Characterization of motor development in infants of adolescent mothers

Caracterização do desenvolvimento motor de lactentes de mães adolescentes

Caracterización del desarrollo motor de lactantes de madres adolescentes

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ABSTRACT | This study aimed to characterize the motor development and environmental opportunities of infants of adolescent mothers, as well as to compare the motor development of infants living with grandparents with that of the infants who live only with their parents. The study included 17 infants of adolescent mothers. The instruments used were a questionnaire containing information on the infant and mother, the Affordance in the Home Environment for Motor Development – Infant Scale (AHEMD-IS) and the Alberta Infant Motor Scale (AIMS). The data were analyzed using descriptive statistics, and by means of Pearson test and Mann-Whitney U-test, considering p<0.05 as statistically significant. The results showed that the majority of infants born to adolescent mothers (58.82%) had normal motor development, and in the comparison between the groups, significant difference was observed in the motor performance of children living with grandparents. Regarding environmental opportunities analyzed by means of AHEMD-IS, all households had low opportunity for motor development. In conclusion, although most children have normal motor development, it is important to emphasize that development has multifactorial influences resulting from intrinsic and extrinsic factors. A longitudinal follow-up of children of teenage mothers is needed to understand the outcome of the motor development of these infants.

Keywords | Pregnancy in Adolescence; Child Development; Motor Activity; Infant, Environmental.

RESUMO | Este estudo objetivou caracterizar o desenvolvimento motor e as oportunidades ambientais de lactentes de mães adolescentes, bem como comparar o desenvolvimento motor dos lactentes que moram com as avós com o desenvolvimento dos que moram apenas com os pais. Participaram do estudo 17 lactentes de mães adolescentes. Os instrumentos utilizados foram um questionário contendo informações sobre o lactente e a mãe, o *Affordance in the Home Environment for Motor Development – Infant Scale* (AHEMD-IS) e a Escala Motora Infantil de Alberta (*Alberta Infant Motor Scale* – AIMS). Os dados foram analisados por meio de estatística descritiva, pelo testes de Pearson e U de Mann-Whitney, considerando-se estatisticamente significativos valores de p<0,05. Os resultados mostraram que a maioria dos lactentes filhos de mães adolescentes (58,82%) apresentou um desenvolvimento motor normal, sendo que, na comparação entre os grupos, observou-se diferença significativa de desempenho motor das crianças que moram com avós. Em relação às oportunidades ambientais analisadas por meio do AHEMD-IS, todas as residências apresentaram baixa oportunidade para o desenvolvimento motor. Em conclusão, apesar de a maioria das crianças apresentarem normalidade no desenvolvimento motor, é importante enfatizar que o desenvolvimento tem influências multifatoriais, resultando de fatores intrínsecos e extrínsecos. Um acompanhamento longitudinal de filhos de mães adolescentes se faz necessário para entendermos o desfecho do desenvolvimento motor destes.

Descritores | Gravidez na Adolescência; Desenvolvimento Infantil; Atividade Motora; Lactente; Meio Ambiente.

RESUMEN | Este estudio buscó caracterizar el desarrollo motor y las oportunidades ambientales de lactantes de madres adolescentes, así como comparar el

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desarrollo motor de los lactantes que viven con los abuelos con el desarrollo de los que viven sólo con los padres. Participaron del estudio 17 lactantes de madres adolescentes. Los instrumentos utilizados fueron un cuestionario conteniendo informaciones sobre el lactante y la madre, el *Affordance in the Home Environment for Motor Development – Infant Scale* (AHEMD-IS) y la Escala Motora Infantil de Alberta (*Alberta Infant Motor Scale* – AIMS). Los datos fueron analizados por medio de estadística descriptiva, por los tests de Pearson y U de Mann-Whitney, considerándose estadísticamente significativos valores de p<0,05. Los resultados mostraron que la mayoría de los lactantes hijos de madres adolescentes (58,82%) presentó un desarrollo motor normal, siendo que, en la comparación entre los grupos, se observó diferencia significativa de desempeño motor de los niños que viven con abuelos. En relación a las oportunidades ambientales analizadas por medio del AHEMD-IS, todas las residencias presentaron baja oportunidad para el desarrollo motor. En conclusión, a pesar de que la mayoría de los niños presentaron normalidad en el desarrollo motor, es importante enfatizar que el desarrollo tiene influencias multifactoriales, resultando de factores intrínsecos y extrínsecos. Un control longitudinal de hijos de madres adolescentes se hace necesario para entender el desenlace de su desarrollo motor.

