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Original articles

The use of ICF in the monitoring of hearing and language development in children in their first year of life

O uso da CIF no acompanhamento do desenvolvimento auditivo e de linguagem de crianças no primeiro ano de vida

Sarah Alvarenga Bernardi[1]
Altair Cadrobbi Pupo[2]
Maria Cecília Bonini Trenche[2]
Luisa Barzaghi[2]

[1] Faculdade de Ciências Médicas e da Saúde da Pontifícia Universidade Católica de São Paulo – *Campus* Sorocaba, Sorocaba, SP, Brasil.

[2] Departamento de Clínica Fonoaudiológica e Fisioterápica da Faculdade de Ciências Humanas e da Saúde da Pontifícia Universidade Católica de São Paulo, São Paulo, SP, Brasil.

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Mailing address:
Sarah Alvarenga Bernardi
Rua Miranda Azevedo, nº 551, apto 33 - Centro - Sorocaba - SP
CEP: 18035-090
E-mail: sarah.alvarenga.bernardi@gmail.com

ABSTRACT

Purpose: use the International Classification of Functioning, Disability and Health-Children and Youth (ICF-CY) at National Health System services to record the hearing and language development of children in their first year of life.

Methods: the community health agents (CHAs) of the Basic Health Unit in the city of Sorocaba, São Paulo, Brazil, were trained to apply a questionnaire to monitor the hearing and language in children in their first year of life assisted by the Family Health Strategy (FHS). Audiologists made the correlation of each of the questions with the codes of the ICF-CY.

Results: thirteen CHAs participated in the training program and had higher percentage hits on post-training evaluation, regarding pre-training. Twenty-two children were followed up, of whom 17 evolved as expected, 2 showed improvement in the results, 2 required continuity in their monitoring and for 1, the suspected development risk was maintained.

Conclusions: the use of the ICF-CY allowed the expansion of the attention of health professionals and it can be used to monitor child development. The creation / adaptation of standardized assessment tools based on ICF favors its use in the clinical practice. The training of CHAs was effective and led to their involvement with the issues relevant to child development.

Keywords: Speech, Language and Hearing Sciences; Audiology; Language Development; Community Health Workers; International Classification of Functioning; Disability and Health

RESUMO

Objetivo: utilizar a Classificação Internacional de Funcionalidade, Incapacidade e Saúde- Crianças e Jovens (CIF-CJ) em serviços do Sistema Único de Saúde para o registro do desenvolvimento da audição e da linguagem de crianças no primeiro ano de vida.

Métodos: os ACS da Unidade Básica de Saúde da cidade de Sorocaba, São Paulo, Brasil, foram capacitados para a aplicação de um questionário para monitoramento da audição e da linguagem em crianças no primeiro ano de vida atendidas pela Estratégia de Saúde da Família (ESF). Fonoaudiólogos especialistas em audiologia realizaram a correlação de cada uma das perguntas do questionário com os códigos da CIF-CJ.

Resultados: 13 ACS participaram da capacitação e obtiveram porcentagem de acertos na avaliação pós-capacitação maior em relação à pré-capacitação. 22 crianças foram acompanhadas, 17 crianças evoluíram de acordo com o esperado, 2 obtiveram melhora nos resultados, 2 necessitaram de continuidade no acompanhamento e para 1 a suspeita de alteração no desenvolvimento foi mantida.

Conclusões: a utilização da CIF-CJ permitiu a ampliação do olhar dos profissionais da saúde e pode ser utilizado no acompanhamento do desenvolvimento infantil. A criação/adaptação de instrumentos de avaliação padronizados com base na CIF favorece sua utilização na prática clínica. A capacitação dos ACS se mostrou efetiva e propiciou o envolvimento deles com as questões relevantes para o desenvolvimento infantil.

