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Language abilities performance of children born preterm and low birth weight and associated factors

Desempenho nas habilidades da linguagem em crianças nascidas prematuras e com baixo peso e fatores associados

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ABSTRACT

Purpose: To examine the language development at chronological age 2 to 3 years of children born preterm with low birth weight and its associated risk factors. **Methods:** In this cross-sectional study, children were assessed using the Denver Developmental Screening Test (Denver II test) and Early Language Milestone Scale (ELM scale). The chi-square test was used and all variables with p<0.20 were entered in a binary logistic regression model; statistical significance was set at p<0.05. **Results:** Among the 77 children studied, 36.4% had abnormal Denver II test performance in its four sectors and 37.6% had cautions and delays in the area of language specifically. On assessment of language ability by the ELM scale, 32.5% of the children showed altered responses. The abnormal performance of the four sectors of the Denver II and language in the ELM scale, after logistic regression, remained associated with suspected developmental abnormalities by parents (Denver II and ELM), weight less than 1500 g and caesarean section (Denver II only), and intracranial hemorrhage and family per capita income less than half the minimum wage (ELM only). **Conclusion:** Children born preterm with low birth weight showed delayed language development, with greater impairment in the expressive auditory function associated with socioeconomic risk factors and child's history.

Keywords: Infant, premature; Infant, newborn; Risk factors; Language development; Screening

RESUMO

Objetivo: Analisar as habilidades do desenvolvimento da linguagem em crianças de 2 a 3 anos de idade, nascidas prematuras e com baixo peso e os fatores de risco associados. **Métodos:** Estudo transversal com aplicação do teste de Denver II *(Denver Developmental Screening Test)* e escala ELM *(Early Language Milestone Scale)*. Foi utilizado o teste de Qui-quadrado e todas variáveis com p<0,20 entraram no modelo de regressão logística binária, nível de significância (p<0,05). **Resultados:** Das 77 crianças avaliadas, 36,4% apresentaram desempenho global alterado no teste de Denver II, considerando os quatro setores, e 37,6% apresentaram cautelas e atrasos no setor da linguagem, especificamente na avaliação da habilidade de linguagem pela escala ELM, 32,5% das crianças apresentaram alterações. O desempenho alterado, considerando os quatro setores do teste de Denver II e da linguagem na escala ELM, após regressão logística, permaneceu associado com: suspeita dos pais de alterações no desenvolvimento (Denver II e ELM); peso <1500 g e cesariana (Denver II somente); hemorragia intracraniana e renda familiar mensal *per capita* ≤1/2 salário mínimo (ELM somente). **Conclusão:** Crianças nascidas prematuras e com baixo peso apresentaram atraso na aquisição de habilidades no desenvolvimento da linguagem, com maior comprometimento da função auditiva expressiva, associado a fatores de risco socioeconômicos e de histórico.

Descritores: Prematuro; Recém-nascido; Fatores de risco; Desenvolvimento da linguagem; Triagem

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INTRODUCTION

The birth of premature children (gestational age under 37 weeks) is a global health problem. The increased survival of premature babies is due to the expansion of access to health services and advances in the assistance provided to pregnant women and these children, both through technological evolution of the advanced support equipment and specialized training of the health professionals who provide this type of service within neonatal intensive care units (ICU)[1].

The prognosis of children born preterm and with low birth weight can be compromised because it depends on the complex interaction between biological and environmental factors related to intensive care, technology, and human resources trained for such assistance[1-3].

The risks of morbidity and mortality are increasing with the growing prematurity rate; consequently, there is higher risk of developmental disorders. Prenatal biological risk factors for developmental disorders include hypertension and maternal diabetes, congenital infections, and alcohol and drug use during pregnancy. Perinatal risk factors include prematurity, low birth weight, neonatal asphyxia, hyperbilirubinemia, intracranial hemorrhage, convulsive crisis, and infections, among others. Further risk factors include some environmental aspects such as poor health care and education, socioeconomic factors, family environment, accidents, and violence[4].

Health care for children born preterm must not only be directed at reducing mortality but should also be redirected on follow-up after release from the ICU, with particular attention to the morbidities associated with prematurity, ensuring children's quality of life, and improving their performance in school, adolescence, and adulthood[2].

