

Health profile of children diagnosed with cerebral palsy treated at the Lucy Montoro Rehabilitation Center in São José dos Campos

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ABSTRACT

Cerebral Palsy is a disorder of posture and movement due to a brain injury and may result in neurological and motor dysfunction, usually associated with the severity of the sequelae and the child's age. **Objective:** To evaluate the epidemiological profile of children diagnosed with Cerebral Palsy treated at the Lucy Montoro Rehabilitation Center in São José dos Campos in the state of São Paulo. **Method:** 83 medical records were reviewed from December 2011 through December 2014. Factors were recorded such as age, gender, origin, prior physical therapy, types of cerebral palsy according to anatomical distribution, seizures, orthoses, treatment with botulinum toxin, auxiliary means of locomotion, GMFM score, and GMFCS level. **Results:** There was a predominance of males (55%) and 32% of them were aged between 4 and 6 years. The majority were from São José dos Campos (33 individuals). As to the types of Cerebral Palsy, there was a higher prevalence for tetraplegia and diplegia (43% each); 61% of the patients did not have seizures, and 30% had applications of botulinum toxin. There were 41% who needed assistive devices for locomotion. The prevalent score of GMFM was 0-25% (22 individuals), and the largest portion (29%) classified as level IV in the GMFCS. **Conclusion:** Further studies are needed to define the epidemiological profile of children with Cerebral Palsy for a better characterization of this population and guidance for future research.

Keywords: Cerebral Palsy, Health Profile, Rehabilitation Centers, Physical Therapy Modalities

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INTRODUCTION

The term cerebral palsy (CP) describes a non-progressive group of developmental, movement, and postural disorders, secondary to injuries or anomalies stemming from the brain in its initial phase of development, with various types and degrees of motor impairment.¹

Cerebral Palsy can be classified by two criteria: type of motor dysfunction present (resulting clinical presentation) that includes the types of tone alterations: athetoid, choreic, dystonic, ataxic, mixed, and spastic; and injury topography, that is, localization of the affected parts of the body, which includes tetraplegia or quadriplegia, monoplegia, diplegia, and hemiplegia.²

Spasticity is the most frequent presentation. To maximize their functional potential and to minimize secondary problems such as shortenings and contractures, the treatment programs for spastic CP have the reduction of muscle tone as their main goal. One of the resources recently in use has been the application of botulinum toxin. This substance acts in the neuromuscular junction, impeding the release of acetylcholine and allowing a temporary muscular paresis (from 3 to 6 months) through the chemical action of the toxin, which reduces the excessive tonic or phasic muscular activity, leading to improvement of the passive and active movements and allowing greater stretching of the muscles in question. It is also recommended for improving hygiene and care of the patients, and their positioning, and to facilitate the use of orthoses.³

According to Cury & Brandão,⁴ motor disorders cause limitations in the daily life activities and, in addition to motor impairment, individuals with CP may present with other associated problems such as visual, auditory, or mental disabilities, learning difficulties, changes in sensory function, perception disorders, behavioral problems, communication deficit, and seizures. Seizures stem from nervous system injuries, which provoke abnormal discharges of electrical activity in the brain and may provoke an increase in the injured area, worsening the patient's clinical condition.

The degree of motor impairment and the presence of associated disorders are the main factors that determine the prognosis of a child with CP. The development of specific tests for functional evaluation have helped in the quantitative determination of motor impairment, such as the GMFM (Gross Motor Function Measurement) and GMFCS (Gross Motor Function Classification System).⁵

The GMFM is used to evaluate gross motor skills, and, being functional and quantitative, it is useful to describe functional level without considering the quality, aiding in the treatment plan.⁶ The GMFM is composed of 88 items grouped into five dimensions: A (lying down and rolling), B (sitting), C (crawling and kneeling), D (standing up), and E (walking). By observing the child's performance a score is given of 0 (when no activity is performed), 1 (when the activity is initiated), 2 (the activity is partially completed) to 3 points (activity is completed), in three attempts.⁷ The points for each dimension are added up, a percentage is calculated, and the final result is given by the sum of the percentages of each dimension divided by the total of the 5 dimensions.⁸

