EVALUATION OF THE FUNCTIONAL CAPACITY OF CHILDREN WITH CEREBRAL PALSY

Avaliação da capacidade funcional de crianças com paralisia cerebral

Carla Ciceri Cesa [1], Maria Eduarda dos Santos Alves [2], Louisiana Carolina Ferreira de Meireles [3], Fernanda Fante [4], Sonia Aparecida Manacero [5]

ABSTRACT

Purpose: to describe the functional capacity of children with cerebral palsy who performed the care of Physical Therapy Specialty and Speech, Language and Hearing Sciences. **Methods:** a cross sectional observational study, comprising 14 children with spastic quadriplegic (6 performed Physiotherapy and 8 performed Physiotherapy and Speech therapy). The Pediatric Evaluation of Disability Inventory (PEDI) and the Manual Abilities Classification System (GMFCS) were used to evaluate them. The associations between categorical variables were analyzed using Fisher exact test. Comparisons between means were performed using the Student t test. **Results:** we didn't obtain statistically significant improvement in the areas of self-care, mobility and social function between the two groups in the fields of functional skills and caregiver assistance. **Conclusion:** the Physiotherapy group of children had higher functional scores than those in the Physiotherapy group associated with Speech Therapy, but there was no statistically significant difference between the groups. This was probably due to the small number of participants, the diversity of clinical presentation and possible differences of Physical Therapy intervention conducted in two states with very different socioeconomic situations.

KEYWORDS: Speech, Language and Hearing Sciences; Physiotherapy; Cerebral Palsy

INTRODUCTION

Non-progressive chronic encephalopathy in children, also denominated Cerebral Palsy (CP), is characterized by the deficiency of the motor and postural control, secondary to a damage to the central nervous system (CNS)[1]. The clinical picture of the CP varies according to its classification, generating functional limitations that limit the global development as the oral motor control.

The incidence of the CP in developed countries is 2,0 to 2,5 for 1.000 live births[2]. It is said that physiopathologically the neuromotor picture can involve different parts of the body depending on the cerebral area affected, generating different classifications based on that principle[3]. The classification of CP can be made by anatomical aspects in quadriplegic, hemiplegic and diplegic. Another classification is related to the muscular tone and presence of abnormal movement, presented in the spastic, athetosic, ataxic, hypotonic and mixed forms[4].

The motor deficit will always be present in patients with CP, either in higher or lower degree. However, a great portion of patients presents other associated problems (integration, sensorial problems, epilepsy, metabolic alteration, deformities, dysphagia, language disturbance, among other).

(1) Center of Studies and Physiotherapy for Functionality and Integration – CENEFFI; Berenice Dias Ramos otorhinolaryngology Clinic, Porto Alegre, RS, Brazil; Speech, Language and Hearing Sciences course of Nossa Senhora de Fátima University, Caxias do Sul, RS, Brazil.

(2) Federal University of Rio Grande do Sul – UFRGS, Porto Alegre, RS, Brazil.

(3) Federal University of Rio Grande do Sul – UFRGS, Porto Alegre, RS, Brazil.

(4) Federal University of Rio Grande do Sul – UFRGS, Porto Alegre, RS, Brazil.

(5) Center of Studies and Physiotherapy for Functionality and Integration – CENEFFI; Brazilian Association of Physiotherapy in Neurology for the Development and Popularization of the Neurofunctional Concepts – ABRADIMINE; Pediatrics and Child´s Health Medicine post-graduation program of the Catholic University of Rio Grande do Sul – PUC-RS, Porto Alegre, RS, Brazil.

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Some authors[5], when researching spathic CP, suggest that the functional classifications of the Manual Abilities Classification System (MACS) and of the Gross Motor Function Classification System (GMFCS) are good indicators of the manual function and of mobility of children with CP, being respectively relevant for evaluation and planning of the therapeutic intervention. Another study[6] signals the need of application of GMFCS and the Pediatric Evaluation of Disability Inventory (PEDI), due to the variability presented by the children with cerebral paralysis.

Physiotherapy has as objectives to inhibit abnormal pathological patterns, to better the postural tone and to supply patterns and motor experiences to the child that seeks learning and adaptation of normal patterns of movement to take to functionality[4]. Speech, Language and Hearing Sciences besides intervening in the mastication, breathing, suction and swallow stomatognathic functions it intervenes in the language aspects. In the absence of the speech, the introduction and use of alternative means of communication are promoted, of high or low assistive technology[7].

