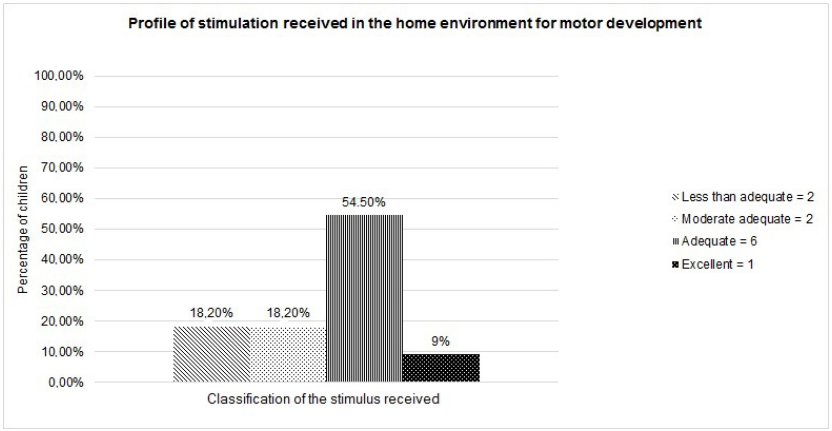

Figure 2. Profile of opportunities in the home environment for the motor development of children up to 18 months old.

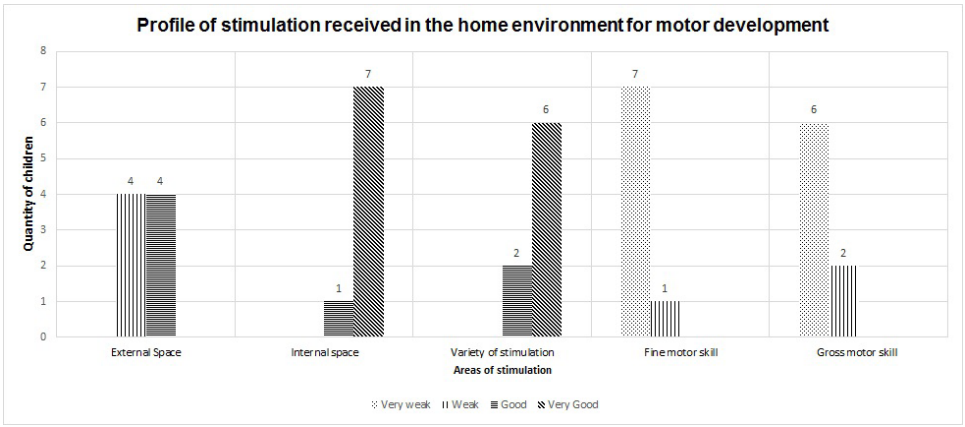

Figure 3. Profile of opportunities in the home environment for the motor development of children from 19 to 42 months old.

"very weak stimulation" for seven children (87.5%). In the total score of this scale, all eight children had a profile considered reasonable for stimulation in the home environment.

3.5 Associations and correlations between variables × ICF-CJ

Regarding the results of the correlations of this study, it was possible to observe the findings reported below. For the analysis of the variables age, AHEMD, birth weight, ABEP strata, monthly family income, head of household and nutritional classification, it was verified that age was moderate and positive correlated with the AHEMD score for received stimulation (rs = 0.527, p = 0.021), but with moderate and negative correlation for global motor (rs = -0.550, p = 0.015) and fine motor (rs = -0.519, p = 0.023). This demonstrates that, at more advanced ages, the child receives more stimulation, but the younger the age, the child tends to receive higher scores on global and fine motor skills.

Birth weight had a moderate correlation with ABEP (rs = 0.556, p = 0.013), and the higher the birth weight, the higher the declared income.

The average monthly income reported tended to correlate with the head of household´s education (rs = 0.454, p = 0.051); the higher the income, the higher the level of education.

ABEP had a weak and positive correlation with AHEMD global motor score (rs = 0.471, p = 0.042) and general AHEMD score (rs = 0.490, p = 0.033), which shows that the better the family income classification, the greater possibility of acquisition and offers of toys.

The nutritional classification had a moderate correlation (rs = 0.507, p = 0.027) with the education

of the head of the family - the lower the education, the greater the chance of presenting a nutritional deficit (thinness).

There was no association of predilection between the results of the Denver II test when the influence of the variables gender, school attendance, premature, type of delivery, single mother and absent father were verified.

4 Discussion

4.1 ICF-CJ

Through the ICF-CJ systematization, it was possible to observe the contextual health factors of children up to three years old, such as family environment, received stimuli and motor development, and to classify the current health of the sample of this research.

Recent study defines the functionality as the third health indicator, in addition to existing indicators, mortality, and morbidity, as a way to monitor health strategies in the systems (STUCKI; BICKENBACH, 2017). Thus, the methodology proposed in this study is in line with the current literature and changes in health paradigms (HWANG et al., 2014), since it allows an expanded view of children's health in primary care.

