ABSTRACT

Objectives: to know the weight, length and body mass index of children with cerebral palsy of the district of Lisbon; to analyze the relationship between the commitment and the deficit stature-weight motor. Method: comparative study (children percentile <5 vs percentile >5), composed of a sample of 104 children and their caregivers. Performed the measurement of anthropometric parameters and consultation of the survey data for the evaluation of the child with Cerebral Palsy. Data analysis performed by SPSS version 20.0. Results: approximately 50% of children presents serious compromise engine. It was found that children with percentile<5 have higher levels of dependence. The significant risk factors were: children with severe limitations the level of gross motor function, orofacial myology polisher, performance in the supply, speech and control of the nanny. Conclusion: approximately 1/3 of the children were in percentile<5 in weight, length and BMI. The children who present greater compromise engine are those that show greater stature-weight deficit. Descriptors: Motor Limitations; Growth; Cerebral Palsy.

RESUMO

Objetivos: conhecer o peso, comprimento e índice de massa corporal das crianças com paralisia cerebral do distrito de Lisboa; analisar a relação entre o compromisso motor e o défice estaturo-ponderal. Método: estudo comparativo (crianças percentil<5 vs percentil>5), composto por uma amostra de 104 crianças e seus cuidadores. Realizada a medição dos parâmetros antropométricos e consulta dos dados do Inquérito de Avaliação da Criança com Paralisia Cerebral. Análise de dados realizada pelo SPSS versão 20.0. Resultados: cerca de 50% das crianças apresenta compromisso motor grave. Verificou-se que as crianças com percentil<5 têm maiores níveis de dependência. Os fatores de risco significativos foram: crianças com limitações severas a nível da função motora grossa, motricidade bimanual, desempenho na alimentação, fala e controle da baba. Conclusão: cerca de 1/3 das crianças encontravam-se no percentil<5 no peso, comprimento e IMC. As crianças que apresentam maior compromisso motor são as que revelam maior défice estaturo-ponderal. Descriptors: Limitações Motoras; Crescimento; Paralisia Cerebral.

RESUMEN

Objetivos: conocer el peso, la talla y el índice de masa corporal de niños con parálisis cerebral del distrito de Lisboa; analizar la relación entre el compromiso y el déficit motor estatura-peso. Método: estudio comparativo (niños percentil <5 vs percentil >5), compuesto de una muestra de 104 niños y sus cuidadores. Realiza la medición de parámetros antropométricos y la consulta de los datos de la encuesta para la evaluación del niño con parálisis cerebral. Los análisis de datos realizados por el programa SPSS, versión 20.0. Resultados: aproximadamente el 50% de los niños presentan compromiso serio del motor. Se encontró que los niños con el percentil<5 tienen mayores niveles de dependencia. Los factores de riesgo fueron: niños con graves limitaciones al nivel de función motora gruesa, pulidor miología orofacial, rendimiento en la alimentación, el habla y el control de la baba. Conclusión: aproximadamente 1/3 de los niños estaban en el percentil<5 en el peso, la longitud y el IMC. Los niños que presentan mayor compromiso motor son los que muestran mayor déficit estatura-peso. Descriptors: Limitaciones Motoras; Crecimiento; Parálisis Cerebral.

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MOTOR LIMITATIONS AND GROWTH IN CHILDREN WITH CEREBRAL PALSY
LIMITAÇÕES MOTORAS E CRESCIMENTO EM CRIANÇAS COM PARALISIA CEREBRAL
LIMITACIONES MOTORAS Y EL CRECIMIENTO EN NIÑOS CON PARÁLISIS CEREBRAL

Joana Marques1, Luís Sá2

ORIGINAL ARTICLE
INTRODUCTION

Children need love and respect, they need involvement that promotes their development in full potential, and they need to grow up in a context that is sensible to their needs. A handicapped child is, above all, a child. In the last few decades, ways of approaching a child with special needs have seen endless advances. Where, in the past, intervention frequently meant its social isolation, nowadays we see great efforts towards integration and inclusion, at the same time implementing a global approach of the child and not only of the problems caused by the pathology.

Cerebral Palsy (CP) is the most frequent motor deficiency in childhood. Children with CP frequently are in a complex and heterogenic clinical situation, of difficult characterization and require constant monitoring. Due to the heterogeneity and the complex relations between factors involved, CP is one of the pathologies to pose challenges to children and their families, to technicians, health services, educational services and services of social action.

