Evaluation of motor behavior in children between zero and under 12 months in a peripheral region of Santos

ORIGINAL ARTICLE

Avaliação do comportamento motor de crianças entre zero a 12 meses incompletos em região periférica na cidade de Santos

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ABSTRACT: Child development has been a subject of frequent study considering the various risk factors cited in the literature. The aim of this study was to evaluate the motor behavior of children born at term in the Northwest region of Santos. Fifty children, of both sexes, aged between zero and under 12 months participated in the study and were evaluated by the Child Behavior Development Scale in the first year of life. The participants were divided into three groups: normal development (ND), regular development (RD), risk or delay group (RDG). The results showed that 48% of the children evaluated were classified with risk or delayed development. We concluded that children who live in peripheral regions should participate in screening and intervention programs so their chances of presenting a risky development could be minimized.

KEYWORDS: Child development; Evaluation; Primary prevention; Child.

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RESUMO: O desenvolvimento infantil tem sido objeto de estudo frequente considerando os diferentes fatores de risco apontados na literatura. Este estudo teve como objetivo avaliar o comportamento motor de crianças nascidas a termo na Zona Noroeste de Santos. Participaram 50 crianças, na faixa etária entre zero e 12 meses incompletos, de ambos os sexos, que foram avaliadas pela Escala de Desenvolvimento do comportamento da criança no primeiro ano de vida. Os participantes foram divididos em três grupos: grupo de desenvolvimento normal (GDN), grupo de desenvolvimento regular (GDR), grupo risco ou atraso (GRA). Os resultados mostraram que 48% das crianças avaliadas foram classificadas com risco ou atraso para o desenvolvimento. Pode-se concluir que crianças que vivem em comunidades nas regiões periféricas devem participar de programas de triagem e intervenção para que possam ter minimizadas as chances de apresentarem riscos ao desenvolvimento.

DESCRITORES: Desenvolvimento infantil; Avaliação; Prevenção primária; Criança.

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INTRODUCTION

Motor development has been studied by several researchers based on theories that guide the relationship of the child with his neurophysiological development and his involvement with the environment. Until the mid-20th century, motor development was studied under the prism of the neuromaturational theory, to which evolution would occur naturally from the myelination of the nervous system. The Dynamical Systems theory, quite accepted nowadays, relates the development of the child to a set of systems that interact and promote the acquisition of specific skills, whereas neurological maturation as one of the important factors, highlighting the influence of the environment[1].

In recent decades, especially in the United States and European countries, early stimulation programs underwent transformations. For this new approach, the stimulation received a new name −early intervention (from Spanish *atención temprana*), which is equivalent to a set of interventions aimed at children from zero to six years considering the family and the context in which the child is inserted, always aiming to promote the child development[2,3].

Several factors, however, may put at risk the normal course of a child's development. A number of biological or environmental conditions that increase the odds of the child's neuropsychomotor development are defined as risk factors[4].

One of the main causes of motor delay include low birth weight, maternal education, and socioeconomic conditions. The higher the number of risk factors involved, the higher the possibility of a compromised development[5,6].

Children who are at risk of delay deserve attention and specific actions so that motor problems do not extend into adulthood. In addition, motor delays are often associated with secondary losses of psychological and social order that hinder the child's socialization and school performance[7].

Pre, peri, and postnatal factors are more frequent in low-income populations and can influence the development of the child, justifying development monitoring procedures of early childhood in children attending day care or needy populations that may be exposed to risks[3,8].

Child development should be a matter of concern to different health professionals. It is this staff's responsibility to carry out the therapeutic intervention efficiently. All the actions focusing on healthcare deserve interdisciplinary attention[9]. In particular, physiotherapists and occupational therapists must contribute to the research on child development, especially those related to motor acquisitions, both in healthy infants and in the ones exposed to risk factors[10].

Thus, preventive actions on development changes depend on the knowledge about normal and regular development of motor acquisitions, which shall be the base to plan the treatment program. The period in which the intervention is proposed should also be considered. In the first years of life, there is a bigger brain plasticity, which allows the optimization of gains in motor development. In this context, various research showed improvement in the acquisition of motor skills in children who receive early stimulation[11].