Descritores: Fonoaudiologia; Audiologia; Desenvolvimento da Linguagem; Agentes Comunitários de Saúde; Classificação Internacional de Funcionalidade; Incapacidade e Saúde

INTRODUCTION

Basic health attention is part of the children's health vigilance system, and its actions span from the identification of risk pregnancies to follow-ups in child growth and development[1]. The first year of life encompasses the most rapid and important CHAsnges of child development [2], which justifies the need for follow-up of children during this period. This follow-up is conducted by a team of health professionals and should not be limited to the biological aspects of development, but should also encompass psychosocial aspects and consider both health and life conditions of the child, mother and family [3].

In Basic Attention, the Community Health Agents Program (CHAP) and the Family Health Strategy (FHS) have become valuable tools in full attention to children's health. The presence of a health-care professional who is in direct touch with the community, as are the Community Health Agents (CHAs) may aid in the identification of risks or problems that may interfere in the process of child development [4]. These professionals are part of and work with the support of other professionals who compose the Family Health Team and may have the matrix support [5,6] of specialized professionals who are part of the family Health Support Nucleus (FHSN).

Literature on the rehabilitation of hearing impaired children agree that early diagnosis and intervention decrease the impact or damage to the development of cognitive, hearing and language skills[7]. This is also true for many other health problems or risks in children. Language development follow-up, for example, enables the assessment of the integrity of neural systems involving hearing, cognitive development, motor articulation function, among other sensory and cognitive aspects[8].

Even after the introduction of Newborn Hearing Screening, the concern with hearing and language development during the first year of life has been the object of study for several authors who say there is a high rate of newborn evasion who do not proceed with the audiological identification and/or diagnosis process[9-11]. Standardized protocols for developmental assessment of newborns and children up to one year of age are currently being used in specialized services, among which, specifically in the field of language and hearing is the "Questionnaire for monitoring auditory and language development in the first year of life", developed by Alvarenga et al. (2013)[12] answered by parents and filled-in by the CHAs.

The Pan American Health Organization (PAHO) published the Handbook for monitoring child development in the context of Integrated Management of Childhood Illnesses (IMCI) in 2005 with guidelines for health-care professional on developmental milestones and an assessment protocol for follow-up of child development[13]. Since 1998, the World Health Organization (WHO) recommends training of CHAs to stay alert for hearing and ear troubles[14]. Some studies have been conducted in Brazil based on the education of CHAs for actions in Hearing Health attention. All of them have proved the efficiency of training in the permanent education process and in the education of multipliers in preventing hearing impairment, identifying risk factors and the need for developing health education actions[12,15,16].

The International Classification of Functioning, Disability and Health – Child and Youth version (ICF-CY) is part of the group of international classifications and was based on the International Classification of Functioning, Disability and Health published by the World Health Organization in 2001. This classification aims to document the CHAsracteristics of child development and the influence of her surrounding environment. It may be used by health-care professionals, educators, politicians, Family members, consumers and researchers. The ICF is organized according to the following domains: Body functions and structures; Activities and Participation; Environmental factors and Personal Factors[17]. As the name suggests, the ICF is not an assessment tool but a registration tool using internationally known codes, that is still not being widely used in Brazilian health services.

In its 11th congress, the Brazilian Association of Collective Health (BACH) recommends: a) that all healthcare professionals, education institutions, government organs of several cooperation sectors learn and include the ICF principles in all forms of education; b) the inclusion of the ICF in health vigilance, in healthcare attention networks, all healthcare attention levels, as it is a model of attention focusing on caregiving; c) the development and completion of forms and CHAsnges to information systems, through a Department of Health-created work group in order to implement the ICF in health information systems and interdepartmental work groups in order to create integrated systems to subsidize sectorial and intersectorial policies involving the ICF[18].

However, it has not been widely used in Brazil, since managers and technicians have been using it

exclusively in specialized attention units, leaving behind all of its classification potential in primary healthcare[19,20].

Decree number 5.839 was created by the National Health Counsel in July 11th, 2006, and establishes the use of the ICF in the National Universal Health System (NUHS) as a clinical tool that generates information on healthcare, enabling the management of healthcare actions and services [21].