The pre- and postnatal complications observed in children born prematurely with low birth weight can cause impairments in cognitive and motor abilities, as well as in areas of attention, memory, language, and visual–motor and visual–spatial coordination, which can be detected early or at later stages of life[5,6].

Prematurity and low birth weight are risk factors for impaired development of speech and language[6]. Deviations of language development can occur in auditory receptive (AR) and/or auditory expressive (AE) and/or visual (V) functions, leading to a poorer expressive vocabulary[7]. Losses in language ability can cause problems in learning to read and write, poor school performance, and consequent social and affective issues[8].

The essential expansion of health care to children born preterm with low birth weight in various regions of the country requires the dissemination of evaluation methods and more studies on their development. It is necessary to observe and assess in more detail the various aspects of communication, such as the use of gestures, production of verbalizations, construction of words and phrases, vocabulary, and morphologic and syntactic complexity, in addition to the imitation and understanding of communicating with others[9,10].

Few studies exist regarding the development of preterm newborns with low weight in the State of Mato Grosso (MT). The aim of this study was to analyze the language skills of children aged 2 to 3 years who were born prematurely and with low birth weight in the municipality of Cuiabá (MT) and evaluate the association between potential risk factors and language performance.

METHODS

This research is part of a project that was submitted and approved by the Research Ethics Committee of the Júlio Müller University Hospital from the Universidade Federal de Mato Grosso (UFMT), protocol no. 967/2010. Only children whose parents or guardians accepted the invitation to participate and signed the Free and Informed Consent Form were included in the survey.

This cross-sectional analytical epidemiologic study included a group of children who were born prematurely with low birth weight, with chronological ages between 2 and 3 incomplete years. The study was carried out with children born in hospitals that had a neonatal ICU, three insured by the Unified Health System (SUS), and in a hospital belonging to the supplemental healthcare system in the municipality of Cuiabá (MT) in the central-west region of Brazil.

In order to calculate the sample, we used the proportions method, performing a survey of the number of children born premature with low birth weight in 2009 in Cuiabá-MT, by mother's residence, using data from the Information System on Live Births (SINASC). This search identified 411 children under these conditions. Based on the average results obtained in studies[11,12], the percentage of children born preterm with low birth weight who showed changes in speech and language development was approximately 21%, which was used for sample size calculation. Taking into account a sample error of 7%, the calculated sample size was 75 children.

Inclusion criteria were as follows: gestational age under 37 weeks and low birth weight (less than 2,500 grams), births occurring in maternities included in the search, and chronological age between 2 and 3 incomplete years at the time of assessment. Exclusion criteria were as follows: children with low birth weight, non-premature, preterm children without low birth weight, presence of any congenital malformation and/or neurologic problem and/or hearing disability and/or visual impairment that could interfere with or render the application of the chosen tests unpractical.

Some of the participating children were located directly in hospitals with outpatient follow-up of premature infants. We performed searches in the hospital information system records in order to gather the addresses and telephone numbers of the remaining children.

Parents were initially contacted by telephone, but some were contacted directly at their homes through a messenger. Seventy-seven children were included and evaluated, two more than the calculated sample size. An initial interview was conducted with the guardians, in addition to completion of a data collection sheet and application of screening instruments in an individual outpatient room.

The dependent variables were considered the results of the Denver Developmental Screening Test II (Denver II test)(13) and the Early Language Milestone (ELM) scale(14). The Denver II test(13) enables evaluation of the four sectors of development: personal–social, fine motor–adaptive, language, and gross motor. This instrument is routinely used in clinics for the follow-up of premature infants in the hospitals of Cuiabá, capital of Mato Grosso (MT)(15,16). The ELM scale(14) provides a similar way of applying the Denver II test, enabling screening of language skills and delineating which language function is compromised: Auditory Receptive, Auditory Expressive, and Visual.

