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CORRELATION BETWEEN THE TOPOGRAPHY OF CHILDREN WITH DISABILITY AND THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING

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ABSTRACT

Neurological disabilities result from an injury that affects the CNS in its phase of structural and functional maturation, causing a mainly sensorimotor dysfunction, which manifests itself in the pre-, peri- or postnatal period, which is defined as a persistent disorder, with alteration in muscle tone, posture and movement. This study aimed to correlate the topography of children with disability and their motor performance according to the International Classification of Functioning. This is a cross-sectional study, with a quantitative approach, carried out with 38 children with disability who were undergoing rehabilitation treatment. For the functioning evaluation, the International Classification of Functioning (ICF-CY) was used. The data was compiled in Epi Info. The children evaluated had greater difficulty in carrying out the activities of going up and down the stairs, walking, running and jumping, both in performance and capacity. Attention is called to the importance of knowing these children's functional status, through functional classification and evaluation, so therapeutic procedures will be adequately carried out, as well as guidance to their caregivers. This enables the stimulus of their functional skills to take place, improving the quality of life of children with disabilities.

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INTRODUCTION

Motor development (MD) is a constituent event in the life of human beings. It provides them with motor skills with which they perform daily activities, progressively acquiring movement patterns (diversifications and complexity) [Maronesi, 2015]. The knowledge of both MD and the obtaining of functional skills in people with alterations in the neuromaturation process is of great importance, as based on such knowledge therapeutic goals are assertively planned toward the achievement of better development and functional independence [Souza, 2015].

Neurological disabilities (ND) result from an injury affecting the central nervous system (CNS) in the phase of structural and functional maturation. It causes a mainly sensorimotor dysfunction manifested in the pre-, peri- or postnatal period, defined as a persistent disorder, with alteration in the muscle tone, posture, and motor movement [Briesemeister et al., 2013].These factors of the disorder increase the probability of the child developing alterations in their acquirement of motor, cognitive and psychosocial skills [Pereira et al., 2016]. Hence, it is essential to identify disorders in neuropsychomotor development (NPMD) during the first year of life to ensure early intervention on evolutive delays [Briesemeister et al., 2016].

In 2001, the World Health Organization (WHO) approved a classification system for the understanding of human functioning and disability, the International Classification of Functioning, Disability and Health (ICF), divided into four domains: body functions, body structures, activities and participation, and environmental factors. It furnishes a classification model that considers the presence and seriousness of a health problem, both in the individual and social aspects, and makes the standardization of functioning terminology possible [Ruaro et al., 2012].In the 1990s, WHO developed a children and youth version of the ICF, the International Classification of Functioning, Disability and Health – Children and Youth Version (ICF-CY). It was accepted in 2007 to match internationally the levels of children and youth health and monitor the children's disability so measures could be developed for children and youth to have improved health and education [Rodriguez et al., 2017].

It is greatly important to evaluate the functional manifestations of children with ND, as the functional performance is influenced not only by the intrinsic properties of the child but also the specific requirements of the task and the characteristics of the environment where that child interacts. In this context, this research's main goal is to correlate the children's mobility with neurological alterations through the ICF-CY and associate capacity with performance. Thus, this evaluation is made necessary for the better understanding of motor performance, especially regarding motor limitations caused by neurological pathologies.