The follow-up of children at risk for hearing and language development disorders must be a part of the routine in healthcare units, as it directly influences the child's global and social development. However, the basic attention healthcare professionals' concern with monitoring child development during the first years of life remains restricted to nutritional factors and weight growth. Therefore, there is need for more incentives by managers in order to include these aspects in the units' routine, so that all professionals directly involved in child healthcare may be aware of the importance of this follow-up.

The purpose of this study was to use the ICF-CY in recording hearing and language development of children during their first year of life in a basic healthcare attention unit.

METHODS

This is a prospective, descriptive study, approved by the Research ethics Committee at the College of Health and Medical Sciences of the Pontifical Catholic University of São Paulo – PUC-SP (CEP FCMS-PUC/SP) under number CAAE 44636815.8.0000.5373. The sources of data generation for the instruments were kept anonymous, as were the subjects involved in the study. The participants signed a free informed-consent term, in accordance with Resolution CNS 466/2012.

The study was conducted at the Basic Health Unit (BHU) at Parque São Bento neighborhood, in the city of Sorocaba - São Paulo[(1)], a mixed unity that withholds one administration while providing traditional model care to one part of the territory and providing the remainder of the territory with an integral attention model planned by the FHT. Two groups of subjects participated: a) *Group 1- Community Health Agents (CHAs)*, included according to the following criteria: working in the Family Health teams of the Basic Health Unit at Parque São bento and participating of the training program about hearing and language development and about the proper completion of the questionnaire used in the study. The exclusion criterion was the CHAs not participating of the training program regarding the questionnaires used in the study. b) *Group 2 – Newborns and children in their first year of age*, of both genders, overseen by the FHT teams working at the Parque São Bento BHU Family Health Teams in Sorocaba - São Paulo, between September and December 2015. Children who did not belong to the area assigned to the FHT were excluded.

In order to monitor hearing and language development, the 'Questionnaire for monitoring auditory and language development in the first year of life', developed by Alvarenga et al. (2013) [12] was used. This instrument is composed of questions regarding hearing and language development, according to expected behaviors for each month, in the period ranging from 0 to 1 year of age. Data analysis followed the questionnaire assessment criteria proposed by the authors, where the child is considered at risk for hearing and language disorders if at least one of the answers is 'no'. In the case of affirmative answers, the child is considered to be within the expected standards for her age group[12].

In order to perform the record using the ICF-CY, three Speech-Language Pathologists and Audiologists, specialized in Audiology and who work with children, were separately asked to correlate each item on the questionnaire to the ICF-CY codes. The items in the 'Questionnaire for monitoring auditory and language development in the first year of life' were related/associated to the domains and categories in the ICF-CY, which are: Body functions and structures; Activities and Participation; Environmental Factors and Personal Factors. The only classifiers used were 0 (no disorder) and 8 (not specified), since the instrument does not quantify the degree of disorder. Therefore, for those answers suggesting the existence of any developmental disorder, the 8 classifier was used.

The agreement in choice by at least two Speech-Language Pathologists and Audiologists was the criterion to determine the final definition of ICF-CY codes related to each questionnaire item.

In order to educate the CHAs to complete the questionnaire, an 8-hour training session offered as a workshop was conducted, based on the handbooks developed by the *International Workshop on Primary Ear and Hearing Care* proposed by the WHO. Training

(1) According to the Brazilian Institute of Geography and Statistics (2010), the city of Sorocaba, in the state of São Paulo, Brazil, has a total population of 586,625 inhabitants. The basic attention network is currently composed by 31 basic health units, 44 FHT teams distributed across 14 health units, covering 27,6%[22,23]. The BHU at Parque São Bento has 15 assigned CHAs.

involved the following themes: hearing physiology; types, causes and risk factors for hearing loss; normal standards of motor, hearing and language development, from birth to the first year of age; consequences of hearing loss on child development and for the Family; guidelines on hearing and language stimulation; environmental factors (barriers and enabling factors) of the ICF-CY. Interactive and audio-visual resources were used for this purpose.

Written material, with contents adapted from: 1) *World Health Organization: primary ear and hearing care training resource* and 2) material developed in the study by Alvarenga et al.(2013)[12] was specifically developed for this workshop.