Most of the studies with the use of ICF are aimed at populations with diseases (CASTANEDA; BERGMANN; BAHIA, 2014; DORNELAS et al., 2014; SANTOS; LLERENA JÚNIOR; RIBEIRO, 2015; CASTRO; COELHO; PINTO, 2016; TOLDRÁ; NASCIMENTO, 2016). Few studies investigated this tool in populations without diagnosis, healthy or with typical NPMD (SILVA et al., 2016) and no study was developed with the children population in public health places like the FHSC.

The participant FHSC does not have actions aimed at the monitoring of the children´s NPMD, nor does it stimulate early actions for those who are at risk of delay, which is in line with Caminha et al. (2017) about the scarcity of child development surveillance in basic health care in Brazil.

This lack of NPMD surveillance practices is in line with the recommendations of the Child Health Surveillance program created by the Ministry of Health (YAKUMA et al., 2015). A possible justification for this distancing between care directives and practical actions would be the lack of training and continued training for professionals working in basic care units (DELLA BARBA et al., 2017).

In this way, the use of tools that help the professionals´ viability (LLANO et al., 2013) which are in the primary care network, unified, both for comparison and monitoring of information and for decision-making of the best and most evaluation practice ways (CIEZA et al., 2016) is one of the prerogatives and purposes of the ICF-CJ (ALVES et al., 2016) and it was confirmed in the present study.

4.2 Semi-structured interview × ICF-CJ

The characterization of the sample for this study to respond to the environmental and personal factors of the ICF-CJ corroborates the findings of a developing country, such as Brazil. Bornstein et al. (2012) report that there is a lack of data on conditions that affects the NPMD, especially in developing countries, but with evidence already known. However, studies have demonstrated that socio-cultural context and unfavorable socioeconomic conditions are risk factors for NPMD (GRANTHAM-MCGREGOR et al., 2007; WALKER et al., 2007).

In the sample studied, most children did not attend school/day-care. Although the literature defines day-care centers as development-promoting environments, particularly in early childhood (MARTINEZ et al., 2016), it is necessary to evaluate the quality of the stimulus received both in the school environment and at home.

Another factor to be considered in the study of the complexity of development is the nutritional status (CUNHA; LEITE; ALMEIDA, 2015). The results of this research are worrisome because all children presented nutritional risks, most of whom were classified as overweight. These findings have a worldwide trend that is directly related to economic and social issues (BLACK et al., 2013). Cunha, Leite and Almeida (2015) state that children should receive adequate feeding with exclusive breastfeeding preferably up to two years old through adequate prenatal nutrition, exclusive breastfeeding in the first six months, addition of adequate complementary foods and continued breastfeeding until two years old. These findings lead us to reflect on the existence of the CMP with a caregiving perspective, without the proper control of the health of the participating children, which does not seem sufficient for full development.

The risks to development may be due to factors inherent to the child, biological aspects, besides family and environmental, which also exert influences under the NPMD (RESEGUE; PUCCINI; SILVA, 2008).

Thus, contextual factors in the children´s area and their environments should also be investigated, since the precarious socioeconomic situation, low level of education of the family members and the lack of programs and public policies aimed at this population, realities found in this research, and considered barriers to the full NPMD, which justifies the expanded investigation of children´s health under a preventive and promotional approach (SAKURAMOTO; SQUASSONI; MATSUKARA, 2014).

Changes in family structures, reality of the study, with single mothers and absence of the father also need investigation (ARAUJO, 2013).

The results obtained in this study show that 63.16% of the families reported an income below two thousand reais per month, and most of the participants obtained classification between categories C1 and C2, according to ABEP extracts. The higher the income of the family, the greater the possibility of acquisition and offer of toys for the children and consequently, there are repercussions in a greater stimulus to the development (GIORDANI; ALMEIDA; PACHECO, 2013).

The findings of this study, with children in a socioeconomic situation at risk and with few stimuli in the home environment, corroborate the study of Palma, Guaríglia and Marques (2016), in which it is emphasized that children from low social class families have few opportunities access and availability to toys that contribute to the stimulation of motor development. Zajonz, Müeller and Valentini (2008) studied 19 children from 6 to 15 months old and, in their results, socioeconomic factors were related to motor development, children with higher motor delays were from less favored families socioeconomically, which highlights that poverty is a limitation of child development opportunities. This fact is also related to the low level of education of the family head of the sample studied, and 47.37% had not finished elementary school.

It was observed that most families have goods and services above what they receive in real value, that is, some families present consumption patterns higher than their income (FERREIRA; LIMA, 2014), however, without configuring greater access to educational goods, considering that education was low.

Most of the participants in this sample were born at term, with adequate birth weight and a present father, which in the literature, they are considered as protective factors (ARAUJO; MÉLO; ISRAEL, 2017).

The systematization of ICF-CJ in this work is able to classify the acquisition of goods and services a, among other issues. Thus, we can classify if the socioeconomic context in which the child is inserted is a barrier or a facilitator for his motor development, such as the supply of toys and/or materials that encourage his development in the home environment.