The objective of this study was to describe the children with cerebral paralysis functional capacity who accomplished services of Physiotherapy and Physiotherapy and Speech, Language and Hearing Sciences.

METHODS

This study was approved by the Committee of Ethics in Research of the Federal University of Rio Grande do Sul (CEP-UFRGS), number 214.533 and Presentation Attest for Ethical Appreciation (CAAE) number 01326512.9.0000.5347.

It is a descriptive study, of transverse, individual and contemporary character, accomplished at Kinder – Centro de Integração da Criança Especial in Porto Alegre/RS (proposing institution), and in the Unidade Prestadora de Serviço Casa Henrique (collaborating institution), in Caruaru/PE, in which children with clinical diagnosis of spastic quadriplegic CP were recruited as a sample.

The ones legally responsible for the participants received information on the research and they signed the Term of Free Consent, according to the Resolution number 196/96 of the National Council of Health/Health Ministry, as well as the directors signed the Term of Consent for research accomplishment in the Institutions.

It was included in the study children of both sexes, with ages between 6 months and 7 and a half years, who have accomplished just Physiotherapy twice a week at the most or Physiotherapy and Speech, Language and Hearing Sciences in the same frequency.

Children that did not present legal responsible ones, children that had serious deformities that disabled handling, serious epilepsy and patients that accomplished Physiotherapic and Speech, Language and Hearing Sciences services at the same time in other institutions were excluded of the study.

This way, 14 children composed the sample of this study, whereas 6 children accomplished Physiotherapy and Speech, Language and Hearing Sciences in the proposing institution, and 8 children accomplished Physiotherapy in the collaborating institution.

The calculation of the sample size was accomplished in the PEPI program (Epidemiologists Programs) version 4.0 and based on two studies[5,6]. For a trust level of 95%, an estimate population of patients with cerebral paralysis that presents the criteria of 17 children's inclusion (9 at Kinder – Centro de Integração da criança especial and 8 at Casa Henrique), a standard deviation of 15 points in the scales of the PEDI instrument and a margin of error of 5%, a minimum total of 12 children was obtained.

All of the children were appraised and classified in the level V, according to Gross Motor Function Classification System – AND & R (GMFCS) – Enlarged and Revised[8], which it bases on the voluntarily initiate movement with emphasis in sitting down, transference and mobility. The level V presents as a general characteristic the transport in a manual wheel chair.

All of the children were evaluated through the Pediatric Evaluation of Disability Inventory (PEDI)[9]. The PEDI constituted of three parts, with closed questions about functional ability, the referred adult's attendance and the modifications accomplished in the self-care, mobility and social function areas. Each area generated a normative and continuous gross score taking into account the scores contained in the manual of the inventory.

In relation to the statistical analysis of the PEDI the continuous variables were described through average and standard deviation (symmetrical distribution) or medium and interquartile range (asymmetrical distribution). The qualitative variables were described through absolute and relative frequencies.

The association among the categorical variables was analyzed using the exact test of Fisher. Comparisons among averages were accomplished through the test t of Student. In case of asymmetry, the test of Mann-Whitney was applied. The level of adopted significance was 5% (p <0, 05) and the

collected data were analyzed in Social Statistical Package for the Sciences (SPSS) versions 17.0 for Windows.

RESULTS

Of the 14 children that participated in the research, 9 were male. In the group of Physiotherapy and Speech, Language and Hearing Sciences the average of age (in months) was of 61,9±22,0, compared to 79,5 ± 16,5, of the group of Physiotherapy.

It was observed that the results obtained in the comparison of the scores of functional ability of the PEDI between the groups of Physiotherapy and Physiotherapy and Speech, Language and Hearing Sciences (Table 1) didn't present statistically significant difference in the self-care, mobility and social function areas.

In the domain of the caretaker attendance we also did not obtain statistically significant improvement in the self-care, mobility and social function areas between the two groups (Table 2).

The graph of Illustration 1 demonstrates the difference found among the scores of the functional skills of the two groups.

Yet the graph of the Illustration 2 demonstrates the difference found among the scores of the assistance caregiver between the groups.