In order to assess the acquired knowledge and the effectiveness of the CHAs training session a test was conducted before and after training, with specific questions regarding the content, according to the study by Alvarenga et al. (2008) [15]. The positive evaluation criteria was established as higher than 70% of correct answers on the test taken after training. The Wilcoxon test was used in order to compare the percentage of correct answers on the tests taken before and after training [24].

The 'Questionnaire for monitoring auditory and language development in the first year of life' were completed by CHAs when interviewing parents of children registered at the Family Health Teams (FHT) during monthly home visitations between September and December, 2015.

RESULTS

ICF-CY codes associated to the "Questionnaire for monitoring auditory and language development in the first year of life"

The content analysis held by the Speech-Language Pathologists and Audiologists yielded the following relation between the "Questionnaire for monitoring auditory and language development in the first year of life" and the ICF-CY codes (Figure 1).

According to the authors of the aforementioned questionnaire, the question "Does your child hear well?", regarding auditory perception, was included for all months aiming to verify parents' opinion about their children's hearing. Therefore, the ICF code regarding auditory perception is found in all months of child follow-up.

Age Group	Answer	ICF-CY Code	0=yes 8=no
1st day to 30/31 days of life Month 1			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception	
2. Does your child get startled with loud noises? Give me an example	( ) Yes ( ) No	b2300 Detection	
Months 1-2			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception	
2. Does your child pay attention to sounds?	( ) Yes ( ) No	b2300 Detection b1401 Attention shift	
3. Does your child recognize your voice?	( ) Yes ( ) No	d3100 Responding to the human voice b2301 Sound discrimination	
Months 2-3			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception	
2. Does your child calm down with your voice? With lullabies?	( ) Yes ( ) No	b2301 Sound discrimination b2304 Speech discrimination d3100 Responding to the human voice d115 Hearing	
3. Does your child make cooing sounds?	( ) Yes ( ) No	b3100 Voice production	

Age Group	Answer	ICF-CY Code	0=yes 8=no
Months 3-4			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception	
2. Does your child try to turn his/her head towards sound?	( ) Yes ( ) No	b2302 Locating sound source	
3. Does your child utter more sounds than in the previous month, fff, oooo? (bubbles, brrr)	( ) Yes ( ) No	b3401 Production of several sounds b3408 Alternative vocalization functions, specified others	
Months 4-5			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception	
2. Does your child look for sounds?	( ) Yes ( ) No	b2302 Locating sound source	
3. Does he/she utter several sounds as trying to talk?	( ) Yes ( ) No	d331 Pre-linguistic productions	
Months 5-6			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Does your child look when you call him/her?	( ) Yes ( ) No	b2303 sound lateralization b2304 Speech discrimination b2308 Speech recognition d3100 Responding to the human voice b1401 Attention shift d1600 Focusing attention on touch, face and voice	
3. Does he/she say mamamama dadadada as trying to talk?	( ) Yes ( ) No	d331 Pre-linguistic productions b3401 Production of several sounds	
Months 6-7			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Does your child recognize names of family members?	( ) Yes ( ) No	b2308 Speech recognition b16700 Oral language reception	
3. Does your child say several different syllables? For example: dada, papa. (speaks a lot)	( ) Yes ( ) No	b3401 Production of several sounds d331 Pre-linguistic productions	
Months 7-8			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Does he/she turn quickly when called?	( ) Yes ( ) No	b2303 Sound lateralization b1401 Attention shift d1600 Focusing attention on touch, face and voice	
3. Does he/she like to play with toys that make noise?	( ) Yes ( ) No	d115 Hearing	
Months 8-9			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Does he/she understand when people say “no”?	( ) Yes ( ) No	b2308 Understanding speech d3101 Understanding simple spoken messages b16700 Oral language reception	
Months 9-10			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Does he/she try imitating sounds?	( ) Yes ( ) No	b2304 Speech discrimination d130 Imitation b3401 Production of several sounds	