4.3 Denver II Development Screening Test × ICF-CJ

It is observed that the risk values for the NPMD of this of 47.37% children are slightly higher for this age group, suggesting the current international literature of 2 to 11% worldwide (LOWE; MCMILLAN; YATES, 2015), from 1 to 3% of the children under 5 years old (SHEVELL et al., 2003; FERREIRA, 2004). However, the observed values are similar to those reported by national studies in 24% of babies from 4 to 18 months old of public day-care (MOREIRA et al., 2009), 48% in Brazilian children up to 12 months old (NAVAJAS; BLASCOVI-ASSIS, 2016)and up to 52.7% from 6 to 18 months old (SILVA; ENGSTRON; MIRANDA, 2015), in 33% (MARIA-MENGEL; LINHARES, 2007), 43.1% (RIBEIRO; PEROSA; PADOVANI, 2014) to 52.6% (RESEGUE; PUCCINI; SILVA, 2008) and 77% (COSTA et al., 2016) in children aged 3 to 4 years old.

However, in the values obtained worldwide, this exact prevalence of delay in NPMD is still unknown, when considering the complexity in the definition and uniformity in the concept of what is typical development (FIGUEIRAS et al., 2005). Perhaps the lack of criteria in determining what would be delayed would lead to this difficulty of real and more accurate estimates in terms of prevalence (DORNELAS; DUARTE; MAGALHÃES, 2015).

The evaluation and identification before 12 months old has a relevant predictive value (FORMIGA; LINHARES, 2011), and the use of tools increases the chance of identifying the delay from 30 to 70-80% (DEMIRCI; KARTAL, 2015), with Denver II as an instrument of easy application for the reality of the FHSC, able to respond to some domains of activity and participation of the ICF-CJ. It is worth noting that the Denver II test is a screening and non-diagnostic test, which may be an initial mapping, with the need for more specific and accurate referrals and assessments. This is because the main problem of lack of early screening is that up to 50% (RYDZ et al., 2005) of children are not able to receive early interventions (ROSENBERG; ZHANG; ROBINSON, 2008), which could avoid learning difficulties and will only be perceived and

then treated in the child when he reaches school age (RYDZ et al., 2005).

Through the Denver II test, it was possible to identify that language was the most compromised area among the participating children, as Costa, Cavalcante, and Dell'Aglio (2015) identified in 59.2% of 319 children aged 36 to 48 months old, and by Ribeiro, Perosa and Padovani (2014) in 24.6% of 65 children between 11 months and 12 months old. For Pinto et al. (2015), the delay in this area would be a consequence of inadequate stimulation of language standards in the home environment, especially in low-income and/or low-education level families and excessive work hours.

4.4 Opportunities in the home environment for motor development (AHEMD) × ICF-CJ

The home environment is considered a precursor to the essential stimuli for child development and constitutes the environmental domain of the ICF-CJ that is closest to the child. Bueno, Castro and Chiquetti (2014) performed a study with 21 infants and six of them presented low stimulation opportunity. In this study, two children up to 18 months old of the 19 participants had a low opportunity for stimulation.

When we considered children from 19 to 42 months old who participated in this study, we obtained results divided into five areas. For the areas of fine motor stimulation and gross motor stimulation, we obtained worrying results. Seven of the eight children of this age group received very weak stimulation classification for fine motor stimulation and six children received very weak classification for the area of gross motor stimulation. Nobre et al. (2009), applied the same instrument in 128 participants and obtained results very similar to this study. The most affected areas were gross motor stimulation, in which 99% of group A (households with monthly income below R$ 1,000.00) and 100% of group B (households with monthly income higher than R$ 1,000.00) did not obtained adequate classification for gross motor stimulation, and 99% of group A and 96.2% of group B presented weak and very weak classification, respectively, in the area of fine motor stimulation.

We can discuss this result because, with the passing of the months, the stimuli directly offered to the children diminish, and they continue to play with the same toys previously got and that no longer present stimulation results as expected for age and the child's potential. Another hypothesis would be that the toys become more elaborate and pedagogical over time, requiring knowledge of the parents to make in case of non-existence of the possibility of purchase or even the financial issue.

Another finding in this study for children older than 18 months old was the best opportunity in the internal space when compared to the external space, which received a weak or very weak classification. This leads to the discussion from two points of view, the first one related to the low family income, previously discussed, which makes the homes small and poor in stimuli, and the second one related to the exposure to violence, as described by Walker et al. (2007), which means that children do not have the opportunity to explore outside environments and are restricted to the same stimuli.

The AHEMD instrument can assist during classification by ICF-CJ in assessing issues related to interactions and interpersonal relationships, involvement in play and recreation and leisure spaces, as the ICF-CJ is able to document the influence that the territory the child is inserted demand in its development (BERNARDI et al., 2017), at the same time that already allows to draw guidelines to the family interviewed.

4.5 Correlations between variables × ICF-CJ

In this study, the female was related to a better performance in the global motor and fine motor skills of AHEMD, but in the study by Venturella et al. (2013) no gender differences in overall motility are reported in the first two years (the authors suggest that differences between the genders are influenced by context opportunities).