Palabras clave | Embarazo en Adolescencia; Desarollo Infantil; Actvidad Motora; Lactant; Ambiente.

INTRODUCTION

Motor development is considered a continuous and sequential process linked to chronological age, which begins at conception and lasts until adulthood[1-3]. It is the result of continuous interaction between genetically determined biological potentials and environmental conditions, and are therefore influenced by the interaction between individuals and the context in which they are inserted[4]. The first year of life is a period of high neural plasticity, and having a rich and challenging environment, as well as carrying out appropriate tasks, will foster the acquisition of motor skills[5,6].

In the scientific literature, there is a strong consensus on the influence of environmental stimuli on the motor development of children. Based on the concept of Affordance, referring to opportunities that provide challenges to individual development or to the good or bad experiences offered by the environment to people, actions provided in response to stimuli can support the formation of the repertoire of children[7-9].

Maternal care is a set of biopsychosocial and environmental actions that allow the child to develop well[10]. In recent decades, teenage pregnancy has been considered an important public health issue, because of its worldwide prevalence[11-13]. It also has been suggested as a possible risk factor for delayed motor development of the child, due to poor mother-infant bonding, maternal neglect, lack of adequate maternal care, lack of interest and the emotional immaturity of adolescents to become mothers[14]. To minimize the difficulty of maternal care, the adolescent mothers turns to the support of her family group and usually ends up transferring the exercise of maternal care to the child's grandmother. In a study[15] of adolescent mothers and grandmothers, the authors observed that babies often call their grandmother "mother", corroborating the idea that the grandmother is both a mother and a grandmother to these children.

Given the above, this study aimed to evaluate the motor development and environmental opportunities on infants of adolescent mothers, and the specific objective was to compare motor development on infants living with their grandparents with the development of those living only with their parents.

METHODOLOGY

Sample

This is a descriptive cross-sectional study, whose sample consisted of 17 infants of both sexes, aged between 3 and 12 months, divided into 2 groups: Group A, with babies whose grandmother (maternal or paternal) was present in the household, and Group B, with babies whose household was composed of only their parents. Only infants of adolescent mothers were included, and those diagnosed with cognitive impairment, congenital malformations, low birth weight, prematurity, complications during pregnancy and neonatal period were excluded. Mothers were informed and made aware of the research, having signed the informed consent form before the evaluation started. The study was approved by the institution's Research Ethics Committee under protocol No. 160 118.

In order to characterize the sample, a questionnaire relating to the characteristics of the infant (gender, gestational age, head size and circumference at birth) and of the mother (age, educational level, number of pregnancies and the presence of the grandmother at the household) was applied. The socioeconomic status of

the family was assessed by the monthly family income and the socioeconomic survey of ABEP (Brazilian Association of Research Companies) - Criterion 2011[16].

Instruments

The instrument used for the assessment of children was the Alberta Infant Motor Scale (AIMS)[17] in the version validated for the Brazilian population[18]. AIMS is an observational instrument developed to assess the motor development of children born at term and preterm with a corrected age, from birth through the acquisition of independent walking[17,18]. It contains 58 items grouped into four subscales that describe the development of spontaneous movement and motor skills in four basic positions: prone (21 items), supine (9 items), sitting (12 items) and standing (16 items). The percentile curve is obtained from the relationship between the gross value and the age of the child. AIMS was applied by the same examiner in the homes of every child, and all measurements were recorded on film with a digital camera in a fixed surface.

The opportunities at the household were evaluated using the second version of Affordances in the Home Environment for Motor Development - Infant Scale (AHEMD-IS, 3–18 months), which evaluates simple, fast and effective opportunities present in the context of home environment[8]. The questionnaire has 48 questions divided into 3 dimensions: internal and external Physical Space (14 items), Daily Activities (13 items) and Toys (21 items). The score of a dimension is calculated by adding the points obtained for all questions within each dimension. The total score of AHEMD-IS was calculated for 2 groups: 3–9 months and 10–18 months[5]. For the 3–9 months age group, classification was considered "Low" when ≤ 37 points; "Average" when between 38 and 49 points; and "High" when ≥ 50 points. For the 10–18 months age group, it was considered "Low" when ≤ 50 points; "Average" when between 51 and 68 points; and "High" when ≥ 69 points[5].