Age Group	Answer	ICF-CY Code	0=yes 8=no
Months 10-11			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Does he/she wave when someone says 'bye-bye?	( ) Yes ( ) No	d130 Imitation d3101 Understanding simple spoken messages b16700 Oral language reception b2308 Auditory functions, specified others (speech recognition)	
3. Does he/she babble as if talking?	( ) Yes ( ) No	d331 Pre-linguistic production b3401 Production of several sounds	
Months 11-12			
1. Does your child hear well?	( ) Yes ( ) No	b1560 Auditory perception d115 Hearing	
2. Is he/she saying his/her first words?	( ) Yes ( ) No	d330 Speaking; d1330 Acquiring simple words b16710 Oral language expression.	
3. Does he/she understand orders such as 'where is it?" and "give it to me"?	( ) Yes ( ) No	d3101 Understanding simple spoken messages b2308 Auditory functions, specified others, (auditory recognition) d2100 Completing a simple task	

Figure 1. ICF-CY Codes associated to the questions of the "Questionnaire of monitoring auditory and language development in the first year of life" (Waldir, colocar embaixo da figura)

FHA Training

In all, 13 of the 15 FHA working at the Parque São Bento BHU participated in the study. The FHA are part of two FHT teams. The purple team has 7 FHA and all of them (100%) participated of training. The Orange team has 8 FHA, 6 of which (75%) took part in training. Two were excluded for being on medical leave at the time when the training workshop was held.

The percentage of correct answers in the questionnaire used for FHA assessment after training was significantly higher than before training (P=0.00117) (Table 1).

Table 1. Percent of correct answers on the assessment questionnaire before and after CHAs training (p=0.00117).

CHA	Questionnaire			
	Before		After	
	n	%	n	%
1	12	60	12	60
2	9	45	13	65
3	13	65	16	80
4	12	60	18	90
5	11	55	18	90
6	12	60	17	85
7	13	65	20	100
8	17	85	19	95
9	12	60	19	95
10	11	55	19	95
11	11	55	17	85
12	13	65	20	100
13	16	80	16	80
Mean	12.46	62.31	17.23	86.15

Of the 13 FHA who participated in training, 11 scored higher than 70% on the questionnaire after training, which corresponds to 84.62% of the sample. Two FHA (15.38%) scored below 70% of correct answers and had another opportunity to review the content individually.

Relation between the ICF codes and the children's auditory and language development

The territory covered by the Parque São Bento BHU has 374 children registered in the age group of up to one year. Of these, 88 (23.5%) are registered in one of the two FHT teams, of which 63 in the area covered by the purple team, and 25 in the area covered by the Orange team.

The "Questionnaire for monitoring auditory and language development in the first year of life" was completed in regard to 22 children, corresponding to 5.18% of the number of children registered in the territory, 25% of the children registered in the FHT, of which 28.5% (n=18) of the area concerning the purple team and 16% (n=4) the orange team.

Regarding the age group of the children regarded in questionnaire responses, there was a greater percentage of children in the period between the first day and first month of life (27.27%). There was no sample in the age group comprehending the period between the 11th and 12th months.

However, not all children were followed for the same period of time. In all, 6 children (27.27%) were followed during one month - subjects 1, 2, 3, 9, 18 and 19, 12 children (54.55%) during 2 months - subjects 4, 5, 7, 10, 12, 13, 14,15,16, 17, 20, 21 and 4 children (18.18%) during 3 months - subjects 6, 8, 11 and 22. The children were numbered and the respective results were organized according to age groups at the end of follow-up, and not according to the child's number. A CHAsrt, relating the ICF-CY codes and hearing and language development and age group is presented in order to improve visualization of the expected skills in each age group and the selected code (Figure 2). The colored area clearly shows the progression of auditory and language skill development.

In regard to the answers to the "Questionnaire for monitoring auditory and language development in the first year of life" based on the ICF-CY, 108 (92.31%) answers were positive and 9 (7.69%) were negative. The latter suggest a possible disorder in hearing and language, according to the questionnaire's interpretation criteria.