For the assessment of the Denver II test sectors in children aged between 2 and 3 years, we used the following items:

- Personal–social sector: changes clothes, feeds doll, wears clothes, brushes their teeth with help, washes and dries their hands, names friends, puts t-shirt on, gets dressed without help, plays cards, brushes their teeth without help, and prepares food;
- Fine motor–adaptive sector: builds a tower with four cubes, builds a tower with six cubes, copies a vertical line, builds a tower with eight cubes, wiggles thumb, copies a circle, draws people with three parts, copies a cross, and picks a long line;
- Language sector: shows two figures, combines words, names a figure, names six body parts, shows four figures, speaks half of their words understandably, names four figures, knows two actions, knows adjectives, names a color, uses two objects, counts a block, uses three objects, knows four actions, speaks all words understandably, understands four prepositions, names four colors, and knows three adjectives;
- Gross motor sector: kicks the ball forward, jumps, throws the ball over shoulders, jumps high, balances foot for one second, balances foot for two seconds, and balances foot for three seconds.

We only applied the Denver II test items corresponding to the age line drawn for each participant, according to their age.

To verify the applicability and viability of tests, a pilot study was conducted with ten children from a daycare center, without history of prematurity and low birth weight, who were not a part of the sample.

Both evaluations performed with the research participants were made from a line drawn on the child's chronological age that included the tests to be evaluated. The items or tests were represented by rectangles showing the test age limit percentiles. The child passed the Denver II test if they performed it successfully. For the items in which the child failed, the percentiles represented the cut-off points to define: delays, 90th percentile (p90) to the left of the age line; caution or attention, age line between p75 and p90; and failed age line between p25 and p75. Taking into account the number of delays and cautions, the classification of the test performance was regarded as:

- Normal: the child showed no delay or demonstrated only hesitation in all tests from the four sectors;
- Suspected: the child showed only a delay or two or more cautions in all tests from the four sectors;
- Abnormal: the child showed two or more delays in one or more of the analyzed sectors.

Denver II test performance was analyzed according to its application instructions, with all the four sectors considered in the statistical analyzes. For statistical analysis, the suspected and abnormal results were grouped and named *changed* and those deemed normal were categorized as *appropriate*.

The ELM scale assesses the language milestones grouped in functions: AR, AE, and V. Behaviors are shown in a single-page chart and divided into 36 months, allowing designation of the location of each item and the month in which ability started.

ELM behaviors of children aged 2 to 3 years are distributed in accordance with the following functions:

- Auditory Expressive: says four to six unique words, more than 50 unique words, says I/you, uses prepositions, conversation, names, and uses objects (glass, ball, spoon, and pencil);
- Auditory Receptive: follows two orders without gestures, indicates named objects, indicates objects described by use, and orders/spatial notion;
- Visual: follows an order with gestures, starts to sign games, indicates desired objects (last three items up to 18 months of age).

As previously mentioned, the participants evaluated in this study had a chronological age between 2 and 3 years at the time of the exam. This influenced the language Visual function assessment, which is included in the ELM scale until age 18 months. However, it did not interfere with the testing because all studied children met the requirement of being within the age range and performed the last three elements of the Visual assessment.

The test results were considered *appropriate* for the evaluated area when the child obtained, sequentially, up to three items of success corresponding to the chronological age. It was considered a *failure* or *altered* when the child did not perform a test placed completely to the left of the age line, i.e., above p90, and three more consecutive failures were identified sequentially in the evaluated area.

When the performance of one of the instruments was changed, retests were performed for up to 2 weeks. All children with changed performance were referred for specialized care. Parents' reports and the direct or incidental observation of the evaluated behavior were considered.

The independent or explanatory variables deemed as risk factors were divided into three groups: a) child-related, gender, race/ethnicity, gestational age, birth weight, type of delivery, hospitalization time in the neonatal ICU, Apgar score, and breastfeeding time by mother only; b) neonatal diagnostics, those documented in hospital medical records; c) socioeconomic, participation in stimulation program, daycare attendance, suspected developmental change, number of siblings, time of maternal education, and family income.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 17.0 (SPSS Inc., Chicago, IL, USA). In order to verify the association between the independent variables and test performance (dependent variable), the Chi-square test ($p<0.05$) with Yates' correction was used. All variables with $p<0.20$ were entered in the binary logistic regression model, and a few differences were noted in those remaining in the final model ($p<0.05$).