The GMFCS was created by Robert Palisano, in Canada. It is used to show the functional potential of children with CP, as well as to establish their expected long term development. It is a widely used ordinal scale of evaluation with five levels. Its levels vary according to the functional limitations shown by the child and to the need for locomotion equipment. At level I, the child walks without limitations, at level II, he or she walks with limitations, at level III, they use a manual device for mobility, at level IV there is self mobility with limitations (the child may use motorized mobility), and at level V, the child is transported in a manual wheelchair. This classification is subject to change during the neuropsychomotor development of the child and it is applied according to age.⁷

There are reports that in developed countries the incidence of CP is around 1.5 to 5.9 per 1,000 live births.⁹ According to Rebel et al.,¹⁰ 20,000 new cases of CP are estimated in Brazil per year. The incidence of CP in developing countries is estimated at 7 cases per 1,000 live births.¹¹ The search for epidemiological data also helps the development of public health prevention campaigns to promote, protect, and restore health.¹²

OBJECTIVE

There were three objectives to this study: the first was to trace the epidemiological profile of the patients seen at the *Centro de Reabilitação Lucy Montoro* in São José dos Campos; the second was to verify the prevalence of age, gender, origin (in the Vale do Paraíba region), whether physical therapy was performed previously, types of cerebral palsy (anatomical distribution), episodes of seizure, use of orthoses, application of botulinum toxin; and the third was to demonstrate the level of

gross motor function through the GMFM and the functional potential through the GMFCS classification of levels.

METHOD

This is a retrospective study, carried out through the review of 83 patient medical records in the children's outpatient clinic from the database containing the medical records at the *Serviço de Arquivo Médico e Estatística (SAME)* (Statistic and Medical Archive Service) of the *Centro de Reabilitação Lucy Montoro* (CRLM) in São José dos Campos, between December of 2011 and December of 2014.

After reviewing a complete listing of the medical records, the diagnoses other than cerebral palsy were excluded (such as myelomeningocele, spinal cord injury, muscle dystrophies, and syndromes, among other things) as well as those patients who only received care in early stimulation groups and in intensive orientation groups. Thus, included in the present study were the medical records of patients diagnosed with cerebral palsy, inserted in the children's rehabilitation program at the CRLM of São José dos Campos, and whose physical therapy evaluation had been filled out completely.

A standard form was created by the researchers to be used with each medical record, with the data necessary for the study such as gender, age, origin, type of cerebral palsy according to anatomical distribution, whether physical therapy had been used previously, seizures, use of orthoses, application of botulinum toxin, use of auxiliary means of locomotion, scoring in the GMFM, and GMFCS level.

To better visualize and understand the GMFM data, the total scores were divided into four groups: scores from 0 to 25%, scores from 25.01% to 50%, scores from 50.01% to 75%, and scores from 75.01% to 100%.

After filling out the forms, the data were tabulated and described. The study was approved by the Ethics and Research Committee (ruling No. 419,921). A request was made to authorize the research in clinical medical records.

RESULTS

The sample was composed of 56 medical records of patients with ages ranging from 0 to 14 years, both male and female. There was a predominance of males (55%) and of patients with ages between 4 and 6 years (32%)

followed by patients older than 8 years of age (27%), as shown in Figure 1.

Most patients came from the city of São José dos Campos (33 individuals). In relation to the previous use of physical therapy, 95% of the patients had already been treated in other institutions or clinics.

As for the types of CP (according to anatomical distribution) in the medical records analyzed, an equal percentage of 43% was observed for tetraplegia and diplegia, followed by hemiplegia (12%) and double hemiplegia (2%) (Figure 2).

Until the physical therapy evaluation date, 61% of the patients had not presented with seizures and only 30% had had an application of botulinum toxin. A total of 23 individuals from the sample (41%) made use of auxiliary means of locomotion. The auxiliary means most used by the patients was the Adapted Wheelchair (AWC), as shown in Figure 3. A little more than half the patients (59%) used orthoses for the lower limbs.