In spite of the improvement in perinatal care in developed countries, the occurrence of CP remained constant, with reference values of 2.08‰ of the born living in Europe. In Portugal, around 200 new cases emerge yearly, of which 90% will reach adulthood (Campos, 2013). It is, however, possible that there is an under-notification of minor forms of CP. Notifications, for the larger part, come from institutions, hospital personnel (pediatric services and physical medicine and rehabilitation). Moreover, centers for Cerebral Palsy generally do not reference minor cases for being underdiagnosed at this age (5 years) or even for not considering the need for diagnostic accompaniment and special rehabilitation.

Deficiencies in alimentation and growth are common in children with CP. A fact that may have a great impact on health, including psychology, functioning, socializing and surviving. It becomes fundamental to understand the etiology of the delay in growth of these children and the relation with the compromised motor to intervene early and on time. Malnutrition being one of the causes for low weight and stature, these areas have to be investigated to promote the quality of life of these children/families and to minimize as far as possible the scars of bad alimentation.

Independent associations between anthropometric data and various variables may be considered as tracking tools. They are very useful in a protocol that permits early identification of the risk of malnutrition, and to establish opportunities for multidisciplinary teams to intervene with prevention strategies, recuperating the nutritional and functional states of these children.

Having said this, it is fundamental to know the growth of children with cerebral palsy, more specifically, know the CP children with stature and weight deficits - and know the factors associated with growth delay.

The power supply is an important focus of attention of nursing. Is of multiple functions: nutritional status, developmental care, preventive, cultural, therapeutics, emotional. Is contemplated by the theoretical nursing as a focus of assessment and intervention of nursing in the sense of promoting health and therapeutic relevance (Virginia Henderson, Faye Abddelah, Dorothea Orem, Nancy Roper).

Nurses may play a central role in the promotion of a healthy diet and in early detection of dietary errors and risk situations, because they work in near proximity to the people.

The nursing intervention in aspects of health promoters in child/young and family (as the power supply) will reflect on their harmonious development and healthy, and may contribute to the experience of a full life and well integrated socially.

The power supply and the growth are areas of intervention of the nurses, since they have the duty to promote health and prevent disease in the child. The nurse of child health will have a fundamental role in surveillance, as well as the nurse of school health and community health, in monitoring and survey of the needs of these children and their families.

In this follow-up, it is relevant to study the implications of the disease on the growth of these children. The area studied in this work will have a fundamental role in surveillance, as well as the nurse of school health and community health, in monitoring and survey of the needs of these children and in this way to intervene early and timely.

In the face of this problem, it is fundamental to know the growth of children with cerebral palsy, more specifically, know the CP children with weight and stature deficits and their relationship with the compromised motor. The results obtained in this study will facilitate the identification of the needs of children and in this way to intervene early and timely.

In the last few decades, ways of approaching a child with special needs have seen endless advances. Where, in the past, intervention frequently meant its social isolation, nowadays we see great efforts towards integration and inclusion, at the same time implementing a global approach of the child and not only of the problems caused by the pathology.
growth. This said, were defined the objectives of the study and outlined the methodology.

**OBJECTIVES**

- To know the weight, length and Body Mass Index (BMI) of children with cerebral palsy of the district of Lisbon, followed at the Cerebral Palsy Center in Calouste Gulbenkian (CCPCG) and in the center of Rehabilitation Medicine of United Kingdom (CMRA).
- To analyze the relationship between commitment and stature-weight motor deficit.

**METHOD**

This study follows an essentially quantitative methodology, with descriptive and exploratory character, being a comparative study.

The universe of this study is composed by children with CP that reside in the district of Lisbon, the sample being children with CP, born in Portugal between 2001-2006, inclusive and which were followed in CMRA and in CCPCG. The sample is of type non-occasional probabilistic.

We chose to study of children born between 2001 and 2006 since, according to the definition of CP (Andrada et al, 2009), only if you can confirm the diagnosis of CP from 5 years of age. For this reason, to the date of collection of data (around 2013-2014), the children were in the age range between 7-12 years, age that gives us security of the confirmation of the diagnosis and where you can already evaluate some consequences of pathology in the growth and development of children.

