







FACTORS ASSOCIATED WITH ACUTE HEALTH PROBLEMS IN PREMATURE INFANTS*

FATORES ASSOCIADOS A AGRAVOS AGUDOS DE SAÚDE EM PREMATUROS*

FACTORES ASOCIADOS A PROBLEMAS DE SALUD AGUDOS EN PREMATUROS*

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ABSTRACT

Objective: to analyze neonatal and socioeconomic factors associated with the development of acute health problems in late and moderate preterm infants in the first year of life. **Method:** longitudinal epidemiological study, in which 151 premature babies (born with a gestational age of 32 to 37 incomplete weeks) were followed during the first year of life. Data collection occurred, quarterly, using a characterization instrument with neonatal and socioeconomic variables. Monitoring took place using forms, applied via telephone call to parents of premature babies, to identify acute health problems. The data were subjected to analytical statistics using Pearson's correlation. **Results:** acute illnesses showed a linear trend throughout the first year of life. Gastrointestinal disorders were more frequent in the first months, and skin allergies and respiratory disorders occurred more frequently at the end of the first year of life. Neonatal vitality was a factor associated with greater intensity of acute illnesses. **Conclusion:** the intensity of acute illnesses has a significant correlation with neonatal factors in the first trimester of life.

Keywords: Signs and Symptoms; Infant, Premature; Infant; Pediatric Nursing; Longitudinal Studies.

RESUMO

Objetivo: analisar fatores neonatais e socioeconômicos associados ao desenvolvimento de agravos agudos de saúde de prematuros tardios e moderados no primeiro ano de vida. **Método:** estudo epidemiológico, longitudinal, em que foram acompanhados 151 prematuros (nascidos com idade gestacional de 32 a 37 semanas incompletas) durante o primeiro ano de vida. A coleta de dados ocorreu, trimestralmente, por meio de instrumento de caracterização com variáveis neonatais e socioeconômicas. O acompanhamento se deu por meio da utilização de formulários, aplicados via telefonema aos pais dos prematuros, para identificação dos agravos agudos de saúde. Os dados foram submetidos à estatística analítica com a aplicação da correlação de Pearson. **Resultados:** os agravos agudos apresentaram tendência linear ao longo do primeiro ano de vida. As afecções gastrointestinais foram mais frequentes nos primeiros meses, e a alergia de pele e as afecções respiratórias ocorreram mais frequentemente ao final do primeiro ano de vida. A vitalidade neonatal foi fator associado a maior intensidade de agravos agudos. **Conclusão:** a intensidade dos agravos agudos tem correlação significativa com fatores neonatais no primeiro trimestre de vida.

Palavras-chave: Sinais e Sintomas; Recém-nascido Prematuro; Lactente; Enfermagem Pediátrica; Estudos Longitudinais.

RESUMEN

Objetivo: analizar los factores neonatales y socioeconómicos asociados al desarrollo de problemas de salud agudos en prematuros tardíos y moderados durante el primer año de vida. **Método:** estudio epidemiológico, longitudinal, en el que se siguieron 151 prematuros (nacidos con una edad gestacional de 32 a 37 semanas incompletas) durante el primer año de vida. La recolección de datos se realizó trimestralmente mediante un instrumento de caracterización con variables neonatales y socioeconómicas. El seguimiento se llevó a cabo mediante la utilización de formularios aplicados por teléfono a los padres de los prematuros, para la identificación de problemas de salud agudos. Los datos se sometieron a un análisis estadístico utilizando la correlación de Pearson. **Resultados:** los problemas de salud agudos mostraron una tendencia lineal a lo largo del primer año de vida. Las afecciones gastrointestinales fueron más frecuentes en los primeros meses, y las alergias cutáneas y las afecciones respiratorias ocurrieron más a menudo al final del primer año de vida. La vitalidad neonatal fue un factor asociado a una mayor intensidad de problemas de salud agudos. **Conclusión:** la intensidad de los problemas de salud agudos tiene una correlación significativa con factores neonatales en el primer trimestre de vida.

Palabras clave: Signos y Síntomas; Recien Nacido Prematuro; Lactante; Enfermería Pediátrica; Estudios Longitudinales.