RESULTS

For the Denver II test, 63.6% of the results were deemed normal, 15.6% were considered suspected, and 32.5% were considered abnormal. For the ELM scale, 67.5% of AE function results were appropriate and 32.5% were changed. AR function results were appropriate in 81.8% of participants and altered in 18.2%. One hundred percent of Visual function results were appropriate. Figures 1 and 2 show the overall performance in the Denver II test and ELM scale, respectively.

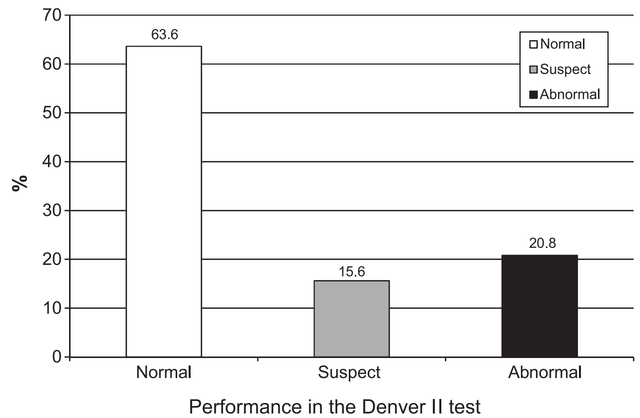

Figure 1. Performance of the evaluated children (n=77) on the Denver II test

In the Denver II test language sector, 37.6% of results contained cautions and delays.

Table 1 shows the frequencies of abnormal results and associations with the overall performance in the Denver II test and ELM, according to the analyzed risk variables.

Tables 2 and 3 show the variables that remained in the binary logistic regression final model, elaborated from the inclusion all risk variables ($p < 0.20$) for the four sectors, for the Denver II test and ELM language analysis, respectively.

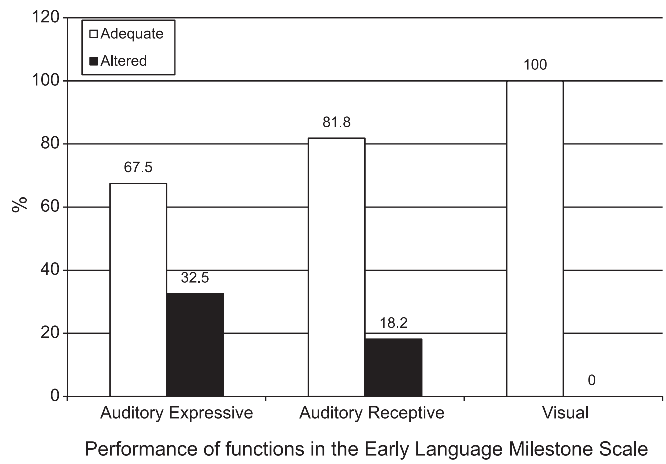

Figure 2. Early Language Milestone Scale performance of the evaluated children (n=77) according to auditory expressive, auditory receptive, and visual functions

DISCUSSION

According to retrospective studies[3,5,6], children who are born prematurely show some variability in the risk factors related to developmental changes. These findings reinforce the multifactorial characteristics of the developmental process and the cumulative concept of risk. Phenomena of this nature can be explained by multicausal models and not only by isolated factors, regardless of whether they are biological or environmental[17]. In order to evaluate the association between risk factors and language skills performance, we chose some of the factors most commonly used in other studies to assess the development of preterm infants.

In similar studies, assessment of biological and socio-economic factors in the search for risk factors or those associated with compromised global and language development has also shown positive results[12,18].

The identification of developmental changes using the Denver II test and compromised language in the AE area, and on a smaller scale in the AR area, using the ELM scale assessment, are in accordance with other studies[7,19].

It must be noted that, among the changes observed in the Denver II test, changes in language skills were predominant. A similar result indicated that deviations in language are receptive to immaturity in abilities and tasks that involve duration and direction of attentive focus[19]. On the other hand, the changes in expressive language could be associated with the biological factors of these children or the age-related delay or social factors that can improve with adequate environmental stimulation[20].

Some studies[6,20,21] demonstrated that the smaller the gestational age and birth weight, the higher the chance or risk for developmental changes, which can be observed in various aspects of infant growth such as motor, cognitive, language, auditory, emotional, and others. Low birth weight is a risk factor for impaired language development[22].

