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The motor development of children's cardiopathy in a reference hospital in the amazon region

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The motor development of children's cardiopathy in a reference hospital in the amazon region

El desarrollo motor de la cardiopatía infantil en un hospital de referencia de la región amazónica

O desenvolvimento motor de crianças cardiopatia em um hospital de referência na região amazônica

ABSTRACT

Congenital heart diseases are diseases that occur as a result of a cardiac malformation in the embryonic period. Due to its alterations, it can delay motor development. Objective: To quantify motor development in the preoperative period of cardiac surgery in a reference hospital in the Amazon region. Method: This is a quantitative, observational and cross-sectional study. 14 children from 03 to 18 months of both sexes took part in the research. The research instrument was the Alberta Infant Motor Scale (AIMS) which assesses the motor development of children. Results: In the evaluation of the percentile (TH) of the AIMS scale in the studied sample, it revealed that 28.6% had suspicious behavior in relation to motor development, 35.7% had borderline behavior and 35.7% had normal development. Conclusion: The results suggest that children with congenital heart disease have a delay in motor development, and its severity may or may not be related to the type of pathology.

DESCRIPTORS: Coordination Development Disorder. Congenetic cardiopatics. Public health.

RESUMEN

Las cardiopatías congénitas son enfermedades que ocurren como resultado de una malformación cardíaca en el período embrionario. Por sus alteraciones, puede retrasar el desarrollo motor. El objetivo de este estudio fue cuantificar el desarrollo motor en el período preoperatorio de cirugía cardíaca en un hospital de referencia de la región amazónica. En la investigación participaron catorce niños de entre 3 y 18 meses de ambos sexos, evaluados para el desarrollo motor mediante la Escala de Motricidad Infantil de Alberta (AIMS). Los resultados encontrados en la evaluación del percentil (TH) de la escala AIMS en la muestra estudiada revelaron que el 28,6% tenía un comportamiento sospechoso en relación al desarrollo motor, el 35,7% tenía un comportamiento límite y el 35,7% un desarrollo normal. Los resultados sugieren que los niños con cardiopatía congénita tienen un retraso en el desarrollo motor y su gravedad puede estar relacionada o no con el tipo de patología.

DESCRIPTORES: Trastorno del desarrollo de la coordinación. Cardiopatías congénicas. Salud pública.

RESUMO

As cardiopatias congênitas são doenças que ocorrem do resultado de uma má-formação cardíaca no período embrionário. Em decorrência de suas alterações, ela pode causar atraso no desenvolvimento motor. Objetivo: Quantificar o desenvolvimento motor no período pré-operatório de cirurgia cardíaca em um hospital de referência na região amazônica. Método: Trata-se de um estudo quantitativo, do tipo observacional e transversal. Fizeram parte da pesquisa 14 crianças de 03 à 18 meses de ambos os sexos. O instrumento da pesquisa foi Alberta Infant Motor Scale (AIMS) que avalia o desenvolvimento motor de crianças. Resultados: Na avaliação do percentil (TH) da escala AIMS na amostra estudada revelou que 28,6% apresentaram comportamento suspeito em relação ao desenvolvimento motor, 35,7% apresentaram comportamento limítrofe e 35,7% apresentaram desenvolvimento normal. Conclusão: Os resultados sugerem que crianças com cardiopatia congênita apresentam atraso no desenvolvimento motor, podendo ou não relacionar-se sua gravidade ao tipo de patologia.

DESCRIPTORES: Transtorno do Desenvolvimento da Coordenação; Cardiopatias Congênitas; Saúde Pública.