METHODOLOGY

This is an exploratory, cross-sectional study with a quantitative approach, submitted to and approved by the Ethics Committee (CAAE Certificate 62623416.9.0000.5495).The research counted with the participation of 38 children diagnosed with ND, aged from 11 to 144 months, who receive care at the pediatric physiotherapy sector of a health care center in a city in the interior of Minas Gerais, Brazil.Initially, the adults responsible for the children were invited to receive clarifications about the research; once they agreed to it, they signed the Informed Consent Form. The participants were identified through the analysis of their data on medical history, sorting those diagnosed with neurological disabilities. Then, variables related to their birth were analyzed: gender, gestational age (GA), type of delivery, weight, length, Apgar score, and head circumference. After these analyses, a home visit was scheduled to collect data through functioning evaluation. As the child was observed in their usual environment, they were investigated in terms of the "Activity and Participation" component, of the "Mobility" category, of the "change basic body position, hold body position, walk, and move" domains; the qualifiers were performance and capacity. To classify the level of functioning, the International Classification of Functioning, Disability and Health – Children and Youth Version (ICF-CY) (WHO, 2011) was used, which is a version of the International Classification of Functioning, Disability and Health (ICF) translated and adapted for children and youth. For the analysis of activity limitations, the first ICF qualifier was applied, in which the items related to the capacity to perform a certain task were analyzed, based on items 0, 1, 2, 3, and 4 – 0 meaning no disability; 1, slight disability (from 5 to 24%); 2, moderate disability (25 to 49%); 3, serious disability (50 to 95%); and 4, complete disability (96 to 100%).

The statistical analysis of the numerical variables with the total performance and capacity values were evaluated twofold through linear regression, considering the 1- and 5-minute Apgar score and the Apgar scoreimprovement. To verify the association between capacity and performance, a simple linear correlation was conducted, considering the p-value significance level lower than 1%.The correlation between topography classification and the ICF-CY domains evaluated was conducted through mean values and standard deviations, by means of interacting the four types of topography with the four domains, and through general variance analysis.

RESULTS

A total of 38 children participated in this study, of which 14 (36.84%) were female and 24 (63.15%), male. As for age, 36 (94.73%) children were 17 months or over, and two (5.26%) were between 0 and 17 months. Data from birth indicate that six (15.78%) were born in private hospitals, while 32 (84.21%), in public hospitals. A total of 27 (71.05%) were born full-term, and 11 (28.94%), preterm. As for the type of delivery, 26 (68.42%) underwent Cesarean section, three (7.89%) were assisted with forceps, and 9 (23.68%), had a normal vaginal delivery.Regarding GA, the mean was 35.02 ± 4.34 weeks. In the 1-minute Apgar,the mean obtained was 7.47 ± 1.75, andin the 5-minute Apgar, the mean was 8.97 ± 0.97;the Apgar score improvement had a mean value of 1.5 ± 1.1. Concerning weight, the mean found was 2,373. 34 ± 988. 12 grams; for head circumference, the mean obtained was 32.30 ± 4.07 centimeters; and for length, the mean was 44.09 ± 5.85 centimeters. Regarding age, the mean found was 70. 21 ± 45.59 months. The total performance mean was 51.42 ± 29.51 points, andthe total capacitymean was 59.89 ± 23.70 points. As for the time when they began physiotherapy,the mean was 12.73 ± 14.70 months.

In the topographical classification, three (7.89%) children were found to be athetotic; 11 (28.94%), diplegic;seven (18.42%), right hemiplegic; four (10.52%), left hemiplegic; and 13 (34.21%), quadriplegic. The athetosis mean was 12.67 ± 7.38;the diplegia mean, 11.73 ± 5.48; hemiplegia mean, 8.36 ± 7.58; and quadriplegia mean, 20.6 ± 8.06. Following the ICF-CY domains, when changing body position, the mean was 11.71 ± 9.69; when holding the body position, the mean was 11.71 ± 9.69; when walking, the mean was 133.18 ± 4.07; and when moving, the mean was 14.13 ± 6.36.Through the variance analysis, an association between functional capacity and performance of children with neurological dysfunction was verified, with a significance level between gender, type of delivery and topography. In the Performance qualifier, regarding gender, the p-value obtained was 0.03867; the type of delivery reached p-value 0.00486;and topographyhad p-value 1.682. In the Result qualifier, gender obtained the resulting p-value 0.0407; type of delivery, p-value 0.0147; and topography, p-value 2.65.