Table 1. Performance in Denver II Test and Early Language Milestone Scale (n=77)

Variáveis		Performance in Denver II test				p-value	Performance in ELM				p-value
		Abnormal		Normal			Abnormal		Normal		
		n	%	n	%		n	%	n	%	
Gender	Male	20	44.4	25	55.6	0.080	16	35.6	29	64.4	0.493
	Female	8	25.0	24	75.0		9	28.1	23	71.9	
Race/ethnicity	White	6	26.0	17	74.0	0.221	6	26.1	17	73.9	0.435
	Black	22	40.7	32	59.3		19	35.2	35	64.8	
Gestacional age (weeks)	≥34	10	25.0	30	75.0	0.031*	9	22.5	31	77.5	0.052
	<34	18	48.6	19	51.4		16	43.2	21	56.8	
Birth weight (grams)	1,500-2,499	17	28.3	43	71.7	0.006*	16	26.7	44	73.4	0.041*
	<1,500	11	64.7	6	35.3		9	52.9	8	47.1	
Delivery	Normal	3	14.3	18	85.7	0.014*	3	14.3	18	85.7	0.037*
	Caesarian	25	44.6	31	55.4		22	39.3	34	60.7	
Hospitalization time (days)	<30	20	33.1	40	66.7	0.299	19	31.7	41	68.3	0.778
	≥30	8	47.1	9	52.9		6	35.3	11	64.7	
Apgar first minute	0 to 6	7	41.2	10	58.8	0.640	7	41.2	10	58.8	0.385
	7 to 10	21	35.0	39	65.0		18	30.0	42	70.0	
Apgar fifth minute	0 to 6	3	75.0	1	25.0	0.264†	3	75.0	1	25.0	0.188†
	7 to 10	25	34.2	48	65.8		22	30.1	51	69.9	
Breastfeeding time by mother exclusive (days)	<180	16	39.0	25	61.0	0.604	14	34.1	27	65.9	0.737
	≥180	12	33.3	24	66.7		11	30.6	25	69.4	
Intracranial hemorrhage	Yes	7	58.3	5	41.7	0.085	7	58.3	5	41.7	0.037*
	No	21	32.2	44	67.7		18	27.7	47	72.3	
Jaundice	Yes	16	48.5	17	51.5	0.056	16	48.5	17	51.5	0.009*
	No	12	27.3	32	72.7		9	20.5	35	79.5	
Respiratory distresses	Yes	27	38.6	43	61.4	0.389†	23	32.9	47	67.1	1.000†
	No	1	14.3	6	85.7		2	28.6	5	71.4	
Neonatal infection	Yes	12	63.2	7	36.8	0.005*	11	57.9	8	42.1	0.006*
	No	16	27.6	42	72.4		14	24.1	44	75.9	
Attends daycare/school	Yes	6	30.0	14	70.0	0.492	6	30.0	14	70.0	0.784
	No	22	38.6	35	61.4		19	33.3	38	66.7	
Participates in intervention/ stimulation program	Yes	2	66.7	1	33.3	0.616†	2	66.7	1	33.3	0.508
	No	26	35.1	48	64.9		23	31.1	51	68.9	
Suspected of altered developmental by parents	Yes	11	73.3	4	26.7	0.001*†	12	80.0	3	20.0	0.000*†
	No	17	27.4	45	72.6		13	21.0	49	79.0	
Maternal education time (years)	≤9	10	50.0	10	50.0	0.192	7	35.0	13	65.0	0.528
	>9≤12	13	28.3	33	71.7		13	28.3	33	71.7	
	>12	5	45.5	6	54.5		5	45.5	6	54.5	
Paternal education time (years)	≤9	10	40.0	15	60.0	0.761	8	32.0	17	68.0	0.749
	>9≤12	13	3.5	27	67.5		12	30.0	28	70.0	
	>12	5	41.7	7	58.3		5	41.7	7	58.3	
Monthly Family per capita income (minimum wage)	≤1/2	13	38.2	21	61.8	0.761	14	41.2	20	58.8	0.147
	>1/2	15	34.9	28	65.1		11	25.6	32	74.4	
Number of siblings	≤3	28	37.8	46	62.2	0.469†	25	33.8	49	66.2	0.551†
	>3	0	0.0	3	100.0		0	0.0	3	100.0	