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INTRODUCTION

Congenital heart disease is a macroscopic structural abnormality of the heart and/or the great intrathoracic vessels, which has significant or potentially important functional repercussions, representing approximately 40% of all congenital defects, and identified as one of the most frequent malformations.^{1,2}

Congenital cardiac pathologies often cause complications and delays in child development that are difficult to treat, especially in more severe cases, however, early detection of these delays allows for early intervention and adequate rehabilitation. Therefore, the multidisciplinary health team must assess the meaning of any delay in the child development of children that deviate from the normal limits of variability.³

The epidemiology of congenital heart disease reveals a ratio of 11.82:1000 newborns, with a higher incidence being observed in stillbirths (87.72:1,000) than in live newborns (9.58:1,000).⁴ Similar data were also found in another study that presents an incidence of 4 to 19: 1000 cases in live births.⁵ In Brazil, the forecast of new cases per year is around 28.846, and approximately 20% reach a cure spontaneously.⁶

In Brazil, in 2008, congenital heart diseases accounted for approximately

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19% of mortality in children under one year of age, representing the second leading cause of death in this age group. They are the malformations with the greatest impact on the morbidity and mortality of children and on the costs of health services, as they represent the main cause of death among congenital malformations.⁷

Most cardiac pathologies have an unknown origin, however, several factors can be associated with the causes of congenital anomalies, such as: incomplete prenatal care, mother aged over 40 years, genetic factors, use of abortive drugs during pregnancy and others perinatal complications that can lead to morphological changes during the embryonic stage and that are not corrected during intrauterine development.⁸

Survival after birth will depend a lot on the type of heart disease. Earlier deaths are usually linked to more severe anatomical changes. Patients with congenital heart disease, who survive the first year of life, are exposed to the progression of their heart disease and its possible consequences, such as: physical development deficit, pulmonary arterial hypertension, fibrosis and myocardial dysfunction, strokes, strokes and accidents hemorrhagic, all capable of substantially deteriorating the quality of life.⁹

Among the child development assessment scales, the Alberta Infant Motor Scale (AIMS) stands out, which aims to assess the broad motor development over time of full-term and preterm newborns from 0 to 18 months of age, thus identifying newborns whose motor performance is delayed or abnormal in relation to the normative group.¹⁰ Thus, the research aims to quantify motor development in the preoperative period of cardiac surgery in a hospital in the Amazon region.

METHOD

The research is quantitative in nature, with two stages: theoretical framework survey and observational and cross-sectional field research. The research followed all the norms of resolution 510/16, being approved under CAAE nº 2.055.773, with a favorable response. The research started after the participants signed the Informed Consent Form (ICF). The research took place over a period of 3 months in a hospital belonging to the Unified Health System (SUS), a reference in cardiac surgery in the Amazon region.

Nineteen children participated in this study, however, three were excluded for presenting incomplete medical records and two were diagnosed with neurological syndromes after the evaluation. Therefore, the sample consisted of 14 children aged between 03 and 18 months, of both sexes.

Children who were not in their first week of hospitalization, preterm, who for some reason had postnatal complications, who were hemodynamically unstable and using drugs, children who had already undergone some type of cardiac surgical procedure, were excluded from the research.

The instrument used in the research was the Alberta Children's Motor Scale (AIMS). AIMS presents 58 items that assess prone, supine, sitting and standing postures. Of the 58 items, 6 items are tested in the prone position, 5 in the

supine position, 3 in the sitting position and 44 in the standing position. The assessment procedure consists of positioning the child in the posture that you want for the assessment and observing which items of this particular posture he assumed.

After data collection, an electronic

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spreadsheet was created to store the data in the Microsoft Excel® 2010 software, in which each line corresponded to a case and a column to a variable. For the descriptive presentation of the data, tables were created using the Microsoft Word® 2010 software, representing the means and standard deviation of the distributions of the numerical variables and the absolute and relative frequencies for the categorical variables. To compare the means of numerical variables, the nature of the variables and the normality of distribution were taken into account. This study used the non-probabilistic sampling method, for convenience.

RESULTS

The sample consisted of 14 children in which females represented 35,7% (n = 5) of the sample and males 64,3% (n=9).

The results found in the evaluation of the percentile (TH) of the AIMS scale in the studied sample revealed that 28,6% (n=4) showed suspicious behavior in relation to motor development, those who obtained a score of 5 th. 35,7% (n=5) showed borderline behavior of motor development, where the score obtained on the scale was 10 – 25 th. And 35,7% (n=5) had normal development, the scale score was 50 – 75 -90 th.