In the relation of topography to the ICF-CY domains, when changing body position, the child classified with athetosis presentedmean valueof 11.66 ± 9.45; the children classified with diplegia presented mean of 13.18 ± 6.46; those with hemiplegia obtained mean of 5.36 ± 7.04; and those classified with quadriplegia, the mean was 29.61 ± 7.44. According to the "hold body position" domain, the child classified with athetosis presented mean of9.66 ± 7.50; the children classified with diplegia presented mean of 8.18 ± 5.43; those with

hemiplegia had a mean of 3.45 ± 5.88; and those classified with quadriplegia presented mean of 22.15 ± 5.78. In the "walking" domain, the child with athetosis had mean of 13.33 ± 4.61; the diplegic childrenpresented mean of 13 ± 3.43; the hemiplegic ones obtained mean of 11.36 ± 4.12; and the quadriplegic ones had mean of 14.84 ± 4.16. When moving, the child with athetosis obtained mean of 16 ± 10; the children classified with diplegia presented mean of 12.54 ± 5.22; those with hemiplegia had mean of 13. 27 ± 8.52; and those with quadriplegia presented mean of 15.76 ± 4.26 (FIGURE 1).

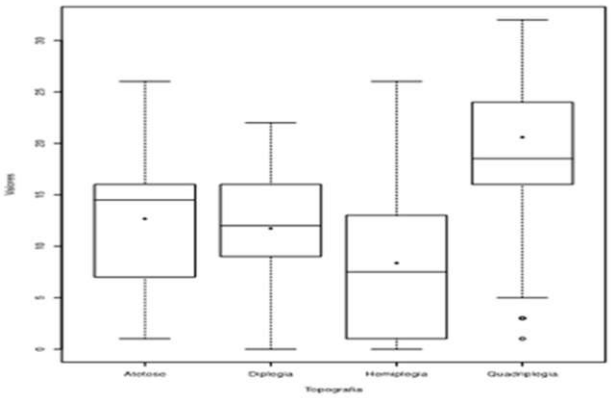

Figure 1. Correlation between topography classification and ICF-CY domains

According to the variance analysis, there was a correlation between the topography and the execution of the ICF-CY domains, with a p-value of 1.22.Forming correlations between the ICF-CY domains and the topographical classification, the variance analysis demonstrated that there was a significance level among the hemiplegic children when performing the "hold and change body position, walk, and move" domains. The diplegic children revealed a significance level in the "hold body position" domain. Quadriplegic children presented a significance level in the "hold and change body position" domains. The children with athetosis do not demonstrate any significance level (FIGURE 2).