Table 1 – Comparison of the scores of functional ability of the Pediatric Evaluation of Disability Inventory – PEDI – between groups

Scores	Speech, Language and Hearing Sciences and Physiotherapy group (n = 8) Medium (P25 to P75)	Physiotherapy Group (n = 6) Medium (P25 to P75)	p-value
Self-care			
Gross	1 (0 a 2)	6 (2 a 9)	0,081
Normative	< 10 (<10 a<10)	< 10 (<10 a<10)	-
Continuous score	7,7 (0 – 12,6)	21,4 (11,4 – 27,0)	0,081
Standard error	6,4 (4,7 – 11,2)	3,5 (3,0 – 5,1)	0,081
Mobility			
Gross	1 (0,3 – 1)	1,5 (1 – 3)	0,414
Normative	< 10 (<10 a<10)	< 10 (<10 a<10)	-
Continuous score	7 (1,7 – 7)	9,2 (5,2 – 14,2)	0,414
Standard error	5,7 (5,7 – 9,0)	5,0 (3,7 – 6,8)	0,414
Social function			
Gross	3 (1,3 – 4,8)	10 (1 – 20)	0,414
Normative	< 10 (<10 a<10)	< 10 (<10 a<10)	-
Continuous score	16,1 (8,7 – 21,6)	30,1 (5,6 – 44,7)	0,414
Standard error	4,4 (3,8 – 5,7)	3,2 (2,3 – 7,0)	0,414

[1]PEDI: Pediatric Evaluation of Disability Inventory.
Associations between categorical variables were analyzed using the Fisher exact test. Comparisons between averages were performed using the Student t test.

Table 2 – Comparison of the scores of caretaker attendance of the Pediatric Evaluation of Disability Inventory – PEDI – between groups

Scores	Speech, Language and Hearing Sciences and Physiotherapy group (n = 8) Medium (P25 to P75)	Physiotherapy Group (n = 6) Medium (P25 to P75)	P value
Self-care			
Gross	0 (0 – 0)	1 (0 – 2,8)	0,228
Normative	< 10 (<10 a<10)	< 10 (<10 a<10)	-
Continuous score	0 (0 – 0)	12 (0 – 27,5)	0,228
Standard error	21,6 (21,6 – 21,6)	15,3 (8,3 – 21,6)	0,228
Mobility			
Gross	0 (0 – 0)	0 (0 – 0)	1,00
Normative	< 10 (<10 a<10)	< 10 (<10 a<10)	-
Continuous score	0 (0 – 0)	0 (0 – 0)	1,000
Standard error	17,6 (17,6 – 17,6)	17,6 (17,6 – 17,6)	1,000
Social function			
Gross	0 (0 – 0)	1 (0 – 8,3)	0,181
Normative	< 10 (<10 a<10)	< 10 (<10 a<10)	-
Continuous score	0 (0 – 0)	11,3 (0 – 45,6)	0,181
Standard error	20,2 (20,2 – 20,2)	14,3 (5,2 – 20,2)	0,181

[2]PEDI: Pediatric Evaluation of Disability Inventory.

Associations between categorical variables were analyzed using the Fisher exact test. Comparisons between averages were performed using the Student t test.