A careful evaluation is necessary to plan an efficient intervention, which considers other factors besides the clinical impression. For early identification of deviations, both of growth and development, different tests and standardized evaluations are described in the literature. These specific instruments increase the rate of identification of children with suspected delay and allow the referral for diagnosis and intervention[12]. Most of the scales used and recognized due to their psychometric properties have been developed in other countries, with cultural characteristics not always similar to Brazil. Nevertheless, they are valuable for studies on Brazilian populations. However, the use of national scales needs to be further discussed. The *Child Behavior Development Scale: the first year of life* was developed by the psychologist Dr. Elizabeth Batista Pinto, under the guidance of Professors Raymundo Manno Vieira and Luiz Celso Pereira Vilanova[13]. Its focus is to analyze the behavior of Brazilian child in the first year of life for both sexes between one and under twelve months. With easy implementation and evaluation, it can be used by professionals of various specialties, allowing intervention strategies whenever gross and fine motor function, language and personal-social area show a slow pace for the child's age, in addition to giving important evidence in the formulation of diagnostic hypotheses of children with behavioral development changes. This can be done using the analysis of a medical history form and the application of the test of 64 behaviors contained in the scale that will be detailed on methodology[13].

Sigolo et al.[14] say that besides being standardized for the Brazilian population, this scale was developed exclusively for the age group initial to the development; it has training, capacitating material (video tape called Baby Skills) and was approved by the Federal Council of Psychology[15]. However, this instrument is still little used in national surveys.

OBJECTIVE

This study aims to evaluate the motor behavior of children born at term in the Northwest of Santos using an instrument drawn up and published in Brazil called *Child Behavior Development Scale: the first year of life*.

METHOD

Fifty children participated in this study, being 22 girls and 28 boys, aged between one and under 12 months. Inclusion criteria were: to live in the Northwest of Santos; to visit a pediatric doctor where the research was carried out; to have been born at term, i.e., after 37 full weeks of gestation. Exclusion criteria were: preterm birth; neurological diagnostics or presence of genetic syndromes; congenital malformations.

This study, of descriptive and cross-sectional nature, was submitted to the Ethics Committee of the Mackenzie Presbyterian University and approved under opinion no. 461/12/03. All participants received the information letter and signed the informed consent form.

The health unit was located in Jardim Castelo neighborhood, Northwest region, Santos. Officially established on 26 July 1976, the Northwest region celebrates 40 years in 2016 and continues expanding, both in demographic and economic aspects. The region was chosen because of characteristics related to low socioeconomic status.

The project was offered by the secretaries of pediatrics when the mothers marked the follow-up appointments for the babies, who should have been born at term among the age group between one and under twelve months.

The evaluation was carried out primarily by applying a medical history form that was answered by the mothers and/or guardians of the babies.

Participants were evaluated by the Child Behavior Development Scale in the first year of life for male and female sexes, in a room at the specialty outpatient clinic of Areia Branca; during the assessment, the mothers were informed about the development of their children and oriented about some procedures that would facilitate the development of their babies. The tests were applied in environment with pleasant temperature, in the presence of the mother or companion and the researcher, with the child awake, fed and in good health, during routine appointments for monitoring the development in the first year of life.

The results of the standardization of the Child Behavior Development Scale: the first year of life, obtained in the answer sheet, provide an evaluation of the pace of the child's development[16], whereas:

- motor behavior in its classification as to the somatic axis, in axial motor behavior or appendicular motor behavior, and regarding the stimulation, in spontaneous motor behavior or stimulated motor behavior;
- activity behavior, regarding the communication, in non-communicative activity behavior or communicative activity behavior.
- The pace of development of the child's behavior from one to twelve months can be considered, in each of the classifications of behavior adopted, regarding age:
- Excellent: when was observed each behavior, obtaining "+" in all those that appear (A), normalize (N), and stabilize (S);
- Good: when each behavior was observed, obtaining "+" in all those who normalize (N) and stabilize (S), and "-" only in behaviors that appear (A);
- Regular: when each behavior was observed, obtaining in behaviors that normalize (N) both "+" and "-", "+" in the ones that stabilize (S), and "-" in behaviors that appear (A);
- At risk: when each behavior was observed, obtaining "+" only in behaviors that stabilize (S) and "-" in behaviors that appear (A), and normalize (N);
- Delay: when was observed each behavior, obtaining "-" in all those behaviors that appear (A), normalize (N), and stabilize (S);

RESULTS

Participating families were composed on average of two children, 39 of them were married mothers, 10 were single, and one was a widow. The family schooling obtained by interview showed that none of the mothers was illiterate, two had some elementary education, twelve had finished elementary education, two had not finished high school, 34 had finished high school, and no one had higher education.