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INTRODUCTION

Premature birth is an important and growing public health problem worldwide. It is estimated that, each year, around 15 million newborns (NBs) are born prematurely, and this number is increasing due to the growing rate of prenatal complications and elective cesarean sections. Furthermore, complications from premature birth are the leading cause of death in children under 5 years of age⁽¹⁾.

Premature birth is subclassified by gestational age (GA) and is associated with the problems resulting from this condition. In this sense, moderately premature babies (GA ranging from 32 weeks to 33 weeks and 6 days) represent 18% of premature births, are closely associated with early neonatal changes, such as respiratory and metabolic changes, and have high survival rates. In turn, late premature babies, with an interval of 34 weeks to 36 weeks and 6 days of GA and an almost complete survival rate, represent around 70% of premature births and are often recognized as “almost full-term”⁽²⁻⁴⁾.

There is a growing prevalence of premature births between 32 and 36 weeks of GA, recognized as late and moderate preterms⁽¹⁾, in several Brazilian settings. This increase began in the second decade of the 21st century (with the highest rates) and has continued in recent years. The maintenance of these premature birth rates triggers the necessary discussion about the survival characteristics of these children, in addition to the immediate and late health demands resulting from this premature birth⁽⁵⁾.

There is a high incidence of readmissions of late and moderate preterm infants in the first month of life. This fact may be associated with early discharge, often focused on the newborn's routine at the time of birth. Readmissions are associated with a diagnosis of jaundice, feeding difficulties, dehydration, sepsis, apnea, respiratory problems and hypothermia⁽⁶⁾. Readmissions are more frequent in infants late in the first month, when compared to newborns who were born moderate, which is justified by the fact that moderate infants remain in neonatal units for longer due to more severe immediate clinical changes⁽⁷⁾.

Regarding morbidity aspects, some authors highlight that breastfed moderate and late preterm infants have a greater predisposition to gain muscle mass compared to borderline premature infants who were not breastfed, making breastfeeding a significant determinant for the growth of this population⁽⁸⁾. Another important adjective for the health conditions of this population are indicators of anemia, which is more common in moderate and late-term infants than in full-term infants. Issues related to growth are also evident, since late preterm infants present

with weight and height deficiency when they reach one year of age⁽⁹⁾.

Regarding respiratory morbidities, a cohort study whose exposure group was composed of late and moderately premature infants, while the control group consisted of full-term infants, found that late and moderately premature infants, in the first year of life, were hospitalized due to infection severe respiratory disease more frequently than those born at term. This also emphasizes the clinical fragility in relation to respiratory diseases⁽¹⁰⁾.

The rationale of this research is the incipient literature of publications that describe the chronic or acute conditions of infants born moderately and late preterm in the first year of life, with only studies focusing on specific morbidities. It is noteworthy that no scientific productions related to chronic and/or acute diseases were found in epidemiological studies with this population.

Regarding the clinical health demands and aspects of morbidity and mortality and developmental changes in late and moderately preterm infants, there are gaps about the impact of this on the acute and chronic health conditions of these children. Moderate and late preterm infants, as they are not in the extreme prematurity range (target population), are not referred for care in a specialized outpatient clinic. This fact reflects the need for support from care networks for this population, considering that many are discharged early from services and do not have continued follow-up post-discharge.

Considering the clinical fragility and the high prevalence rates of late and moderate preterm NB births in recent years, this study aims to identify neonatal and socioeconomic factors associated with the development of acute health problems in moderate and late preterm infants in the first year of life.

METHOD

This is a prospective cohort study carried out in the municipality of Santa Maria, a health reference for the central region of the state of *Rio Grande do Sul* (RS), Brazil. Obstetric, neonatal, and socioeconomic factors were associated with the development of health conditions in moderate and late preterm infants. The participant selection period took place from May 2016 to May 2017 and involved 365 selection days, to minimize seasonal bias. Follow-up was carried out from 2016 to 2018 and ended when the premature baby turned one year old.

All births that occurred in the obstetric center of a university hospital in the city were counted and those that met the following criteria were selected: moderate or late

premature birth⁴ evaluated by the Capurro method at 24 hours of life; residents of the municipality of Santa Maria/RS at the time of hospital discharge. After the screening phase, 151 premature infants were included in the study in the first screening. As it was a follow-up survey, there was a gradual loss of follow-up surveys, totaling 28% of respondents at the end of the first year. It is recognized that the losses in this study can be classified mainly as accidental losses that do not require analytical correction. Losses to follow-up are described in the flowchart below (Figure 1).