The time of diagnosis of the children was counted in months, where 28,6% (n=4) had been diagnosed a month ago in relation to the day of assessment, 7,1% (n=1) had been diagnosed three months ago, 7,1% (n=1) were diagnosed four months ago, 14,3% (n=2) were diagnosed six months ago, 14,3% (n=2) were diagnosed seven months ago, 7,1% (n=1) were diagnosed eight months ago, 14,3% (n=2) were diagnosed 10 months ago, and 7,1% (n=1) were diagnosed 11 months ago.

The length of stay of children was counted in days, where 7.1% (n=1) represents that one child was evaluated on their first day of hospitalization, 14,3%

(n=2) two children were evaluated on their third day of admission, 7,1% (n=1) a child was assessed on their fourth day of admission, 21,5% (n=3) were on the fifth day of admission when assessed, 21,3% (n=3) were on their sixth day of hospitalization on the day of the evaluation, 14,3% (n=2) had been hospitalized for seven days at the time of the evaluation and 7,1% (n=1) had been hospitalized for eight days.

When the intention time was correlated with the AIMS scores, it was observed that there was no statistical correlation, proving that the length of stay did not interfere with the scores obtained on the scale. The same can be seen when the time since diagnosis was correlated with the AIMS scores. There is no statistical correlation.

Of the 14 individuals included in the survey, nine had acyanotic congenital heart disease, of these nine, three had a suspicious score on the AIMS, two had a borderline score and four, the normal score. The other individuals add up to five and had cyanotic congenital heart disease, of these five, only one received a suspicious score on the AIMS, three received a borderline score and only one had a normal score.

DISCUSSION

The characteristics of the sample in this study revealed that there was a predominance of males over females. The profile of the participants differs a little from the profile found by the epidemiological study in Manaus, in which the predominance was male, representing 60%.¹¹

During the evaluation, data regarding the time of diagnosis of congenital heart disease was collected, since some patients with these pathologies are diagnosed early and remain under medical supervision, while others are diagnosed late.

A study showed that most patients with heart disease are diagnosed with less than one month of life, followed by

a period of one month to one year, corroborating our study.¹²

By reading the data presented, it is possible to understand that there is an equality in relation to the time of diagnosis of the children, demonstrating that the diagnosis of congenital heart disease was carried out in the same time interval. Important fact to highlight that the time of diagnosis did not influence the children's motor development, since when it is performed early, the child is monitored by the multidisciplinary team that will point out possible abnormalities during growth and development, thus acting in a preventive or curative manner.

The length of stay is an important issue when thinking about the assessment of the motor development of children who are hospitalized or out of a natural environment, as a different environment, with possible limitations, will cause the baby to reduce motor and sensory, sound, verbal stimuli etc. The hospital environment is a major barrier to motor development in the age group studied, since at this stage of development the baby acquires the main milestones that are key to other future acquisitions.¹³

A long period of hospital stay interferes in a way that restricts the baby to have certain experiences that would lead him to acquire skills, since the baby is restricted to the bed, in the lap of the companion, and may not interact with other babies, change in the times of sleep and interference in feeding compared to those who already eat other foods besides breast milk.

For this reason, we only included babies who were up to their tenth day of hospitalization, so that these deleterious effects of hospitalization would not interfere with our results. The length of stay did not show statistical abnormalities, revealing that all babies were equal to the length of stay, where so far, the period would not be able to interfere with motor development.

In a study similar to the present research, comparing babies hospitalized

for 30 days in a hospital in Porto Alegre with babies from the community. The results showed that all babies who were hospitalized had a low score when compared to the control group.¹⁴

And in another study carried out the epidemiological profile in a reference hospital in Sergipe, which confirms what was found in our study. The study was carried out with 300 children with heart disease, where 70% had acyanotic congenital heart disease, where ventricular septal defect represented 21% of acyanotic heart disease, patent ductus arteriosus 18% and interatrial septal defect 7,7%. This shows that even with the reduced number of participants in this research, this fact did not prove to be an obstacle.¹⁵

Unlike another study, which found only T4F as cyanotic heart disease, a study conducted in a public hospital in Tocantins with 27 patients, in addition to T4F, there was an incidence of Transposition of Great Arteries, Mitral Valve Atresia and Hypoplasia of the Right ventricle. This fact can be explained by the burden of a reduced sample.¹⁶

The results found in the literature show that in populations with some pathology and in a state of hospitalization, the percentage of children evaluated with borderline and/or suspected motor development is higher. The research presented results slightly different from those found in the literature, in which, of the five children with cyanogenic heart disease, only one had a low score on the AIMS scale and, of the nine with acyanogenic heart disease, three scored low.