Research showed that of the 50 mothers, only 20 were working in the following occupations: house cleaner, office assistant, general services assistant, manicurist, merchant (diner). Of the 50 fathers, 40 worked, the others were: one retired, one deceased, and eight unemployed. The

functions they occupied were: fisherman, general services assistant, driver, mechanic, bricklayer, upholsterer, janitor, and hawker.

The housing condition and the type of construction were characterized by 32 families that lived in masonry houses with two bedrooms and one bathroom, 12 families that lived in buildings of one or two bedrooms and one bathroom, and seven families that lived in wooden houses of one or two bedrooms and one bathroom.

Regarding gestation, data showed that all 50 occurred at term (minimum of 37 weeks and maximum of 42 weeks). Twenty-six mothers underwent natural delivery, 21, c-section, and three, forceps delivery.

The birth weight was between 2-3 kg for 18 children and above 3 kg for 32. Twenty-four mothers did not inform the Apgar score. For the rest, it ranged between seven and ten.

During the first year of life, six children were hospitalized for several reasons, including jaundice, meconium aspiration, immaturity of the respiratory system, and various infections.

Only four children showed, according to the mother, chronic diseases, including congenital torticollis, congenital dislocation of the hip, pneumonia, and anemia.

In the group studied, 48 children were fed only with breast milk until six months and two children were fed with powdered milk.

Evaluating the scale of behavior development

The 50 children evaluated were divided into three groups: normal development (ND), regular development (RD), risk-delay group (RDG). This division was proposed for this study aiming to group common characteristics among children based on the results found in each of the eight areas evaluated, to facilitate the understanding of the participants' pace of development. The groups were thus characterized as:

- Normal development group (ND): composed of children who presented excellent and/or good behavior for the items observed in the scale adopted;
- Regular development group (RD): composed of children who showed behaviors classified in at least one item evaluated as regular, the remaining being classified as good or excellent;
- Risk or delay group (RDG): composed of children who obtained classification of risk or delay in at least one of the items evaluated

Figures from 1 to 5 show the distribution of children in their respective groups, identifying the differences between sexes.

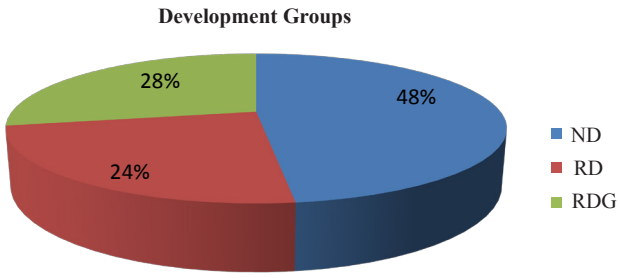

Figure 1 – Distribution of children in the groups evaluated

Within the normal development group (ND), with twelve children in total, 50% were male and 50% female. Figure 2 shows this distribution.

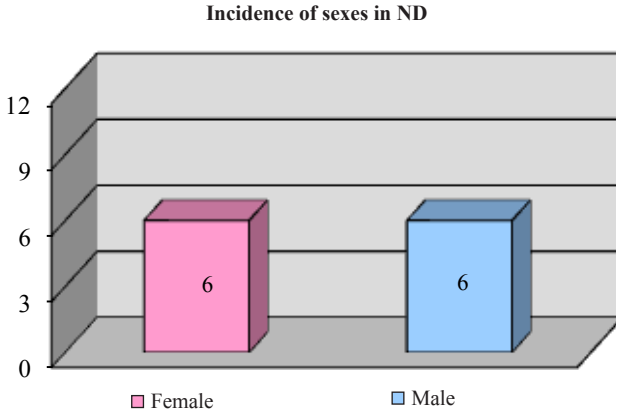

Figure 2 – Incidence values regarding sex in ND

The regular development group (RD), showed in Figure 3 is composed of fourteen children in total, 42.8% being female and 57.1% male.