*Significant values ($p<0.05$) – Chi-square test; † Yates correction

Note: ELM = Early Language Milestone Scale

Table 2. Binary logistic regression analysis of the independent variables associated with global performance in the Denver II test that remained in the final model

Variables	p-value	Odds ratio	95% CI
Suspected of altered developmental by parents	0.000*	15.146	3.423-67.024
Birth weight < 1,500 grams	0.001*	0.109	0.029-0.417
Caesarian section	0.040*	0.203	0.045-0.929

*Significant values (p<0.05) – Forward Wald's test
Note: CI = confidence interval

Table 3. Binary logistic regression analysis of the three independent variables associated with Early Language Milestone Scale performance that remained in the final model

Variables	p-value	Odds ratio	95% CI
Suspected of altered developmental by parents	0.000*	54.679	8.949-334.105
Intracranial hemorrhage	0.002*	13.051	2.651-64.242
Monthly family per capita income	0.028*	5.122	1.190-22.046

*Significant values (p<0.05) – Forward Wald's test
Note: CI = confidence interval

Analyses of the risk factors and test results showed that there was an association between gestational age and performance on the Denver II test; however, we did not observe an association between this variable and the ELM results. However, there were more compromised results in both tests among children with very low weight. Perhaps these results can be justified by considering that, in the Denver II test, the final classification includes changed responses in the four sectors (gross motor, fine motor-adaptive, language, and personal-social), which can interfere with the different answers when the two methods are used.

Gestational age and birth weight are the major determinants of perinatal complications and are related to postnatal developmental deficiencies. The brain development interruption of the preterm child can lead to anatomic and structural changes, thus increasing the chances of developing motor and cognitive disorders. This justifies the risk of language-related impairments for children with low birth weight and lower gestational age(17,23).

Cesarean sections were predominant in this study and were associated with changed performance results in the Denver II and ELM tests. Data from SINASC show that the cesarean section was the preferred birth method for preterm children with low weight in Cuiabá in 2008 and 2009. Although literature data show a lack of association between the delivery type and suspected developmental delay(20), as an emergency option in many obstetric conditions of high prevalence in our community, the cesarean section was the most used delivery type in mothers with high incidence of pre-eclampsia and was related to complications resulting from prematurity in a group of children with very low weight(5).

Another risk factor associated with the language changes on bivariate analysis was the occurrence of intracranial hemorrhage. In this study, intracranial hemorrhage was not classified with levels of severity because few data were found in medical records and there was a lack of uniformity and standardization of the ultrasound techniques used and appropriate time for carrying out these exams. The studied population had a higher percentage of late preterm babies and was less prone to the most severe forms of intracranial hemorrhage(24). According to the exclusion criteria of this study, children with severe neurologic changes and motor disorders were removed from the sample. Nevertheless, multivariate analysis showed that the occurrence of intracranial hemorrhage remained associated with language changes, which is in accordance with findings demonstrating that even preterm children with less severe bleeding may develop cognitive disorders diagnosed at a later stage(24).

Preterm infants are at risk for intrauterine and postnatal infections that can be associated with changes in late neurologic development(25). Neonatal sepsis contributes to the occurrence of changes in child development and increases the risk of cerebral palsy(26). The circumstances leading to a preterm birth, maternal chorioamnionitis and neonatal infection, may increase the risk of injury to the white matter and the incidence of periventricular leukomalacia, intracranial hemorrhage, and consequent impairment of neuropsychomotor development(25).

In this study, similar to the occurrence of infection, the occurrence of jaundice did not take account for the magnitude of the clinical phenomena and diagnostic criteria, because we used data from different hospital services. The existence of an association among these items in the bivariate analysis and their non-permanence after logistic regression, suggests that the influence of these elements on language changes reflects the effect of the combination of other risk factors.

Excluding the cases of bilirubin encephalopathy, neonatal jaundice is not a risk factor related to development(20). When we specifically assessed the jaundice association, the language draws attention to the change in the ELM performance on bivariate analysis. In the Denver II test, this association lost some relevance possibly for incorporating the assessment of other abilities from other developmental sectors. On multivariate analysis, however, none of the tests showed any association, which emphasizes that the jaundice effect could be associated with other factors. For example, sepsis is a known predisposing factor for the toxic effects of hyperbilirubinemia(25).