Most babies with cyanotic heart disease were diagnosed with a borderline score, a score that does not exempt the baby from some delay, but also does not give normality in terms of motor development. Another factor that may have contributed to this result would be the sample size, which is a limitation of the study, since of the 14 individuals included in the research, only five had cyanotic congenital heart disease. These

results allow us to think that in a larger population there are possibilities to find more cases of children with delayed motor development, as in the literature, since even with this small sample, most children were not classified as normal.

The population with acyanotic congenital heart disease corroborates the literature, as in these pathologies there is not much interference of pathophysiology in the development of body structures, as there is no shortage of oxygen when compared to cyanotic ones.

Compared to another study carried out at the Hospital do Coração de Messejana in Fortaleza/CE, it obtained similar results to the present research, where in its population studied a total of 20, 10 babies were diagnosed with delayed motor development and, of these 10, five were babies with cyanotic heart disease and the other five were acyanotic heart disease. Demonstrating similarity with the research carried out, of the four babies diagnosed with delay, three had acyanotic pathology.¹⁷

Among individuals with acyanogenic heart disease, two children were diagnosed with altered or borderline scores, different from what is found in other studies. This fact can be explained by the circumstance that the vast majority are natural or reside in the interior of the state, in riverside populations, where children have less access to health, different lifestyle habits that can interfere with the motor acquisition process, and food restricted that possibly causes some type of nutritional deficit that can harm their development.

Children who are affected by congenital heart disease, in general, are more likely to have motor development disorders, since the altered cerebral blood flow causes a decrease in cerebral oxygen transmission, both in the uterus and after birth, which may affect subsequent development of the brain.¹⁸

For some authors, the brain is delayed in children with some types of complex heart disease, thus, the brain is less mature and more vulnerable at birth than

He compared brain imaging exams of children with preoperative and postoperative congenital heart diseases and found results that show that since the neonatal period there is evidence of brain abnormalities, such as malformed structures and delayed brain maturation.

suggested for gestational age. The fetal and neonatal periods are critical for brain growth and maturation, myelination and neural network development. This altered cerebral blood flow and cerebral immaturity during these sensitive developmental periods can lead to an increased risk of motor development disorders.¹⁹

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Despite the findings in the literature, the research showed that in this group of patients studied, no relationship was found between the type of heart disease and the scores obtained in the AIMS. It is understood, therefore, that in this group of patients, the heart disease type did not influence their motor diagnosis. It is generally understood that heart diseases influence the motor development of children who have them, but it cannot be said that the type of heart disease will influence more or less motor development.

Although there is no uniformity among the numerous studies regarding the best method for assessing development, there is consensus on the importance of early identification. Among the assessment tools used to monitor changes in motor development and discriminate atypical motor behaviors, the AIMS stands out, which is considered a valid and reliable instrument in the assessment of infants at risk. In contrast to the traditional neurological examination, the scale emphasizes functional skills and quality of movement and offers up-to-date normative reference values.

In a systematic review study, which included 23 national and international studies, it indicates that the AIMS is an instrument that has high sensitivity, specificity and accuracy to detect motor deficits and is indicated for monitoring

the motor development of premature children in the first 18 months of life, over time.²¹

Thus, it carried out one to prove the reliability of the AIMS for detecting delay in motor development in the Ceará population. In their studies, it was proven that the AIMS is a valid instrument for this population, since the scale's validation coefficient was 95%.²²

CONCLUSION

The survey results show that children with cyanotic or acyanotic congenital heart disease are more likely to have alterations in normal motor development. Due to the occurrence of congenital heart disease itself, in addition to these delays depending on the severity of the pathology. However, no correlation was identified between the type of heart

disease and the scores presented by the children.

From this, we conclude on the importance of evaluating motor development in this type of population, since congenital heart diseases, as they present in their pathophysiology, structural changes that lead to fundamental physiological changes in the survival of these individuals, provide a greater occurrence of changes in motor development. ■

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