Another finding showed that the opportunities received in the home environment were positive for the older children, as well as related to the better socioeconomic situation, which shows that the better the family income classification, the greater the possibility of acquiring and offering toys. The study by Defilipo et al. (2012) verified that the stable union of the parents, greater maternal and paternal education level and a higher economic level were the factors associated with the best opportunities for motor stimulation in the home. However, the research developed by Nascimento Junior et al. (2014) concluded that only the high socioeconomic family level is not sufficient to structure a home environment that allows the improvement of child motor performance.

The fact that the evaluated children receive higher scores in the global and fine motor of the AHEMD

scale may be related to the lack of opportunities in the external environment, also observed in this study, since violence is a barrier that restricts children in activities in the internal environment (WALKER et al., 2007), causing that especially the older children are restricted to the same stimuli in the course of its development.

In this study, low birth weight was related to lower declared income, which corroborates de Araujo (2013) study, in which children aged 0 to 3 years old who presented low birth weight and monthly family income less than two thousand reais were more likely to present delays in NPMD. However, this finding should be observed with caution, since only one child in the sample studied was born with low weight.

It was also verified the relation of monthly income to the head of household's education, which can be justified, since the higher the education level, the better the job opportunity and, consequently, the socioeconomic condition (RESEGUE; PUCCINI; SILVA, 2008).

The nutritional classification had a correlation with the education level of the head of the family - the lower the education level, the greater the chance of presenting nutritional deficit (thinness), which is pointed out in the studies of Cunha, Leite e Almeida (2015) e Black et al. (2013). However, these findings should be carefully observed, since, in the participant sample, there was a child with thinness and one with severe thinness.

5 Conclusion

In this study, 47.37% of CMP children up to three years old had a delay in NPMD, especially in the language area, with a tendency to be overweight and characterized by low income population, low level of parental education and values of smaller home stimulation opportunities as age increases, which may constitute barriers to NPMD.

The ICF proved to be a valid classification tool for the selection of evaluation instruments in its domains, and it was possible to score aspects of the functionality of typical children with a risk established to NPMD, in addition to systematizing its use in this population. Its use is a challenge for health professionals, promoting the intersectoriality of the different professionals and the different environments of the child's health.

Future studies are suggested with a longitudinal design and follow-up with an expanded vision of health through the ICF, as a way of subsidizing early identification and intervention actions, as well as public policies that urgently guarantee the full NPMD of the small child in the primary care. The limitations of the study are due to the small sample, with no generalization power, as well as the limitation of the instruments used, since they are sorting instruments, requiring more specific and accurate scales.

References

ALVES, C. P. et al. A produção científica da classificação internacional de funcionalidade, incapacidade e saúde para crianças e jovens – CIF-CJ. *Revista Educação Especial*, Santa Maria, v. 29, n. 56, p. 635-652, 2016. http://dx.doi.org/10.5902/1984686X17202.

AMORIM, R. C. et al. Programa de saúde da família: proposta para identificação de fatores de risco para o desenvolvimento neuropsicomotor. *Revista Brasileira de Fisioterapia*, São Carlos, v. 13, n. 6, p. 506-513, 2009. http://dx.doi.org/10.1590/S1413-35552009005000065.

ARAUJO, L. B. *Análise do desenvolvimento neuropsicomotor de crianças de zero a três anos em centros de educação infantil*. 2013. 105 f. Dissertação (Mestrado em Educação Física) – Universidade Federal do Paraná, Curitiba, 2013.

ARAUJO, L. B.; MÉLO, T. R.; ISRAEL, V. L. Low birth weight, family income and paternal absence as risk factors in neuropsychomotor development. *Journal of Human Growth and Development*, São Paulo, v. 27, n. 3, p. 272-280, 2017. http://dx.doi.org/10.7322/jhgd.124072.

ASSOCIAÇÃO BRASILEIRA DE EMPRESAS DE PESQUISA PARA O BRASIL – ABEP. *Critério de classificação econômica Brasil*. São Paulo, 2015. Disponível em: <http://www.abep.org/criterio-brasil>. Acesso em: 17 abr. 2017.

BERNARDI, S. A. et al. O uso da CIF no acompanhamento do desenvolvimento auditivo e de linguagem de crianças no primeiro ano de vida. *Revista CEFAC*, São Paulo, v. 19, n. 2, p. 159-170, 2017. http://dx.doi.org/10.1590/1982-021620171928016.

BLACK, R. E. et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, London, v. 382, n. 9890, p. 427-451, 2013. http://dx.doi.org/10.1016/S0140-6736(13)60937-X.

BORNSTEIN, M. H. et al. Child development in developing countries: introduction and methods. *Child Development*, Chicago, v. 83, n. 1, p. 16-31, 2012. http://dx.doi.org/10.1111/j.1467-8624.2011.01671.x.

BRASIL. Portaria MS/GM nº 2.488, de 21 de outubro de 2011. Aprova a Política Nacional de Atenção Básica, estabelecendo a revisão de diretrizes e normas para a organização da Atenção Básica, para a Estratégia Saúde da Família (ESF) e o Programa de Agentes Comunitários de Saúde (PACS). *Diário Oficial [da] República Federativa do Brasil*, Poder Executivo, Brasília, DF, 24 out. 2011a. p. 48-55.