To minimize selection losses, daily visits were made to the obstetric center, the study setting, to select participants. After analyzing the selection criteria and upon acceptance by the legal guardian to participate in the study, the obstetric and neonatal characterization instrument was applied, containing the following numerical variables: GA (weeks and days), weight, days of hospitalization, Apgar and Socioeconomic Level Score (criteria from the Brazilian Association of Research Companies).

During the follow-up period, which took place via telephone, quarterly contacts were made with those responsible for the newborns (3rd, 6th, 9th and 12th months of life, considering chronological age). The acute condition identification instrument was applied via telephone call, which assesses the intensity of acute clinical health conditions in the perception of the main caregivers, most of whom were mothers. The second instrument used was an excerpt from the children's quality of life assessment scale, which included the following health condition assessment variables, in maternal perception: colic, diarrhea, vomiting, nausea, skin allergy, bronchitis, chest/nose congestion, shortness of breath, breathing difficulty, pneumonia and otitis. The scale is characterized as Likert type and has intensities classified as: 0: Never; 1: Rarely; 2: Often; and 3: Always. According to the authors who translated

and validated the instrument, it is valid and reliable for assessing quality of life in pediatrics in Brazil. The items referring to health condition had a Cronbach Alpha greater than 0.91.⁽¹¹⁾

For data analysis, a correlation was performed between the numerical variables and the intensity of the acute condition. Pearson's correlation was used, due to the normality of the data, after applying the Kolmogorov-Smirnov and Shapiro-Wilk tests. In the analysis of incidence and frequency of acute illnesses (developed the illness; did not develop the illness), carried out over the months of follow-up, they were classified as follows: Rarely, Often or Always = developed an acute illness; Never = did not develop an illness. The quantitative data were considered discrete numerical variables (intensities of the problem), and the independent variables were analyzed using averages. A statistically significant association between the variables and the outcome was considered if the p-value was less than 5% ($p < 0.05$).

The research followed the recommendations of Resolution nº 466/2012 and was approved by the Ethics Committee under opinion report nº 1.511.201 and CAAE nº 53898916.9.0000.5346.

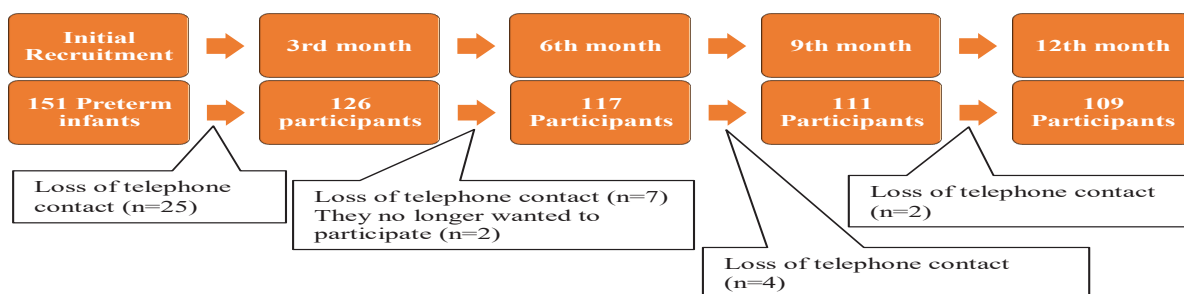
RESULTS

The results are presented considering the frequency of at least one acute illness, in each trimester evaluated, of premature infants participating in the study, stratified by GA (moderate and late), as shown in Figure 2.

There is a linear trend for the prevalence of acute illnesses in the first year of life. The incidence remained similar, with no statistically significant difference between them, except for the 12th month of life ($p = 0.046$).

It is worth noting that, in the last month of evaluation, there was a significant drop in the frequency of acute

Figure 1 - Flowchart of follow-up and loss to follow-up in the study evaluation periods. Santa Maria, RS, Brazil, 2022



conditions in moderately premature infants in relation to the frequency in late premature infants. Under a temporal analysis of the development of acute illnesses, the relative frequency of gastrointestinal disorders is shown in Figure 3.