Statistical Analysis

To describe the sample profile, frequency tables were made of the variables under study, which were analyzed using descriptive statistics. Our data were organized and analyzed in the GraphPad Prism 5.00 software. To verify the Gaussian distribution of the variables, the Shapiro-Wilk normality test was applied. Correlations of motor performance and environmental opportunities were made using the Pearson test. The strength of correlation was interpreted by the following score: perfect correlation (r=1), strong correlation (r value between 0.75 and 0.99), average correlation (r value between 0.5 and 0.74), weak correlation (r<0.5 and ≠ 0) and lack of correlation (r=0). Non-parametric data are presented as a median with the minimum and maximum dispersion values. The comparison was done by Mann-Whitney test. In all cases, α=0.05 was adopted.

RESULTS

Of the 17 children assessed, 10 were female (58.82%) and 7 were male (41.18%), whose average age was 8 (±2.61) months, between 4 and 12 months. With regard to maternal characteristics, age was 18±1.66 years, between 14 and 19 years. The presence of the grandmother (maternal or paternal) was found in 58.82% of households assessed. Most families were concentrated in ABEP's class C (82.45%). The characteristics are described in Table 1.

For the motor development of participants, by analyzing the raw and percentile scores and categorization of AIMS, the infants showed a percentile value of 28±16.95, which translates to normal performance. However, when analyzing the groups, it was found that infants of adolescent mothers who live with their grandmothers (Group A) showed a better motor performance compared with infants who live only with their parents (Group B). When comparing both groups, a significant difference in motor performance was observed (Mann-Whitney test - p=0.0167) (Graph 1).

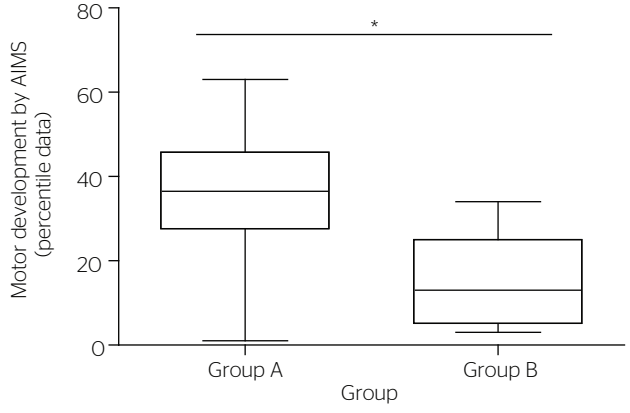
The total score of AHEMD-IS was 29.52±7.23, classified as "low opportunity" in all of the environments evaluated (17-100%), revealing contexts of low opportunity for a good motor development in infants. Regarding the dimensions of AHEMD-IS, Physical Space scores were 6±1.96, classified as "very weak"; daily activities scores were 14±1.37, classified as "very poor"; Toys scores were 10±5.73, classified as "very weak".

The groups' scores in AIMS' raw and percentile subscales are presented in Table 2, as well as the classification of environmental opportunities through the total score of AHEMD-IS. No correlation of motor performance and environmental opportunities were observed by the Pearson test (p=0.1665).

Table 1. Frequency distribution of the descriptive characteristics of the study population (n=17) – categorical variables

Maternal variables	f (%)
Maternal age (years)	
14 and 15	3 (17.64)
16 and 17	4 (23.52)
18 and 19	10 (58.82)
Presence of the grandmother in the family unit	
Yes	10 (58.8)
No	7 (41.2)
Socioeconomic status	
C1/C2	14 (82.45)
D	2 (11.76)
E	1 (5.88)
Education	
Basic education	15 (88.23)
Secondary education	2 (11.77)
Breastfeeding	
Up to 3 months	2 (11.77)
Until age at assessment	15 (88.23)
Variables of infants	Mean±SD
Gender – f (%)	
Female	10 (58.8)
Male	7 (41.2)
Gestational age (weeks)	39±0.80
Chronological age (months)	8±2.6
Birth weight (grams)	3.420±467.15
Head circumference at birth (cm)	34.5±1.16

SD: standard deviation



Graph 1. Motor performance by the Alberta Infant Motor Scale - AIMS (percentile) of infants in Group A and Group B. Mann Whitney test - p=0.0167. Group A: babies whose grandmother is present in the household; Group B: babies whose parents only are present in the household

DISCUSSION

This study aimed to evaluate the motor development and environmental opportunities of infants of adolescent mothers, as well as the influence of the presence of the grandmother in the family. The study showed that the majority of infants born to adolescent mothers (58.82%) had motor development within the normal range, which differs from results reported in a study in which the children of adolescent mothers showed motor development below expected for the age compared with children of adult mothers[13]. However, research[19,20] conducted with children of adolescent mothers indicate a higher incidence of prematurity, low birth weight, and higher frequency of perinatal diseases. The population sample of our study was of children without these risk factors.