The study was accomplished in the CCPCG CMRA and in being the reference institutions in the monitoring of children with CP.

The reason why it was decided to perform this study in Lisbon, focuses on the fact that this district has 1/3 of children with cerebral palsy (Portuguese Association for cerebral palsy, 2009).

The inclusion criteria were the following: children residing in the district of Lisbon; born between 2001 and 2006; children that are followed in CMRA and in CCPCG; the family/caregiver accepted and signed the informed consent form before participating in the study.

The initial sample was of 150 children. Of this initial group, 21 died. The cause of death in 19 of these children was by severe respiratory complication; for the other 2 children the cause is unknown, as death occurred in the hospital with remission of autopsy at the request of the mother.

Of 150 children, 25 had not the correct telephone contact or met the phone. Thus, the total number of children who participated in the study was 104, being 64 males and 40 females.

The percentiles were established in accordance with the Technical Guidelines of the Ministry for General Health (2005).

Initially the researcher approached the two institutions with the objective of make the lifting of the sample. Both institutions have the data of children computerized (age, pathology, telephone contact of parents, date of next query...), taking in these two moments performed the screening of children/family who were within the inclusion criteria.

Were contacted the 104 families, with the objective of presenting the study and schedule an interview. The children who had consultation checked, it was scheduled for the same day of consultation, where it was applied the questionnaire on anthropometric evaluation and later collected the data in the survey of national surveillance of cerebral palsy to 5 years of age.

Obtained data from the two questionnaires, were introduced in a database and performed the division of the sample into two groups. A group were children with weight percentile < 5 (stature deficit) and the other group children with percentile > 5.

After this first moment of study (know the weight, length and BMI of children with CP) was carried out on the second moment (analyze the relationship between the commitment and the deficit stature-weight motor), in which it compared the study group (children with weight percentile < 5) and the control group (children with percentile > 5).

We chose to relate the weight percentile, once the majority of children who were on a weight percentile < 5 were also in percentile < 5 in length and BMI, being in the group of percentile < 5 the weight that if they found more children to perform the second time.

This said, variables were selected that characterize the child with CP the motor level, in order to relate them with the percentile and check if these were associated (with significance) stature-weight deficit.

**Variables**

- Dependent variable → weight percentile.
- Independent variables → type of cerebral palsy, gross motor function, manual skill and food autonomy.

Independent variables were collected from the Investigation of the National Surveillance...
child with Cerebral Palsy, through scales classified from I-V, being that the degree I refers to an independent child and the degree V, to a child dependent, with severe compromise.

The statistical analysis involved descriptive statistical measures (absolute and relative frequencies, mean and standard deviations) and inferential statistics. In this, we used non-parametric statistical because the dependent variables are of a qualitative approach. Thus, we used the Spearman correlation coefficient to analyze the relation between ordinal variables. The Mann-Whitney test was applied to analyze the significance of differences in two independent samples. It was used the test of independence of the Chi-square test to test the relation between the qualitative variables. The assumption of the Chi-square test for which there must be no more than 20.0% of cells with expected frequencies lower than 5 was respected. In the situations in which this assumption was not satisfied, the Chi-square test for the Monte Carlo simulation. The differences were analyzed with the support of the waste adjusted standardised. The significance level was fixed at \( \bar{I} = 0.05 \). However, the significant differences to a level \( \bar{I} = 0.10 \), were also duly commented.

The statistical analysis was performed with the SPSS (Statistical Package for the Social Sciences) version 20.0 for Windows.

Ethical considerations inherent in a work of research have been taken. The design of the study was submitted to the Ethics Committee of the Portuguese Catholic University of Lisbon (24/10/2013), to the Commission of Ethics and the steering CMRA CPACG Clinic. The relatives (parents and guardians of the children) gave their informed consent to participate in the study. After telephone contact, explaining the study and marking the day for the assessment of anthropometric data, the researcher met the person responsible for the child, validated the understanding on the part of the responsible of the objectives of study and before starting, proceeded with the informed consent form.

The data were collected and analyzed maintaining the confidentiality of subjects that constitute the sample.

**RESULTS**

**Sample characterization**

Data were collected regarding the 104 children. In the presentation of the results were only recorded the valid answers, with no in this way, a total always 100% (104).