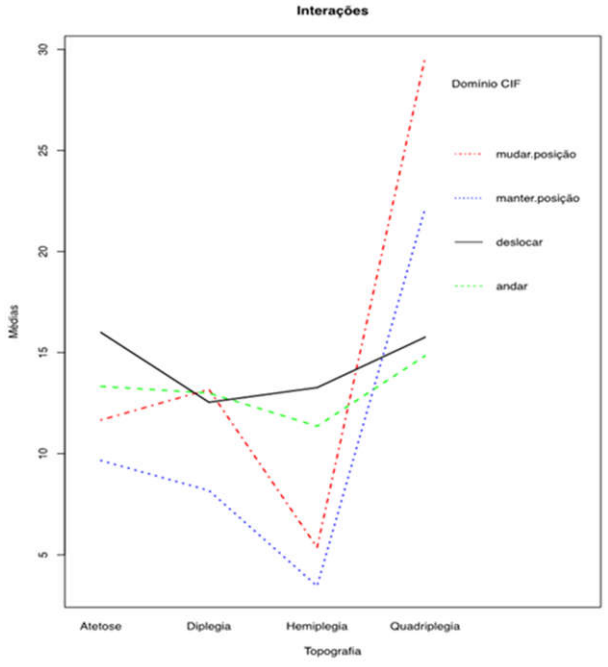

Figure 2. Correlation between ICF-CY domains and topography classification

DISCUSSION

Studies conducted byDias et al. and Medeiros et al., whose sample comprised 27 children with disabilities, predominantly male, in the same age group, corroborated the findings in this study [Dias et al.,2010; Medeiros et al.,2013].Research with children with neurological dysfunctions found the predominance of both normal and forceps-assisted deliveries. Regarding GA, those born preterm and post-term stood out, and birth weight values ranged from 800 to 4,400 grams. The literature points out that the occurrence of ND steeply increases as GA and birth weight decline, corroborating this study [Zanini, 2009]. Concerning the Apgar score, the results in this research presented the 1-minute Apgar score ranging from 1 to 8, and in the 5-minute, from 4 to 9. These values are relevant, as the evaluation of the child's birth conditions is a parameter that identifies the degree of vital conditions at birth. Van Iersel's study evidenced that perinatal asphyxia has clinical relevance to neonatal neurological dysfunctions. The literature has recently suggested that these children may be at greater risk of problems in learning, behavior and memory domains. In these studies' results, it is evidenced that mobility limitation increases due to a difficult delivery, depending on the presence and seriousness of signs of neonatal encephalopathy [Van Iersel et al., 2016]. In their research, Rothstein and Beltrame indicated that, of the 15 participating children, two presented right hemiplegia, one presented ataxia, and 12presented quadriplegia, with greater difficulties to perform activities that required greater neuropsychomotor control, corroborating the findings in this study [Rothstein, 2013].

A study conducted by Brasileiro et al., when evaluating the performance of the domains in the "moving" category, revealed that the greater the requirements of NPMD to perform activities more the disabilities of children with neurological disabilities stood out. It was observed that they were able to walk with assist devices; however, when the domains of rolling, crawling, walking up and down the stairs, running, and jumping were evaluated, they had difficulty to perform them, even with the assistance of the environment and therapist [Brasileiro, 2009]. The functioning levels must be analyzed concerning contextual factors, which have a positive or negative influence on the impact of the disability being studied [Franki et al., 2013]. A positive element was observed, as there was an improvement in the level of these children's moving after an evaluation in their usual context, corroborating this research's findings[Ostroschi, 2017].A research was conducted by Medeiros et al. comprising 12 children with cerebral palsy undergoing physiotherapeutic treatment, with a data collection instrument similarly developed with the ICF. Most of those children performed the evaluated tasks with no difficulties, except for jumping, kicking, and fine motor activities. Limitations were observed in postural shifts, gait, and moving an object with lower limbs; on the other hand, there were no difficulties in holding body position, except for standing [8]. The study by Furlaneto et al. demonstrates that the physiotherapeutic care was essential to lead the children back to functional and recreative activities and to aid in their respiratory dysfunctions, confirming this research's result [15]. The literature demonstrates a significant increase in the level of independence of the children with ND after training them in self-care, functional skills, and assistance from caregivers. These findings indicate that a good intervention program based on functional activities enables functional performance to

improve in these children, diminishing the degree of seriousness that the difficulties represent to these children [Monteiro, 2012; Romano, 2014]. The study by Souza and Alpino evaluated three children diagnosed with cerebral palsy through interviews and functional assessment using the ICF and highlighted that when performance was compared with capacity the children presented a slight increase in performance, making it possible to identify limitations in the execution of activities performed by the children [Souza, 2015].Using the ICF-CY added participation and functioning aspects to the analysis of categories resulting from interviews with the relatives, offering a comprehensive view of the child/adolescent, based on a differentiated understanding of the person, to develop unique therapeutic projects [Ostroschi et al. 2017].

The seriousness of motor dysfunctions is what most influences the aggravation of difficulties in activities and participation of children with ND. Nonetheless, these difficulties are also related to the functional causes and architectonic obstacles, as environmental factors make evident their direct participation in the children's functional performance and daily activities [Machado, 2013]. Morettin et al., when analyzing environmental factors in their study, observed that most of the patients did not have relationship difficulties with their relatives [Morettin, 2013].The studies with children with disabilities face great barriers to perform activities; however, the contextual factors are important facilitators for them to preserve a good quality of life and achieve independence [Mei et al., 2015], corroborating the findings in this study.

Conclusion

The information obtained in this study led to note the importance of knowing the functional status of these children through the functional evaluation and classification of their motor limitations and performance. Thus, adequate therapeutic procedures can be conducted, as well as guidance to their caregivers, which serve as a stimulus for children with disabilities to develop their functional skills and improve their quality of life.

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