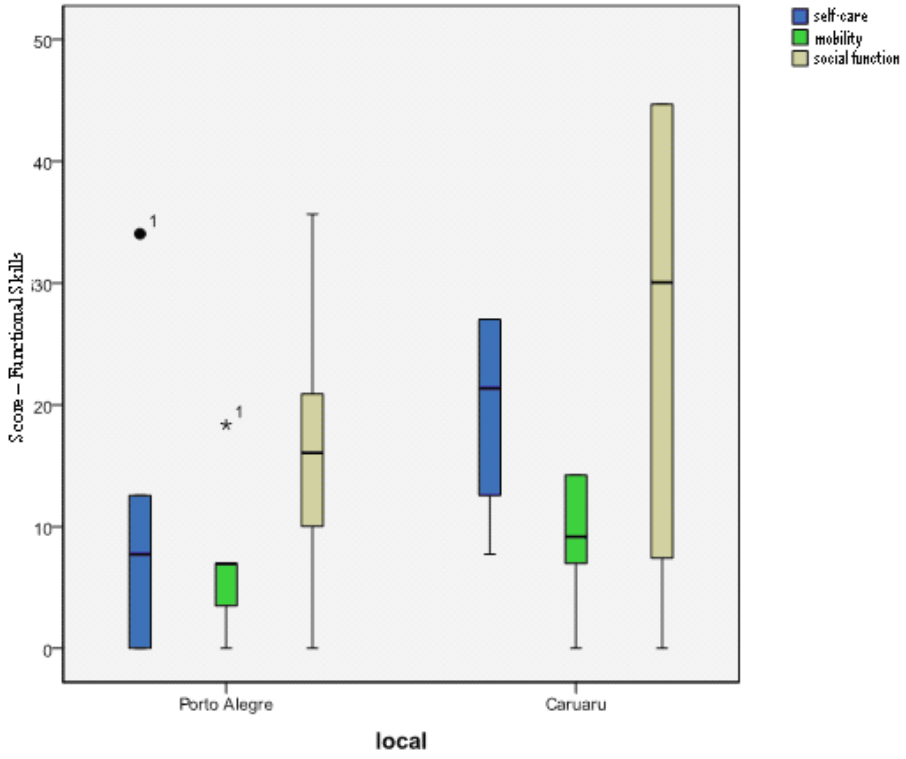

Figure 1 – Graph demonstrating the difference between scores of Functional Skills compared with the research place

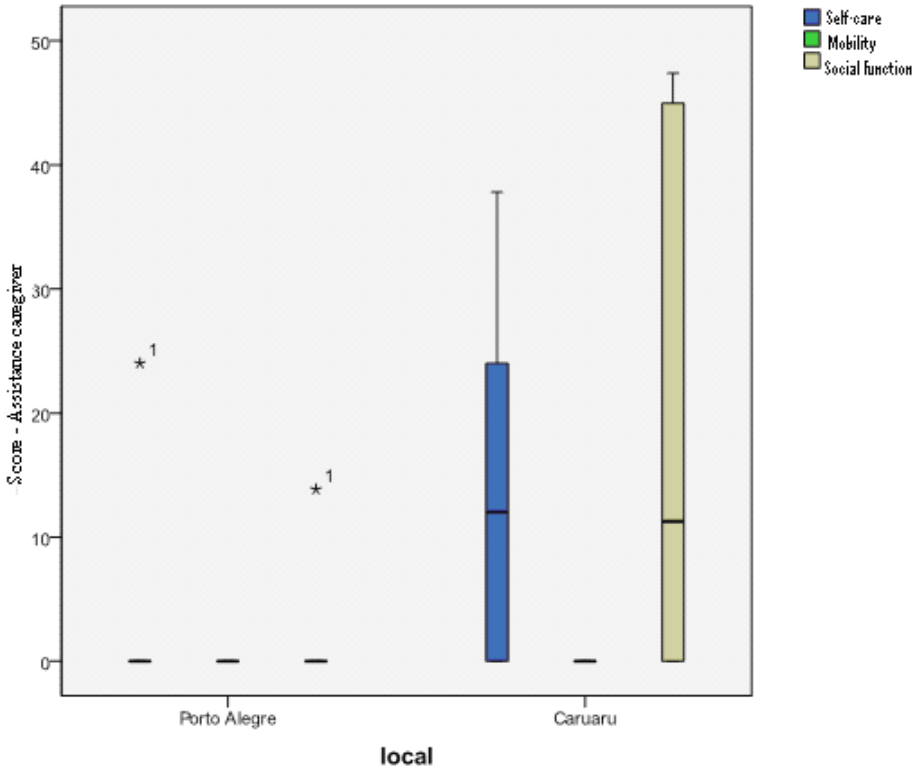

Figure 2 – Graph demonstrating the difference among the scores of Assistance Caregiver compared with the research place

DISCUSSION

Studies demonstrate that the larger the gravity of the neuromotor impairment associated to the restrictions of the task and the environment, the larger will be the presence of limiting factors that can restrict the functional capacity of children with CP[6,10].

Researchers[6] demonstrated that the results found in their study ratify evidences documented already in the literature related to the seriously ill children's functional expectations: they present inferior performance than the ones of light impairment. These discoveries corroborate what was verified in this study and the children that accomplished only Physiotherapy were a little less committed than the ones that accomplished Physiotherapy and Speech, Language and Hearing Sciences.

In a research[10] the relationship between CP condition gravity with the daily and social life activities was evaluated. According to the researchers, as larger the child's CP impairment more restrictions she/he finds in the performance of social activities. It happened due to the difficulties of engaging in activities common to other children as well as the difficulty to execute them with success and then to integrate to the group. In spite of not having statistically significant differences, in the present study it was observed that the lightest children, that accomplished only Physiotherapy, obtained higher scores in the domain of caretaker attendance.

The literature indicates that the effect of the motor restrictions in the child with CP makes the typical environmental situations become functional performance limiting factors[11,12].