BRASIL. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. *Orientações para a coleta e análise de dados antropométricos em serviços de saúde*: norma técnica do Sistema de Vigilância Alimentar e Nutricional – SISVAN. Brasília, 2011b. Disponível em: <http://bvsms.saude.gov.br/bvs/publicacoes/orientacoes_coleta_analise_dados_antropometricos.pdf>. Acesso em: 15 jun. 2017.

BUENO, E. A.; CASTRO, A. A. M.; CHIQUETTI, E. M. S. Influência do ambiente domiciliar no desenvolvimento motor de lactentes nascidos pré-termo. *Revista Neurociências*, São Paulo, v. 22, n. 1, p. 45-52, 2014. http://dx.doi.org/10.4181/RNC.2014.22.914.8p.

CAÇOLA, P. M. et al. Development of the affordances in the home environment for motor development–infant scale. *Pediatrics International*, Australia, v. 53, n. 6, p. 820-825, 2011. http://dx.doi.org/10.1111/j.1442-200X.2011.03386.x.

CAÇOLA, P. M. et al. Further development and validation of the affordances in the home environment for motor development–infant scale (AHEMD-IS). *Physical Therapy*, Alexandria, v. 95, n. 6, p. 901-923, 2015a. http://dx.doi.org/10.2522/ptj.20140011.

CAÇOLA, P. M. et al. The new affordances in the home environment for motor development-infant scale (AHEMD-IS): Versions in English and Portuguese languages. *Brazilian Journal of Physical Therapy*, São Carlos, v. 16, n. 6, p. 507-525, 2015b. http://dx.doi.org/10.1590/bjpt-rbf.2014.0112.

CAMINHA, M. F. C. C. et al. Surveillance of child development: an analysis of Brazil's situation. *Revista Paulista de Pediatria*, São Paulo, v. 35, n. 1, p. 102-109, 2017. http://dx.doi.org/10.1590/1984-0462/;2017;35;1;00009.

CASTANEDA, L.; BERGMANN, A.; BAHIA, L. A Classificação Internacional de Funcionalidade, Incapacidade e Saúde: uma revisão sistemática de estudos observacionais. *Revista Brasileira de Epidemiologia*, São Paulo, v. 17, n. 2, p. 437-451, 2014. http://dx.doi.org/10.1590/1809-4503201400020012ENG.

CASTRO, S.; COELHO, V.; PINTO, A. Identification of functional domains in developmental measures: An ICF-CY analysis of Griffiths developmental scales and Schedule of Growing Skills II. *Developmental Neurorehabilitation,* London, v. 19, n. 4, p. 231-237, 2016. http://dx.doi.org/10.3109/17518423.2014.948638.

CIEZA, A. et al. Refinements of the ICF Linking Rules to strengthen their potential for establishing comparability of health information. *Disability and Rehabilitation*, London, v. 17, p. 1-10, 2016. http://dx.doi.org/10.3109/09638288.2016.1145258.

COSTA, E. F.; CAVALCANTE, L. I. C.; DELL'AGLIO, D. D. Perfil do desenvolvimento da linguagem de crianças no município de Belém, segundo o teste de triagem de Denver II. *Revista CEFAC*, São Paulo, v. 17, n. 4, p. 1090-1102, 2015. http://dx.doi.org/10.1590/1982-0216201517418514.

COSTA, E. F. et al. Association between family poverty and the neuropsychomotor development of children in the administrative districts of Belém. *Fisioterapia em Movimento*, Curitiba, v. 29, n. 3, p. 533-542, 2016. http://dx.doi.org/10.1590/1980-5918.029.003.AO11.

CUNHA, A. J. L. A.; LEITE, A. J. M.; ALMEIDA, I. S. The pediatrician's role in the first thousand days of the child: the pursuit of healthy nutrition and development. *Jornal de Pediatria*, Rio de Janeiro, v. 91, n. 6, p. S44-S51, 2015. Supplement 1. http://dx.doi.org/10.1016/j.jped.2015.07.002.

DAVID, M. L. O. et al. Proposta de atuação da fisioterapia na saúde da criança e do adolescente: uma necessidade na atenção básica. *Saúde em Debate*, Rio de Janeiro, v. 37, n. 96, p. 120-129, 2013. http://dx.doi.org/10.1590/S0103-11042013000100014.

DEFILIPO, E. C. et al. Oportunidades do ambiente domiciliar para o desenvolvimento motor. *Revista de Saúde Pública*, São Paulo, v. 46, n. 4, p. 633-641, 2012. http://dx.doi.org/10.1590/S0034-89102012000400007.

DELLA BARBA, P. C. S. et al. A Terapia Ocupacional em um processo de capacitação sobre vigilância do desenvolvimento infantil na atenção básica em saúde. *Cadernos Brasileiros de Terapia Ocupacional*, São Carlos, v. 25, n. 1, p. 223-233, 2017. http://dx.doi.org/10.4322/0104-4931.ctoRE0747.

DEMIRCI, A.; KARTAL, M. The prevalence of developmental delay among children aged 3-60 months in Izmir, Turkey. *Child Care Health and Development*, Oxford, v. 42, n. 2, p. 213-219, 2015. http://dx.doi.org/10.1111/cch.12289.