Regarding the gross motor function evaluated by the GMFM test, the prevalent score was 0 to 25% (22 individuals) (Figure 4). As for the functional potential, as shown below in Figure 5, most patients (29%) were seen to classify as level IV in the GMFCS, with the same percentage (21%) classifying as levels III and V, and 9% for level I.

DISCUSSION

In the present study, there was predominance of male children, which was also found in the studies by Caraviello et al.¹³ and Pfeifer et al.¹⁴ When considering the predominant high age brackets of the patients (mostly between 4 and 6 years-old, followed by those older than 8 years-old) and the high rate of previous treatment with physical therapy (95%) in other institutions, it could be concluded that younger patients were receiving rehabilitation monitoring in other services. It is known that the earlier the beginning of physical therapy to protect or stimulate the CNS, the better will be the result.⁹ Although the CRLM in São José dos Campos serves 39 cities in the Vale do Paraíba, factors such as distance and transportation cause an impact on the rehabilitation process and patients who reside in the city of São José dos Campos are better suited to the type of care offered (a majority of 33 patients came from this city).

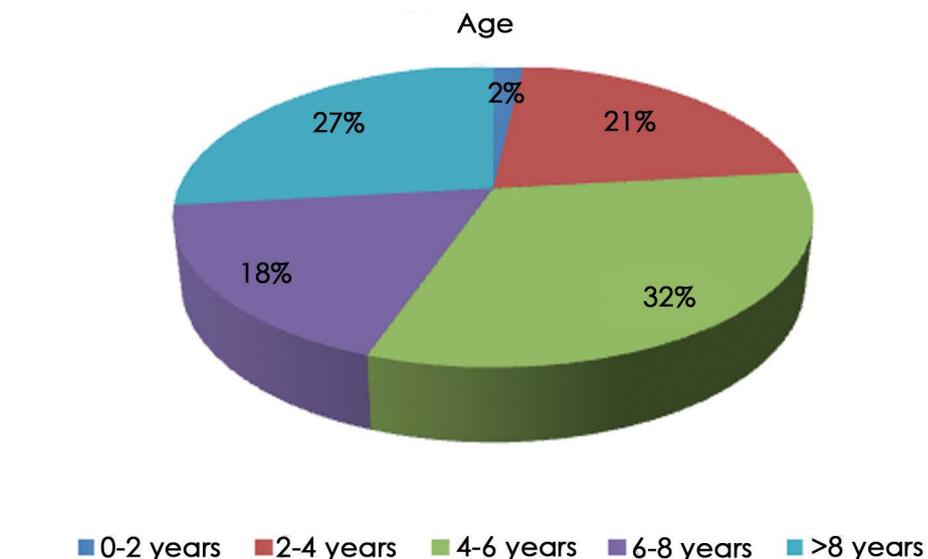


Figure 1. Prevalence of age (per age bracket) of patients with CP

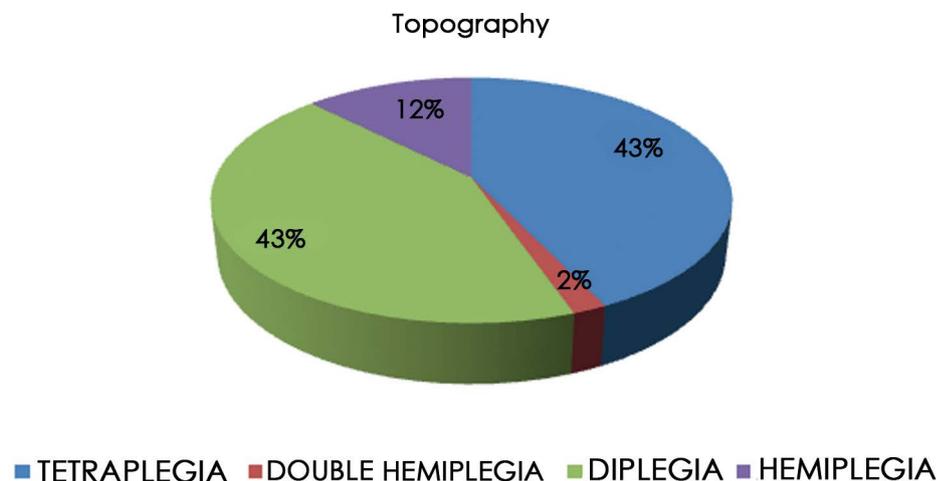


Figure 2. Prevalence of types of CP, according to anatomical distribution

Similar to the literature, the present study showed a greater incidence of CP of the tetraplegic (43%) and diplegic (43%) types. In the study by Caraviello et al.,¹³ there was a predominance of the diplegic type (33.1%), followed by tetraplegic (29.7%). In another study with 55 spastic patients, tetraplegia occurred in 25 of them (45.5%).⁹