The parents/caregivers of children 7, 11, 15, 19 and 22 gave negative answers to some questions, alerting towards a possible disorder in hearing and language development. Child 11 did not perform auditory location during the first month, but acquired the skill during the second month, while child 22 initially did not understand 'no', but was able to perform simple orders on the following month. Child 7, who was followed during a 2-month period, had difficulty, at first, in pre-linguistic production and in producing a variety of sounds and, this result remained the same throughout the 2 months of follow-up. Child 15 failed in pre-linguistic and in producing a variety of sounds and child 19 failed in producing voice during the FHA's last visit.

The results of this study show that 17 children had expected answers for their age group, regarding auditory and language development, two had improved results, two needed to remain in follow-up in order to verify whether or not skills were acquired and one was kept in suspicion of risk for developmental disorder.

DISCUSSION

The ICF is considered a reference classification by the WHO and has the necessary CHAsracteristics to stimulate trans-sectoral work and development of public policies. These are important in order to improve the efficiency of health systems, as they enable the concept standardization, improvement of communication between researchers, managers, health professionals civil organizations and users in general[19,20].

There are a few operational difficulties in conducting the ICF. As it is a large and complex classification, its conduction may take a considerable amount of time, sometimes more time than allowed per appointment for its usage [25]. For the purpose of this study, a checklist with the ICF-CY codes pertaining to the questions from the elected instrument that monitors hearing and language development of children from birth to their first year of age, in order to make its usage more effective. The checklist was standardized for content in a process that involved audiology specialists, thus ensuring that its use is reliable. Other studies such as this one are being held, in order to develop simpler forms of using this classification, among which is the creation of a digital assessment system using the ICF that would aid professionals in using it on a daily basis [26].

Another instrument being used in order to make ICF use easier are the core sets, where categories from the ICF considered more relevant in describing the functionality of a person with a specific health condition

Age group	1st day ao to month 1			Months 1-2			Months 2-3				Months 3-4	Months 4-5	Months 5-6		Months 6-7				Months 7-8	Months 8-9	Months 9-10	Months 10-11		Months 11-12
Children																								
ICF-CY Codes	**1**	**2**	**3**	**10**	**12**	**18**	**8**	**4**	**17**	**19**		**21**	**5**	**11**	**7**	**9**	**13**	**15**	**14**	**6**	**16**	**20**	**22**	
b1560 Auditory perception	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	
b2300 Detection	0	0	0	0	0	0	0	0	0															
b1401 Attention shift				0	0	0	0	0	0				0		0		0	0	0	0				
d3100 Responding to the human voice				0	0	0	0	0	0	0			0		0		0	0						
b2301 Sound discrimination				0	0	0	0	0	0	0														
b2304 Speech discrimination							0	0	0	0			0		0		0	0			0	0	0	
d115 Hearing							0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	
b3100 Voice production							0	0	0	**8**														
b2302 Locating sound source												0	0	**8**										
b3401 Production of several sounds												0	0	0	**8**	0	0	**8**	0	0	0	0	0	
b3408 Alternative vocalization functions, specified others												0		0										
d331 Pre-linguistic productions												0	0	0	**8**	0	0	**8**	0	0		0	0	
b2303 sound lateralization													0		0		0	0	0	0				
b2308 Speech recognition													0		0	0	0	0	0	0				
d1600 Focusing attention on touch, face and voice													0		0		0	0	0	0				
b16700 Oral language reception															0	0	0	0	0	0	0	0	**8**	
b2308 Understanding speech																				0	0		8	
d3101 Understanding simple spoken messages																				0	0	0	**8**	
d130 Imitation																					0	0	0	
b2308 Auditory functions, specified others (speech recognition)																						0	0	
d330 Speaking																								
d1330 Acquiring simple words																								
b16710 Oral language expression.																								
d2100 Completing a simple task																								

Key – classifiers 0 (no disorder) and 8 (with disorder of no specified degree)
Colored area – specific skills in different age groups

Figure 2. Results of the subjects' language and hearing skill development, registered with the ICF-CY codes

or in a specific health context are selected. There have been 34 core sets developed to the present moment. Developing a core set is a systematic process that involves empirical multi-centric studies, systematic literature review, qualitative studies, perspective provided by specialists, international conference for consensus on the codes that will be used to create the first version of the ICF core set and its implementation [27]. The first version of the ICF core set for hearing loss began in 2008 with researchers from the Swedish Institute for Disability Research, funded by the Oticon foundation and the Nordic Society of Audiology, with collaboration of the ICF Research Branch; the International Federation of Hard of Hearing Young People; and the Classifications and Terminologies team at the WHO[28].