DORNELAS, L. D. F.; DUARTE, N. M. D. C.; MAGALHÃES, L. D. C. Atraso do desenvolvimento neuropsicomotor: mapa conceitual, definições, usos e limitações do termo. *Revista Paulista de Pediatria*, São Paulo, v. 33, n. 1, p. 88-103, 2015. http://dx.doi.org/10.1016/j.rpped.2014.04.009.

DORNELAS, L. F. et al. Aplicabilidade da Classificação Internacional de Funcionalidade, Incapacidade e Saúde (CIF) para a avaliação de crianças com paralisia cerebral: uma revisão sistemática. *Cadernos de Terapia Ocupacional da UFSCar*, São Carlos, v. 22, n. 3, p. 579-590, 2014. http://dx.doi.org/10.4322/cto.2014.080.

DRACHLER, M. D. L.; MARSHALL, T.; LEITE, J. C. C. A continuous scale measure of child development for population-based epidemiological surveys: a preliminary study using Item Response Theory for the Denver Test. *Paediatric and Perinatal Epidemiology*, Oxford, v. 21, n. 2, p. 138-153, 2007. http://dx.doi.org/10.1111/j.1365-3016.2007.00787.x.

FERREIRA, H. C.; LIMA, J. P. A insustentável leveza do ter: crédito e consumismo no Brasil. *Revista da Sociedade*

Brasileira de Economia Política, Uberlândia, n. 38, p. 58-88, 2014.

FERREIRA, J. C. Atraso global do desenvolvimento psicomotor. *Revista Portuguesa de Clínica Geral*, Lisboa, v. 20, n. 6, p. 703-712, 2004.

FIGUEIRAS, A. C. et al. *Manual para vigilância do desenvolvimento infantil no contexto da AIDPI*. Washington: OPAS, 2005. Disponível em: <https://www.nescon.medicina.ufmg.br/biblioteca/imagem/1711.pdf>. Acesso em: 15 jun. 2017.

FORMIGA, C. K. M. R.; LINHARES, M. B. M. Motor development curve from 0 to 12 months in infants born preterm. *Acta Paediatrica*, Oslo, v. 100, n. 3, p. 379-384, 2011. http://dx.doi.org/10.1111/j.1651-2227.2010.02002.x.

FRANKENBURG, W. K. et al. The Denver II: a major revision and restandardization of the Denver Developmental Screening Test. *Pediatrics*, Springfield, v. 89, n. 1, p. 91-97, 1992.

GIORDANI, L. G.; ALMEIDA, C. S.; PACHECO, A. M. Avaliação das oportunidades de desenvolvimento motor na habitação familiar de crianças entre 18 e 42 meses. *Motricidade*, Portugal, v. 9, n. 3, p. 96-104, 2013. http://dx.doi.org/10.6063/motricidade.9(3).1097.

GRANTHAM-MCGREGOR, S. et al. Developmental potential in the first 5 years for children in developing countries. *Lancet*, London, v. 369, n. 9555, p. 60-70, 2007. http://dx.doi.org/10.1016/S0140-6736(07)60032-4.

HWANG, A. W. et al. Linkage of ICF-CY codes with Environmental Factors in studies of developmental outcomes of infants and toddlers with or at risk for motor delays. *Disability and Rehabilitation*, London, v. 36, n. 2, p. 89-104, 2014. http://dx.doi.org/10.3109/09638288.2013.777805.

ISMAIL, F. Y.; FATEMI, A.; JOHNSTON, M. V. Cerebral plasticity: windows of opportunity in the developing brain. *European Journal of Paediatric Neurology*, London, v. 21, n. 1, p. 23-48, 2017. http://dx.doi.org/10.1016/j.ejpn.2016.07.007.

JOHNSON, B. Early intervention in children with developmental disabilities. *BMH Medical Journal*, London, v. 3, n. 1, p. 1-4, 2016.

LLANO, J. D. S. et al. Investigation of the evaluative methods used by physical therapists in the specificity of the functional neurology. *Fisioterapia e Pesquisa*, São Paulo, v. 20, n. 1, p. 31-36, 2013. http://dx.doi.org/10.1590/S1809-29502013000100006.

LOWE, L.; MCMILLAN, A. G.; YATES, C. Body weight support treadmill training for children with developmental delay who are ambulatory. *Pediatric Physical Therapy*, Hagerstown, v. 27, n. 4, p. 386-394, 2015. http://dx.doi.org/10.1097/PEP.0000000000000172.

MACY, M. Promising practices, models, and research in the early identification of young children with disabilities. *Journal of Intellectual Disability Diagnosis and Treatment*, Canada, v. 3, n. 4, p. 154-155, 2015.

MARIA-MENGEL, M. R. S.; LINHARES, M. B. M. Fatores de risco para problemas de desenvolvimento infantil. *Revista Latino-Americana de Enfermagem*, Ribeirão Preto, v. 15, p. 837-842, 2007. http://dx.doi.org/10.1590/S0104-11692007000700019.