Of the 104 children in the study (100%), 62.0% (n = 64) were male gender and 38.0% female (n = 40). The majority was of Portuguese nationality (81.7%). The next item is after the children of Angola (5.8%), of Guinea Bissau (3.8%) and Brazil (1.9%).

The average age was 10.1 years (SD = 1.7 years), ranging between 7 and 13 years. The majority had 13 years (23.1%). The fashion was 11 years and median of 10 years.

In the distribution of the children by district of birth was found that predominate the children of the district of Lisbon (76.0%). Then followed the districts of Setúbal (4.0%), Leiria and Faro (1.0%).

**Percentiles of weight, length and BMI**

After the analysis of the percentiles of weight, length and BMI, we verified that a high percentage of children was in percentile <5.

In weight, 44.2% (n = 46) of the children were in percentile < 5, 53.8% (n = 56) between the percentile 5 - 90 and 1.9% (n = 2) in percentile > 90. Similar results were found in length and BMI percentiles.

<table>
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<tr>
<th>Table 1. percentage of children in the 90th percentile for weight, length and BMI</th>
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<tbody>
<tr>
<td>Weight</td>
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<td>5 - 90</td>
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<td>&gt; 90</td>
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<td>Total</td>
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As we obtained similar results in the three percentiles, i.e., the children with low weight also had short stature and low BMI, we chose to relate the weight percentile, being the category children with percentile < 5 where we obtained more cases.

**Compromised motor**

Of the children with the type of CP spastic, 60.6% (n = 63) had the bilateral type, the two being affected hemicorps and 17.3% (n = 18) The unilateral kind. On the other hand, 43.3% (n = 45) of the children had the four affected members.
The type disquinético, 7.7% (n = 8), were type coreo-ateatoide.

In children who presented hemiparésia, 11.5% (n = 12) had the right side affected, and 5.8% (n = 6) the left side affected.

The association of syndromes and congenital anomalies to cerebral palsy was not very clear, being present in only 3.8% (n = 4) and 6.7% (n = 7) of the children, respectively. For this reason, it was not considered relevant to deepen this area.

As regards the scales used in the evaluation of children, we obtained results that lead us to important conclusions.

In the system of classification of gross motor function, it was found that 50% (n = 52) of the children presented the highest level of function alteration (Level IV and V), in which the child is unable to maintain control of head and trunk, has a restriction in all areas of mobility; needs adaptation and supporting technology and is dependent on mobility in wheelchairs (level V).

In the scale of traction polisher, the results were relatively homogeneous, being 28.8% (n = 30) was in level I and 28.8% into level V.

The results obtained regarding the classification system for manual skill tell us that 14.4% (n = 15) of the children presented the maximum limit (level 5), in which the child does not manipulate the objects and has serious limitations in the performance of any activity.

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**DISCUSSION**

**Sample characterization**

The constituents of the studied sample were mostly of male gender is the average age of 10 years. Such characteristics of the sample
were also found in other studies carried out in children with CP.5,7

There was also a statistically significant difference between genders in the sample in another study, characterized by a greater number of boys in relation to girls. They add that the epidemiological data does not determine the effect of sex on the prevalence of the CP. Although there are studies that inform about differences between sexes in motor performance in children without pathologies identified, the impact of sex in motor activities of children with CP has not yet been directly investigated and remains as hypothesis to be tested later.9

The percentiles of weight, length and BMI

The analysis of the weight, length and BMI revealed serious problems in terms of growth of these children, being that almost half of the children were in percentile<5. Such results are going to meet participatory study with 75 children with CP, in which they identified 41.3% of malnourished children.16

Some researchers evaluated the impact of malnutrition in 21 children with CP, using the BMI and concluded that 14 of the 21 children were malnourished.3

The growth parameters in the evaluation of between 2 and 5 years revealed that one third of children already showed a stature-weight deficit with weights in percentile<2 in 30% and statures in this percentile in 40%. Having said that, the authors of this study emphasize the importance of keeping watch the nutritional problem of these children, evaluating and noting the weight, stature and BMI.1

Was registered the weight at 5 years of age in 48.2% and stature in 41.9%. In 39% the weight was below the 5th percentile for age (weight deficit) and in 44% the stature was below the 5th percentile (short stature).9