Leite & Prado² wrote that seizures happen in 25% to 35% of CP cases, generally more associated with tetraplegia or hemiplegia. This clinical presentation is mostly

observed in newborns with severe periventricular hemorrhage in the first 24 hours of life.¹⁵ According to Moura et al.,⁵ from 25% to 40% of the children with CP present with seizures. Carlsson, 2009, mentioned by Zanini et al.¹ showed that 38% of a sample of 146 children with CP also presented with seizures. These data corroborate the findings in the present study, in which 39% of the patients had seizures.

The botulinum toxin is becoming increasingly common in the treatment of children with CP. It is important to remember

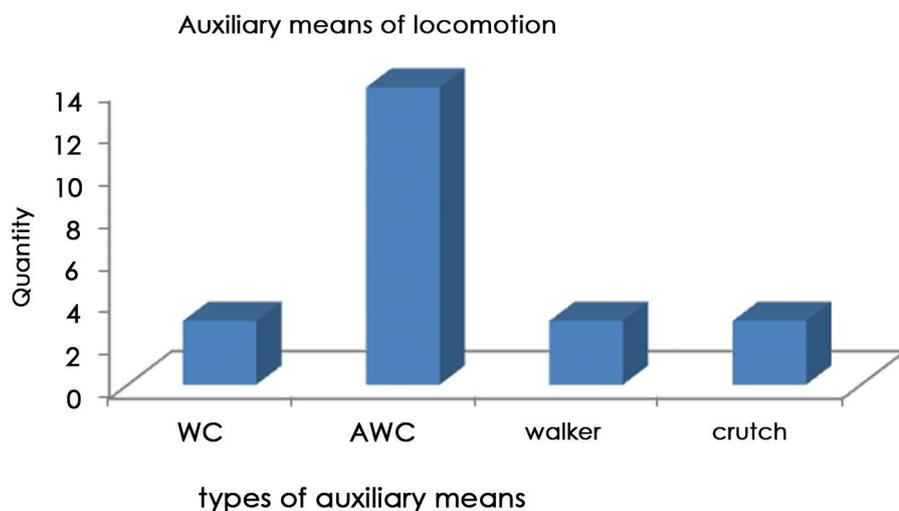


Figure 3. Distribution of types of auxiliary means of locomotion used by the CP patients

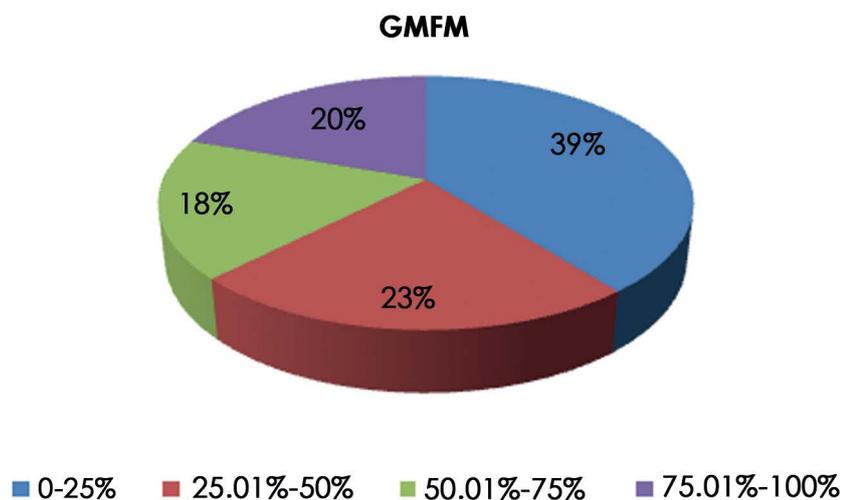


Figure 4. Prevalence of total score in the GMFM test applied in the physical therapy evaluation

that the effectiveness of the botulinum toxin application is associated with a good physical therapy program and should consider two stages of motor development.¹⁶ In the present study, only 30% of the children in the sample had received botulinum toxin applications. And in the study by Magalhães et al.,¹⁷ 40% of the children had received applications. This data may be connected to the fact that not all children are recommended to receive these applications.