The risk-delay development group (RDG), however, contains twenty-four children among the total evaluated, even though they are part of the subgroup risk and eighteen are within the subgroup delay, showed in Figure 4.

The subgroup risk was represented by three girls (50%) and three boys (50%), while the subgroup delay consisted of seven girls (38.8%) and eleven boys (61.2%), showed in Figure 5.

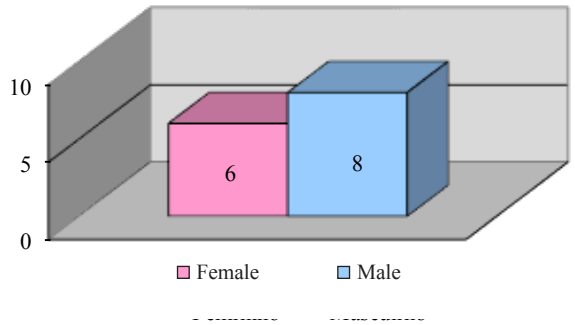

Figure 3 – Incidence values regarding sex in RD

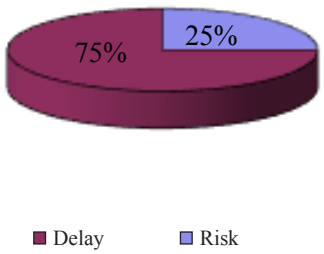

Figure 4 – Representation of the subgroups within the RDG

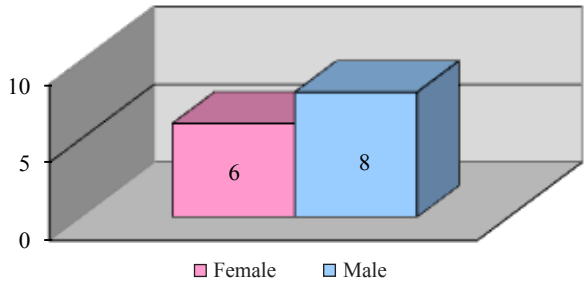

Figure 5 – Incidence of sexes in subgroups risk and delay

DISCUSSION

Integral attention to the health of the child must be the main focus in community programs, whereas that primary prevention should ensure regular monitoring and offering of conditions and guidelines to develop and optimize the child's potential. This segment must count on the support of the family, the community, and the professionals involved with health and education, favoring the familiar welfare[17].

The region where this study was carried out is characterized by the great number of inhabitants living in slums, who are, therefore, more subjected to diseases and violence. The index of infant mortality is quite high, revealing the need for prevention in the different spheres of health care of this population. These data are in agreement with the literature that refers to socioeconomic status as a risk factor to the development[4,5,6].

The group evaluated showed some characteristics that confirm the relevance of choosing the region studied. Most families lived in masonry houses (32), buildings (11), and wooden houses (7), however, one of the limitations of the questionnaire applied refers to the lack of information about the home space, i.e., if it was favorable to the conditions for environmental exploration and children's games. Many of these houses were coming from projects made by *Companhia de Habitação da Baixada Santista* (COHAB) and *Companhia de Desenvolvimento Habitacional Urbano* (CDHU) in partnership with the City Hall. Other gaps were observed during the application of the medical history form. Other relevant information were available, representing a limitation of the study, such as the family structure (total income, income management, changes of residence); characteristics of family dynamics (family/society relationship, family/relatives, family/neighbors, leisure/community); the couple's relationship (harmony, issues regarding children, economy, sex, life goals, temperament, parenting), among other things.

Although most parents have finished high school, (34) mothers and (30) fathers, professional activities were carried out in trade points and small business services, such as; bazaars, supermarkets, bakeries, mechanical workshops, shops of building materials, fishing boats, auxiliary of general services, services that refer to low income. We observed that schooling has been pointed out as a risk factor[18,19], however the group evaluated, although not characterized by parents with low schooling level, showed large percentage of risk, perhaps more associated with environmental and socioeconomic conditions[3,6,18,20].

The results show that about 48% of the children evaluated (24) showed delay in some of the areas of development, or in a risk zone for development. This index can be considered quite high, since the exclusion criteria predicted the non-participation of children, which can lead

to delay in every area. The common element in the group studied was the residence in the Northwest area of Santos.