The different factors that determine a child's development are more dependent on the number of risk factors than on their nature, i.e., the fact that they are children of teenage mothers alone does not mean imminent delay. Under the bioecological perspectives of human development proposed by Bronfenbrenner and Ceci[21], the main relationships necessary for the child's motor development are offered by the family in the household microsystem. Of the households that relied on the presence of a maternal grandmother, only one child presented delay in motor development. It can be inferred by this result that this may be associated with the fact that the grandmother often assumes the role of taking care/supporting the child, thus developing the role of surrogate mother, as reported in the literature by Silva and Salomão[15], as well as being agent propagator of information about care and stimulating babies more adequately.

When analyzing the total score of AHEMD-IS, it is observed that 100% of the assessed households were classified as "low opportunity" for motor development, not even reaching one-third of the total possible score (167 points). These results agree with those obtained by other authors, who stated that the opportunities present in the participants' homes in their studies were insufficient for motor development[7,22-26].

Table 2. Means and standard deviations of the scores given to the positions of the Alberta Infant Motor Scale, of the raw scores and percentiles, and total score of Affordance in the Home Environment for Motor Development - Infant Scale in groups A and B

Groups	Prone (21 items) mean±SD	Supine (9 items) mean±SD	Sitting (12 items) mean±SD	Standing (16 items) mean±SD	Raw score (58 items) mean±SD	Percentile AIMS mean±SD	AHEMD-IS (Total)
A (n=10)	15±6.66	9±1.85	11±2.55	7±3.41	42±12.52	36.5±16.43	27.5±5.94
B (n=7)	6±2.98	5±1.97	5±2.19	3±1.15	20±7.84	13±11.58	31±7.79

Group A: babies whose grandmother is present in the household; Group B: babies whose parents only are present in the household; SD: standard deviation; AIMS: Alberta Infant Motor Scale; AHEMD-IS: Affordance in the Home Environment for Motor Development - Infant Scale.

Although no statistically significant difference between environmental opportunities and motor development have been found, the Physical Space dimension is an important item for the age group between 10 and 18 months, since the internal and external architectural features of the home may offer new sensory and motor experiences, providing the acquisition and refinement of orthostatic posture, dependent and independent walking, as reported by Sinder and Ferreira[27]. Analyzing the Daily Activities dimension, it is observed that most of the children who had impaired motor development belonged to groups considered weak and very weak. These data may suggest that mothers have household chores to be done and cannot provide enough time for activities related to the baby.

Analysis of the Toys dimension indicated that children live in an environment that does not offer enough items and materials to stimulate their motor development, results that are consistent with those by Batistela, Noble *et al.* and Corrêa and Oliveira, in which the values obtained in the Toys dimension were also well below the possible[7,23,28]. It is believed that a low score on this dimension can be related to the low purchasing power of the sample, which may have reduced access to toys due to the priority given to spending on basic needs. These data corroborate the studies of Martins *et al.* and Pilz and Schermann, in which it was observed that families with low income are exposed to more negative environments, because the family income is determining for quality of life[29,30].

CONCLUSION

In this study, it was observed that infants born to adolescent mothers have a better motor performance when the grandmother is part of the family unit, and although there was no association between motor performance and environmental opportunities, there was a high incidence of low opportunities in the sample evaluated.

The motor development has multifactorial influences, resulting from intrinsic and extrinsic factors. Thus, to understand it, one must value the history, culture and practice opportunities for each individual together and not separately.

The most disturbing fact in this study concerns the availability of materials and activities that encourage the full motor development, because although most children present normal motor development (in the assessed age group), the context in which they live has low opportunity for full development. One limitation of this study was the sample size and the fact that it was performed transversely. A longitudinal follow-up of children of adolescent mothers is necessary to understand the outcome of their motor development.

It is also necessary to emphasize the importance of the knowledge that health professionals, particularly physiotherapists, must have on child development and family context, not only seeking rehabilitation, but also emphasizing the full awareness and prevention of developmental problems.

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