Among the evaluated risk factors, race/ethnicity and gender showed no association with developmental and language changes in the tests applied. It has been demonstrated that the boys' brains are more vulnerable to perinatal period insults and would be more prone to developmental and language changes, although the explanation for this phenomenon has not been fully clarified(17-23).

The occurrence of respiratory disorders also showed no association with developmental changes. The type of respiratory disorder was not reported because it was not specified in some records. In addition, the higher percentage of late preterm babies suggests that there was a higher percentage of children with milder forms of respiratory distress, which would obviously have a smaller effect on future prognostic factors.

The systematic and early follow-up of development is quite important because there is a consensus that children monitored with stimulating procedures - at a time in which the effects of brain plasticity manifest - show improvement in responses and quality of life when signs of abnormality and/or deviations are identified(27).

The school or daycare environment can also act as stimulating agent for children and positively influence their development. As we did not include children with characteristics of serious neurologic changes or major motor impairments and the population has a low daycare or school attendance rate, these factors could justify the lack of association between these variables and the changes in developmental and language abilities.

Parents are in direct contact with the child and may be the first to notice or suspect differences in their development and verbal expression. These children are compared to others of similar age in what amounts to frequent observation(28). These factors could partially explain why the variable "suspected developmental changes" showed some relevance in the analysis, both in the Denver II test and ELM scale.

Maternal education level over 5 years was positively associated with improvement in the physical environment, organization of child-oriented activities, increase in daily stimulation with child-appropriate games and materials, and greater emotional and verbal engagement between the mother and child(29). However, the present results are similar those showing that maternal and/or paternal education was not associated with developmental deviations and did not influence the verbal production of preterm children(7-28).

In numerous families with income below the minimum wage and mothers with a low education level, a growing percentage of newborn baby births with low weight can be observed. The factors associated with this trend include poor access to health services and poor child nutrition due to food purchasing power restrictions(30). In a study designed to evaluate the expressive language of premature children compared with term children, we found a positive association between family income and the number of words spoken per sentence, in other words, the higher the family income, the higher the phrasal extension used by the child(7). There was no difference in the comparisons with family income performed in this study, possibly because the Unified Health System is more socially homogeneous. In accordance with another study, the number of siblings did not influence the developmental evaluations(29).

The children who participated in this study came from the neonatal ICU, where they survived after receiving care from trained multidisciplinary and highly specialized teams with the aid of a high technological, diagnostic, and therapeutic investment. The majority of them were released without referral to the specialized multidisciplinary team and without using all these resources invested for their survival. It is concerning that almost half of this sample was from families with a monthly per capita income below the poverty line. A considerable percentage of the studied children will need multidisciplinary health care in order to reach their somatic and neurologic potential and overcome difficulties in their development, as demonstrated here.

Poverty hinders access to health services and multidisciplinary care, including participation in preterm follow-up programs, as well as adequate nutrition and the best educational conditions. There is a need for greater knowledge about the effect of socioeconomic variables and life conditions of children coming from neonatal ICUs for better targeting of public health policies in this population.

Owing to its transversal nature, this study has limitations inherent to its design, which precluded us from identifying whether the changes observed in the language ability of the studied children are permanent or transitory. The effect of biases should also be considered because data collection was performed retrospectively, through interviews with parents or guardians and data collection from patient records without uniformity of conduct among different services.

The language development in preterm children with low birth weight aged between 2 and 3 years may show some changes, even if transitory. These results highlight the importance of public pre- and postnatal assistance policies for the longitudinal follow-up of preterm child development, directed at preventive and intervention aspects. Such policies will improve the assistance and use of financial resources for these children, providing support and follow-up until school age and avoiding losses in socialization and learning.

CONCLUSION

Preterm children with low birth weight show some delays in language development, with a more compromised Auditory Expressive function associated with socioeconomic and history risk factors. We emphasize the importance of using instruments that are specific for recognizing language disorders in the developmental assessment, as well as its relationship with other sectors and identification of the most compromised language function, in order to prepare an appropriate intervention.

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