The influence of the environment on the child's development based on the theories of development, e.g., the Dynamical Systems Theory in which the development depends on activities and demands of the environment, enhancing the self-organizing properties of the sensorimotor system[1].

Saccani et al.[18] relate human development with effects that come from family, environment, and society. These authors claim that biological problems can be modified by environmental factors and that certain situations of vulnerability can have the etiology related to social and environmental factors. The association of low family income, low schooling level, and long period of deprivation exert negative effect on child development.

Other authors examined the influence of the home environment on the development of motor skills, and the results showed that children aged 18 months and 5 years, consistently, showed worse performance in gross motor skills[20]. On the other hand, studies considered that demographic factors, therefore sociodemographic, are more associated with the fine motor performance[21].

The importance of family socioeconomic conditions in cognitive development of children has been confirmed in other studies. In one of them, researchers evaluated children aged 5 years, whereas the low family income, the duration of the deprivation, and maternal education. The association of low family income, low schooling level, and long period of deprivation exert negative effect on child development[18,19]. Studies carried out with malnourished Korean children, adopted into American homes, showed that they had a satisfactory development with the environmental enrichment, only if the motivation was prior to 2 years of age and offered by a period sufficiently long[22].

Family participation goes beyond the parental figure; it may include other relatives, caregivers and even the community, enabling the development of stimulation strategies from the space where the child lives. The authors suggest that without family involvement, intervention tends not to succeed, and the few effects achieved are likely to disappear when the intervention is discontinued. Thus, we highlight the importance of the child's interaction with the environment (body, home, day care, school, neighborhood) as a mechanism responsible for the child's development[23].

The evaluation of the behavior development through the *Child Behavior Development Scale* – EDCC may favor early detection of delays and difficulties in the development of behavior and contribute to prevent the adverse effects on the child, either in the detailed planning of stimulation strategies, in the referral to specialists, or in the improvement of parental knowledge and sensitivity on the child's development with a possible reduction of disturbance in the interaction between parents and child[13,14]. Also, as an additional benefit, the assessment of the baby using the *Child Behavior Development Scale* – EDCC in the presence of the parents, can be a preventative form of intervention, which enables parents to know better the skills and characteristics of their baby's behavior, possibly enabling them to respond better to the adaptive needs of the child and to establish with it more satisfactory interaction[13].

Almeida et al.[24] conducted one study aimed at investigating the influence of a motor intervention program on the baby's behavior in the third trimester of life in low-income day cares. Visual pursuit tasks, handling of the toy and of the postural control of the baby were implemented in the intervention program. The evaluations of the babies were carried out with the application of the Child Behavior Development Scale in the first year of life[16], at the beginning and at the end of the period of intervention. The results suggested that babies of the Intervention Group (n=20) showed significantly higher performance in post-intervention compared with the Control Group (n=20) and positive gains from pre to post-intervention. However, positive and significant changes were not observed in the Control Group. They concluded that, evaluations and motor intervention programs provide positive changes in the babies' behavior in the third trimester in low-income day cares.

Studies indicating risks to child development must be considered in the development of Public Policies so that any factor that might compromise the conditions of growth and development in childhood is minimized. Brito et al.[25] highlight the need to pay attention to observation and monitoring of the development in the first five years of life, so that possible changes are not perceived. For the authors, the early intervention must be considered to mitigate gaps of development for children in this age group.

It was possible to conclude that the children evaluated in this study showed a significant delay in their development, although they were born at term, with good weight at birth, satisfactory Apgar score, having been breastfed by his mother until the age of six months and were born from mothers of middle cultural level. We believe that the contributing factors for the results are based on the socio-environmental context of these children. The physical environment, the relational context family-mother-child, social context (community).

The instrument used was sensitive to detect changes in motor behavior of the group evaluated. However, it is becoming increasingly relevant to extend the concentration of efforts for the triad consisting of child-family-society and not just in the developing child, to favor the effectiveness in the preventive actions for the implementation of clarification and guidance projects to the community, to the families of the pregnant women, to raise awareness of pregnant women on normal motor development of children and the stimulation proper to their steps. Thus, periodic evaluations of the babies with their mothers, guidance regarding the handling and mobilization of the child since birth and lectures on playing and the environmental influence on biopsychosocial development would be fundamental to the development of needy populations.

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