Compromised motor

The application of the scales has allowed a functional overview of the children in the study. The distribution of children by their classification in the classification system of motor function grosse revealed serious commitment (levels IV and V) in 50% of the children. These results were also observed in other studies, in which 69% of children were at level IV-V12 and 42% of the children had serious commitments (levels IV and V).9,12

In the scale of traction phaco functionality was varied, being the percentage of children who presented themselves at the level I, similar to the level V. It was observed more amendments in relation to the function of the upper limbs, being that this did not present alterations in only 21% of the cases, with the function limited 62%.3 On the other hand, another study reflects a better functionality of children, says that 35% of the children were in level I and 24% in level V.9

Due to the fact that the CP cause changes to the level of the fine movements, many children are unable to use cutlery, hold a beaker or take the food of the dish until the mouth using their hands. Others may suffer from gastroesophageal reflux, which makes the supply uncomfortable or painful. One in ten children with CP are unable to swallow, requiring gastrostomy.14

The difficulties in prehension and manipulation in personal autonomy dependence originate (power, dressing, hygiene care of) and in graphic form, requiring therefore, specific support in training of upper limb function. Thus, are often needed to support technologies, in particular computers at school age. The training for its use must be started very early, using since the toys adapted to more sophisticated technologies and to the computer with the system of direct choice or wiping.1

With regard to supply, it was found that almost half of the children had difficulties in supply and ¼ were totally dependent almost. Such results as negative effects were also found in several studies, in which 37 children with CP, identified 78% of children with motor exam and impairment of these, 46% had the capacity to feed themselves autonomously.19

Several studies emphasize the problems of supply, in particular in the study performed at 105 children with CP, in the assessment of competences, found 47.6% food for children with moderate to severe disabilities; 75 children with CP, found 61.5% of children who are totally dependent on the supply and 19.4% of children who needed full or partial help were independent in supply; 29.7% of children revealed serious difficulties in supply (levels IV and V).5,9,15

Relation between the variables

At the crossroads of several variables there were some statistically significant relations, being related to the low weight of children with CP. These variables can be risk factors in the growth of the child and should assess and monitor the anthropometric data of these children and to intervene as early as possible.

Children with CP type disquinético showed less weight compared to children of the type of the spastic. On the other hand, 1/3 of children are dependent on supply diplegias, being that children with changes of motor function grosse level IV and V are those that...
present more limitations on supply and who need more aid. 3

The present study is the encounter of these data, since it was observed that the children with more limitations motor and dependent presented a lower weight percentile face to children without limitations. The incidence of malnutrition in children with neurological changes is related with the severity of the disease (Marchand, 2009). The greater the degree of severity of the disease, the greater will be the difficulties in supply, which consequently is associated morbidity, hospitalizations and absences in school. Children with CP malnourished have deficits cognitive, social and attention. 17 On the other hand, these children are more vulnerable to diseases and death. 19

Motor limitations interfere with the growth of the child. There is a relationship between the motor function grossa, weight and height. 7 The Portuguese children were the ones that presented more delays in growth and the Swedish children, children who exhibited less delays in growth. The Portuguese children had a weight lower than face to children of Norway, Sweden and Denmark, while the length was also lower than the face of Swedish and Danish children.

There are considerable differences in the thick motor function in children at the level of Europe. In a study performed in 6 countries the differences were more accentuated when directed to children of level IV and V, group was found to have more difficulties in supply and consequently less weight and length. 7

The ability to chew and swallow is complex and requires the coordination of several muscles and sensory nerves. For this reason, the children with a coarse motor function impairment of level V present more severe dysphagia faced with other children, revealing this way more difficulties in supply. 1

The likeness of motor function grossa, it was also found that children with more limitations to the level of motricity phaco had a weight percentile lower face to children with less limitations or without limitations. Notes therefore that there is a link between the function and the power supply, being that there is a relationship between nutrition and functionality, being that a child with better nutritional status, has a better functional potential and energy. Gains in muscular strength may not improve the capacity of a child to move independently, but can improve their health, such as for example, improving the ability of coughing, thus preventing pneumonias. 3

When analyzed the performance in the power supply, it is the same relationship, i.e., the more dependent is the child in feeding performance, the lower is the weight percentile. This dependence on the supply can be due to uncoordinated presenting or motor abnormalities. In this way, children with more changes of motor function have greater difficulty in supply. 12

Having said that, it was found that the risk factors that interfere with the nutritional status of children with CP are: children with disquinetic type CP; children with severe limitations the level of gross motor function, orofacial myology phaco and supply.