MARQUES, A. P.; PECCIN, M. S. Pesquisa em fisioterapia: a prática baseada em evidências e modelos de estudos. *Fisioterapia e Pesquisa*, São Paulo, v. 11, n. 1, p. 43-48, 2005.

MARTINEZ, C. M. S. et al. Redes de colaboração e intersetorialidade nas creches públicas do estado de São Paulo. *Cadernos de Terapia Ocupacional da UFSCar*, São Carlos, v. 24, n. 4, p. 673-680, 2016. http://dx.doi.org/10.4322/0104-4931.ctoAO0717.

MOREIRA, H. et al. Um olhar da fisioterapia no atraso do desenvolvimento motor em creches públicas. *Varia Scientia*, Paraná, v. 9, n. 15, p. 27-34, 2009.

NASCIMENTO JUNIOR, J. R. A. D. et al. Nível socioeconômico e affordances do ambiente domiciliar: implicações para o desempenho motor infantil. *Revista da Educação Física*, Maringá, v. 25, n. 4, p. 651-662, 2014. http://dx.doi.org/10.4025/reveducfis.v25i4.26529.

NAVAJAS, A. F.; BLASCOVI-ASSIS, S. M. Avaliação do comportamento motor de crianças entre zero a 12 meses incompletos em região periférica na cidade de Santos. *Revista Terapia Ocupacional da Universidade de São Paulo*, São Paulo, v. 27, n. 3, p. 246-253, 2016. http://dx.doi.org/10.11606/issn.2238-6149.v27i3p246-253.

NOBRE, F. S. S. et al. Análise das oportunidades para o desenvolvimento motor (affordances) em ambientes domésticos no Ceará – Brasil. *Revista Brasileira de Crescimento e Desenvolvimento Humano*, São Paulo, v. 19, n. 1, p. 9-18, 2009. http://dx.doi.org/10.7322/jhgd.19898.

ORGANIZAÇÃO MUNDIAL DA SAÚDE – OMS. *Curvas de crescimento da Organização Mundial da Saúde*. Brasília, 2006. Disponível em: <http://dab.saude.gov.br/portaldab/ape_vigilancia_alimentar.php?conteudo=curvas_de_crescimento>. Acesso em: 15 jun. 2017.

ORGANIZAÇÃO MUNDIAL DA SAÚDE – OMS. *CIF*: Classificação Internacional de Funcionalidade, Incapacidade e Saúde. São Paulo: EDUSP, 2015.

PALMA, L.; GUARÍGLIA, D. A.; MARQUES, I. Análise do desenvolvimento motor de crianças em diferentes classes sociais. *Coleção de Pesquisa em Educação Física*, Jundiaí, v. 15, n. 2, p. 35-43, 2016.

PARANÁ (Estado). Lei nº 16.385, de 25 de janeiro de 2010. Institui o Programa Leite das Crianças, conforme especifica. *Diário Oficial*, Curitiba, 25 jan. 2010. Disponível em: <http://www.leisestaduais.com.br/pr/lei-ordinaria-n-

16385-2010-parana-institui-o-programa-leite-das-criancas-conforme-especifica>. Acesso em: 21 jun. 2017.

PILZ, E. M. L.; SCHERMANN, L. B. Determinantes biológicos e ambientais no desenvolvimento neuropsicomotor em uma amostra de crianças de Canoas/RS. *Ciência & Saúde Coletiva*, Rio de Janeiro, v. 12, n. 1, p. 181-190, 2007. http://dx.doi.org/10.1590/S1413-81232007000100021.

PINTO, F. C. A. et al. Denver II: comportamentos propostos comparados aos de crianças paulistanas. *Revista CEFAC*, Campinas, v. 17, n. 4, p. 1262-1269, 2015. http://dx.doi.org/10.1590/1982-0216201517418214.

RESEGUE, R.; PUCCINI, R. F.; SILVA, E. M. K. D. Risk factors associated with developmental abnormalities among high-risk children attended at a multidisciplinary clinic. *São Paulo Medical Journal*, São Paulo, v. 126, n. 1, p. 4-10, 2008. http://dx.doi.org/10.1590/S1516-31802008000100002.

RIBEIRO, D. G.; PEROSA, G. B.; PADOVANI, F. H. P. Fatores de risco para o desenvolvimento de crianças atendidas em Unidades de Saúde da Família, ao final do primeiro ano de vida: aspectos sociodemográficos e de saúde mental materna. *Ciência & Saúde Coletiva*, Rio de Janeiro, v. 19, n. 1, p. 215-226, 2014. http://dx.doi.org/10.1590/1413-81232014191.1904.

ROCHA, E. F.; PAIVA, L. F. A.; OLIVEIRA, R. H. Terapia ocupacional na Atenção Primária à Saúde: atribuições, ações e tecnologias. *Cadernos de Terapia Ocupacional da UFSCar*, São Carlos, v. 20, n. 3, p. 351-361, 2012. http://dx.doi.org/10.4322/cto.2012.035.

ROSENBERG, S. A.; ZHANG, D.; ROBINSON, C. C. Prevalence of developmental delays and participation in early intervention services for young children. *Pediatrics*, Springfield, v. 121, n. 6, p. e1503-e1509, 2008. http://dx.doi.org/10.1542/peds.2007-1680.