In the present study, in the domain of caretaker attendance, there was not statistically significant improvement in the self-care, mobility and social function areas between the two studied groups. The authors of a study[12] confirm that the participants with CP present limitations in the self–care functional ability. However, they indicate that such limitations can be reduced through continuous incentives rendered by the caretakers.

The children's mobility with moderated and serious impairment is mostly made possible through adapted equipment and environmental modifications as well as the ones found in the present sample, demonstrated by the classification in the level V, of the GMFCS scale. Yet children that present independent mobility are more capable to carry out

functional activities and to overcome environmental barriers, compared with those that make use of assistive technology[13].

In relation to the swallow functionality a research[14] points that 100% of the observed cases introduced some dysphagia degree in some of the phases of the swallow. The researchers emphasize that this data did not suffer interference of age and they point out that that result was identified independently of the classification of CP type (36% athetoid and 64% spastic). In spite of not being object of this research, to classify the degree of the dysphagia, it was identified 100% of the sample with incapacity in the ingestion of varied food textures characterizing, like this, the disturbance of the swallow corroborating the discoveries of the study[14].

Due to the restricted number of final participants of this study, the results did not present statistically significant differences. Added to that, the differences in the participants with encephalopathy characterization as the type and degree of attacks acted represented on the same form interference in the obtained results, as well as the economic and cultural characteristics and the influence of the environment on the participant.

A research[15] in which were evaluated children with light and moderate spathic cerebral paralysis concluded that the impact of the motor dysfunction is more significant in the activities that demand change and maintenance of body position in the space.

As for the communication, inability was mainly detected in the speech production[15]. In these cases, the implementation of the Augmentative and Alternative Communication is made necessary, maximizing both expressive as comprehensive communication[7,16].

Inside the pointed parameters for the present evaluation it can be observed that the children that accomplished only services of Physiotherapy presented a higher independence index than the children that accomplished services of Physiotherapy and Speech, Language and Hearing Sciences. However, both groups corroborate the researchers´ study[15] in the oral motor and global aspects.

That aspect makes us think about some points that interfere in those discoveries: the first of them is the degree of the patient's impairment; the second, the interference of the environment on this participant; finally, the interventions previously accomplished with the same.

CONCLUSION

The children of the physiotherapy group had higher functional scores in the PEDI than the one of the Physiotherapy associated with Speech, Language and Hearing Sciences but there was not statistically significant difference among the groups. This probably occurred due to the reduced number of participants and to the diversity of clinical pictures that the pathology can present.

More studies, of longitudinal character and with more homogeneous and larger groups should be done to evaluate the psychomotor development of children with cerebral paralysis accompanied in different therapeutic modalities for evaluation of the functional impact of the same ones.

RESUMO

Objetivo: descrever a capacidade funcional de crianças com paralisia cerebral que realizavam atendimentos de Fisioterapia e Fisioterapia e Fonoaudiologia. **Métodos:** estudo descritivo, de caráter transversal, composto por 14 crianças com PC do tipo quadriplegia espástica (6 realizavam Fisioterapia e 8 Fisioterapia e Fonoaudiologia). Foram utilizados para avaliação o Inventário de Avaliação Pediátrica de Incapacidade (PEDI) e o Sistema de Classificação da Função Motora Grossa (GMFCS). As associações entre as variáveis categóricas foram analisadas por meio do teste exato de Fisher. Comparações entre médias foram realizadas utilizando-se o teste t de Student. **Resultados:** não se obteve melhora estatisticamente significante nas áreas de autocuidado, mobilidade e função social entre os dois grupos nos domínios de habilidade funcional e assistência ao cuidador. **Conclusão:** as crianças do grupo Fisioterapia tiveram escores funcionais mais elevados que as do grupo Fisioterapia associado à Fonoaudiologia, mas não houve diferença estatisticamente significante entre os grupos. Isso se deu, provavelmente, devido ao reduzido número de participantes, à diversidade de quadros clínicos que a patologia pode apresentar e a possíveis diferenças na intervenção fisioterapêutica realizada nos dois estados, que possuem situações socioeconômicas bem diversas.

DESCRITORES: Fonoaudiologia; Fisioterapia; Paralisia Cerebral

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Mailing address:
Carla Ciceri Cesa
Av. Prof. Paula Soares, 315 ap. 302
Porto Alegre – RS – Brasil
CEP: 91220-450
E-mail: carlacesafga@yahoo.com.br