CONCLUSION

In the last decades, there has been a marked improvement of perinatal care in Portugal, obtaining perinatal mortality rates among the best in Europe, and also a greater concern with the importance of early intervention in disturbances of neurodevelopment, face to the advances of the knowledge on the cerebral plasticity.

Considering the great variability of situations that may arise and the phenomenon of "cascade", with interaction of biological risk factors and/or environmental, for effective prevention, it is essential to know better the etiology of CP and the risk factors in order to establish prevention programs, maintenance and treatment, appropriate to the situation of our country.

The obtaining of reliable, comprehensive data on incidence, prevalence, clinical, functional fitness and anthropometric data of children with CP enables provide powerful indicators for correct planning of primary, secondary and tertiary prevention of CP.

The growth parameters revealed that around 1/3 of children presented a deficit statute-by weight with the weight, stature and BMI < 5. This delay in growth is associated to severe morbidities, in particular pressure ulcers, decreased muscle strength, deficit of the immune system, reduction in cardiac work and reduction in bone density, facilitating the occurrence of fractures. Having said that, it is essential to make a careful monitoring of children with CP, with evaluation of these parameters to control/minimize problems of nutrition.

We have seen through our study, the complexity of the clinical picture of CP, verifying a moderate or severe neuromotor deficit in 2/3 of children, and therefore large functional limitations.
Having said this, the study objectives were not only to evaluate the growth of children with CP, as also find the risk factors of scope engine, associated with the deficit, so ponderer estaturo promote greater surveillance and monitoring of children with these characteristics, minimizing the impact on growth and development.

Are particularly the spastic CP children with bilateral violation and children with CP disquinética that present the greatest deficit in growth, being that lack of effective interventions to reduce the morbidity associated with and facilitate the autonomy and inclusion. Unfortunately, even today some of these speeches are only available in few institutions and are accessible to a restricted proportion of its potential beneficiaries. It is necessary that the ministries promote the integrated development and reasoned networks for promotion of the inclusion of children and adults with CP (Andrada, 2012). The nurse accompanies these children and family, having a privileged position in the diagnosis, monitoring and care, thus promoting a better quality of life and health gains.

Having said this, the risk factors and, reinforcing that these are not causes, but may favor a delay in the growth, we have found as significant: children with CP type disquinético; children with severe limitations the level of motor function grossa, orofacial myology phaco and supply.

The identification of risk factors is important to the prevention. This advance knowledge allows an early intervention and timely. The terms knowledge that children with CP with more physical limitations and incapacity in supply feature delays in growth, it will allow us to intervene as early as possible in order to prevent complications, improve the quality of life of the child/family and promote the inclusion of socio-family and school.

It is important to evaluate the children taking into account all its limitations, thereby requiring a careful assessment and specific. The only way to promote the maximum development of their skills, their participation and inclusion socio-family and school, the support and guidance to parents since the early ages and even access to integrated programs of enabling and educational support by a transdisciplinary team and to rehabilitation technology.

We consider essential in all cases of CP, as in other development problems, the timely support of health services, Social Security and education, acting in harmony, complementarity and close collaboration, so as to support the child and the family since the first moments, in their doubts and anxieties, and on the complex task of taking care of the child with disturbances of development. It is necessary to follow the child and family with a program of early intervention and the support of a transdisciplinary team.

In the course of the study we are faced with some limitations, in particular physical deficiencies that hinder the length measurement, surveys of surveillance of cerebral palsy incomplete and delay of data collection (to facilitate the management of time of parents, the researcher has reaped most of the data on the days that the children had consultation, which substantially increased the time of data collection).

At the end of the study, are few issues to clarify and suggestions for future studies, as the impact of gender (male vs female) in motor activities of children with cerebral palsy; what are the difficulties of care providers of children with cerebral palsy; the role of the nurse among children with cerebral palsy in the institutions and health centers.

REFERENCES


Motor limitations and growth in children