RYDZ, D. et al. Developmental screening. *Journal of Child Neurology*, Littleton, v. 20, n. 1, p. 4-20, 2005. http://dx.doi.org/10.1177/08830738050200010201.

SANTOS, T. V.; LLERENA JÚNIOR, J. C.; RIBEIRO, C. T. M. A CIF-CJ para crianças e adolescentes com osteogênese imperfeita: a perspectiva de especialistas. *Acta Fisiátrica*, São Paulo, v. 22, n. 4, p. 192-198, 2015. http://dx.doi.org/10.5935/0104-7795.20150037.

SAKURAMOTO, S.; SQUASSONI, C.; MATSUKARA, T. Social support, parenting style and mental health of childrenand adolescents. *Mundo Saúde*, São Paulo, v. 38, n. 2, p. 169-178, 2014. http://dx.doi.org/10.15343/0104-7809.20143802169178.

SILVA, Â. C. D. D.; ENGSTRON, E. M.; MIRANDA, C. T. Fatores associados ao desenvolvimento neuropsicomotor em crianças de 6 a 18 meses de vida inseridas em creches públicas do município de João Pessoa, Paraíba, Brasil. *Cadernos de Saúde Pública*, Rio de Janeiro, v. 31, n. 9, p. 1881-1893, 2015. http://dx.doi.org/10.1590/0102-311X00104814.

SILVA, A. Z. et al. Avaliação neuropsicomotora e classificação funcional em escolares. *Revista de Terapia Ocupacional da Universidade de São Paulo*, São Paulo, v. 27, n. 1, p. 52-56, 2016. http://dx.doi.org/10.11606/issn.2238-6149.v27i1p52-62.

SHEVELL, M. et al. Practice parameter: evaluation of the child with global developmental delay Report of the Quality Standards Subcommittee of the American Academy of Neurology and The Practice Committee of the Child Neurology Society. *Neurology*, Minneapolis, v. 60, n. 3, p. 367-380, 2003. http://dx.doi.org/10.1212/01.WNL.0000031431.81555.16.

STUCKI, G.; BICKENBACH, J. Functioning: the third health indicator in the health system and the key indicator for rehabilitation. *European Journal of Physical and Rehabilitation Medicine*, Italy, v. 53, n. 1, p. 134-138, 2017. http://dx.doi.org/10.23736/S1973-9087.17.0456.

TOLDRÁ, R. C.; NASCIMENTO, C. L. Estudo da aplicação dos componentes Atividade e Participação da Checklist da CIF em pessoas com Esclerose Múltipla e sua relação com os Core Sets. *Cadernos de Terapia Ocupacional da UFSCar*, São Carlos, v. 24, n. 4, p. 723-732, 2016. http://dx.doi.org/10.4322/0104-4931.ctoAO0641.

TOMASI, A. R. P.; RIZZOTTO, M. L. F. Análise da distribuição e composição profissional dos Núcleos de Apoio à Saúde da Família no Paraná. *Saúde em Debate*, Rio de Janeiro, v. 37, n. 98, p. 427-436, 2013. http://dx.doi.org/10.1590/S0103-11042013000300006.

VENTURELLA, C. B. et al. Desenvolvimento motor de crianças entre 0 e 18 meses de idade: diferenças entre os sexos. *Motricidade*, Portugal, v. 9, n. 2, p. 3-12, 2013. http://dx.doi.org/10.6063/motricidade.9(2).617.

VIEIRA, S. *Introdução à bioestatística*. Rio de Janeiro: Elsevier Brasil, 2015.

WALKER, S. P. et al. Child development: risk factors for adverse outcomes in developing countries. *Lancet*, London, v. 369, n. 9556, p. 145-157, 2007. http://dx.doi.org/10.1016/S0140-6736(07)60076-2.

YAKUMA, M. S. et al. Vigilância em saúde da criança: perspectivas de enfermeiros. *Revista Brasileira de Enfermagem*, Brasília, v. 68, n. 3, p. 384-390, 2015. http://dx.doi.org/10.1590/0034-7167.2015680302i.

ZAJONZ, R.; MÜELLER, A. B.; VALENTINI, N. C. A influência de fatores ambientais no desempenho motor e social de crianças da periferia de Porto Alegre. *Revista da Educação Física*, Maringá, v. 19, n. 2, p. 159-171, 2008. http://dx.doi.org/10.4025/reveducfis.v19i2.3220.

Author's Contributions

Luize Bueno de Araujo: data analysis, text design and writing. Karize Rafaela Mesquita Novakoski and Marina Siqueira Campos Bastos: collection and analysis of data, design and writing of the text. Tainá Ribas Mélo: data collection, statistical analysis and review of the text. Vera Lúcia Israel: orientation and review of the text. All authors approved the final version of the text.

Notes

[1] This work was developed in the Health and Functionality Subject of the Post-Graduation Program of Physical Education - UFPR. The project was approved by the Health Ethics Committee of UFPR, CAAE: 57193516.6.0000.0102, protocol number 1,714,810.