In order to ease the process of using the ICF, it is important to create standardized assessment instruments based on this classification, such as what has been accomplished by this study. Thus, the data may be used in information systems in order to assess health services and compare results among different countries.

Permanent education of basic healthcare attention professional, the FHA among them, has proven to be an important tool in professional update and improvement [29]. This process requires the use of clinical tools to aid them in developing a broader clinical view, enabling not only the identification of situations involving risk and need, but in developing healthcare education actions[30]. This study followed the permanent education methods proposed by Alvarenga et al. (2008)[15].

The analysis of the total scores obtained in the pre and post workshop assessments shows that the educational process was effective, with 86.2% of correct answers, proving the efficacy of the supporting material used in explaining and understanding theory concepts. A previous study compared the effectiveness of the educational process of the FHA of two different cities. One group received support material provided by the WHO and the other group did not. Results showed that the group that received the support material had 70% of correct answers in all domains, while the group who did not receive the material did not achieve 70% of correct answers, especially on questions regarding the concept of hearing, concept of hearing impairment and general aspects of hearing impairment[15]. These authors state that permanent education should be based on an interactive approach, related to the FHA's life experiences and practices, and the use of educational material for support increase the efficacy of the educational process. Both live education as well as long-distance education conducted by video conferences have shown positive results on the knowledge of FHAs [16,31,32].

The sequence of child development may be systematically followed by observing the child's acquisition of developmental landmarks in time. Skill acquisition is based on those acquired previously, and seldom are there skipped steps[33]. In 2005, the PAHO published the Handbook for monitoring child development in the context of IMCI (Integrated Management of Childhood Illnesses) where 32 developmental milestones suggested for follow-up are proposed. According to this handbook, if the child has achieved all milestones for her age and does not have developmental risk factors, she is within normal development. If a child does not have one or more milestones expected for her age group, but the milestones from the previous age group are present, it is possible she may have a developmental delay. However, if the child has one or more absent milestones of the previous age group, she will only in this situation be classified as probably experiencing a developmental delay[13].

In spite of the FHT model enabling Family follow-up there are certain situations where monthly follow-up of all families are not possible [34,35]. Areas that were not covered by the FHT, priority visitations, administrative activities and requests from management contributed to the follow-up time of the children in this study to vary between 1 and 4 months, 54.55% of them followed for a 2-month period. Among the followed-up children, three had negative answers on the questionnaires, indicating a suspicion of auditory development disorder and the need to continue follow-up after the data collection period for this study had ended. These cases were discussed with the FHT and the multi-professional team composing the Family Healthcare Attention Nucleus (FHAT) at the Parque São Bento BHU.

A workshop was held at the end of this study, with participation of the CHAs and managers, in order to present and discuss the study's results. The benefits of the educational process of the CHAs, service limitations in following childhood development and the feasibility of using the ICF-Y questionnaires in order to add to the several actions that are needed in integral childhood healthcare attention were discussed.

CONCLUSION

This study enabled the follow-up and visualization of the hearing development of children in their first year of life in basic healthcare attention, using the ICF-CY codes to register hearing and language skills assessed by the CHAs. Pairing the skills assessed by the instrument "Questionnaire for monitoring auditory and language development in the first year of life" to the ICF-CY codes proved to be an important tool which aided in identifying three children at risk for hearing disorders.

It may also be concluded that the educational process of the CHAss was effective and had impact in their actions, as it enabled a broader look on childhood developmental aspects, favoring eventually necessary interventions.

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