Auxiliary means of locomotion were used by 41% of the current patients, with the adapted wheelchair being the most

prevalent (13 individuals); crutches, walkers, and regular wheelchairs appeared in equal quantities. As described previously, the tetraplegic and diplegic types were prevalent, which leads to thinking that even with the need and recommendation to use auxiliary means, a portion of the patients had no access to the equipment or the growth of the child made its continued use inviable.

However, in relation to the orthoses for lower limbs, a little more than half the patients (59%) used them, indicating that either the access to this type of equipment or

its continued use was easier and, even with the child's growth, was more viable. The study by Cury et al.¹⁸ reinforces the positive impact offered by the use of orthoses on the neuromotor performance of the child.

Considering that most of the patients were classified as level IV in the GMFCS (29%), this data matches up with the quantity of adapted and regular wheelchairs found in the study, since the patients at this level generally need to sit with a support, have limited independent locomotion, and are usually transported or use motorized locomotion.¹⁹

The prevalence of a low score in the GMFM (score from 0% to 25%) indicates that these are probably patients who scored better in the A (lying down and rolling) and B (sitting) domains; the next score most often found in the individuals was from 25.01% to 50%.

A study by Beckung et al.²⁰ showed that the lower the level in the GMFCS, the higher the score obtained in the GMFM and, considering the age of the children, the best performances were reached at around 7 years of age. This fact may be evident also in the present study, in which most subjects had a low score in the GMFM and were classified in the highest levels of the GMFCS.

CONCLUSION

The present study was efficacious in characterizing the patients at the CRLM in São José dos Campos. Through the information obtained, it will be possible to direct new studies and therapeutic approaches to the population prevalent in the region. More directed studies are needed in the Vale do Paraíba region to define the epidemiological profile of the children with cerebral palsy and to provide a better characterization of a specific population, in order to delineate the therapeutic strategies and resources necessary for rehabilitation.

It is important to disseminate the idea of an early multidisciplinary rehabilitation process, for the sooner the diagnosis is reached, the greater the chance of functional gains and the lesser is the probability of secondary complications.

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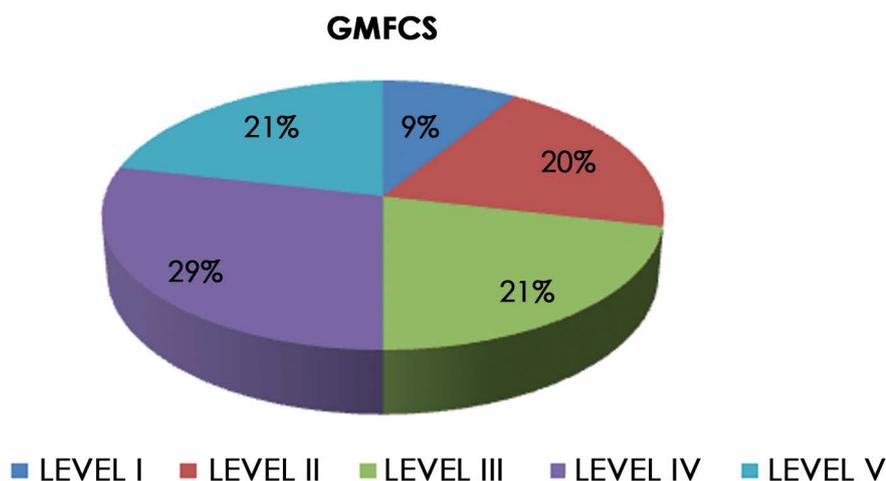


Figure 5. Prevalence of patients classified in each level of the GMFCS in the physical therapy evaluation

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