Colic and vomiting decreased significantly in the first year of life. The acute conditions of diarrhea and nausea did not show significant variation, consistent with the monthly variation in frequency. Figure 4 shows trends and frequencies of onset of respiratory diseases in the first year of life.

There is an increasing trend in the variables stagnant and bronchitis, and they show a significant correlation when analyzing the intensity and increase in chronological age. The otitis variable was more frequent when compared between the first two periods evaluated. As for respiratory difficulty, there was a higher relative frequency in the first two months of evaluation; however, in the 9th and 12th months, it fell by approximately 5%

and remained constant. The other variables had a linear trend, with a percentage variation of 2%, comparing the 3rd and 12th months of life. The prevalence of acute skin allergy was 15.9% in the 3rd month of life, 26.5% in the 6th month, 31.5% in the 9th month and 30.3% at the end of the first year of life.

Table 1 stands out the correlation between chronological age and the intensity of acute illnesses.

Regarding the frequency of acute conditions in the first trimester of evaluation, the prevalence of gastrointestinal conditions was higher when compared to respiratory conditions and skin allergies. About neonatal and socioeconomic factors associated with the intensity of the acute condition, some associations with the outcome of the intensity of the acute condition stand out and had a significant correlation.

Table 2 presents the correlation of factors related to the intensity of the acute condition.

Figure 2 – Relative frequency and development trend of acute illnesses in the first year of life of moderate and late premature infants. *Santa Maria, RS, Brazil, 2022*

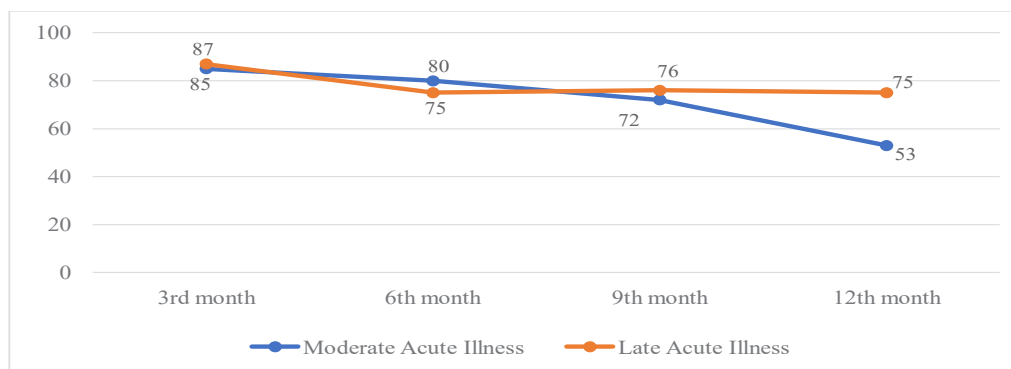


Figure 3 – Trend in the relative frequency of acute gastrointestinal events during the first year of life, stratified quarterly. *Santa Maria, RS, Brazil, 2022*

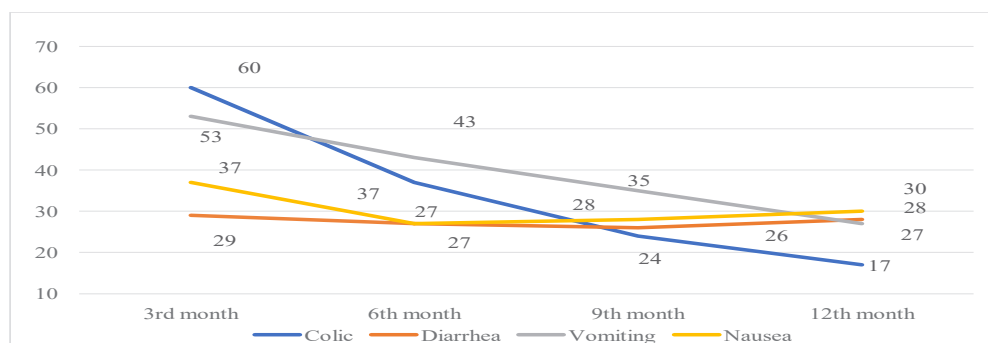


Figure 4 – Trend in the relative frequency of acute respiratory problems and skin allergies during the first year of life, stratified quarterly. *Santa Maria, RS, Brazil, 2022*

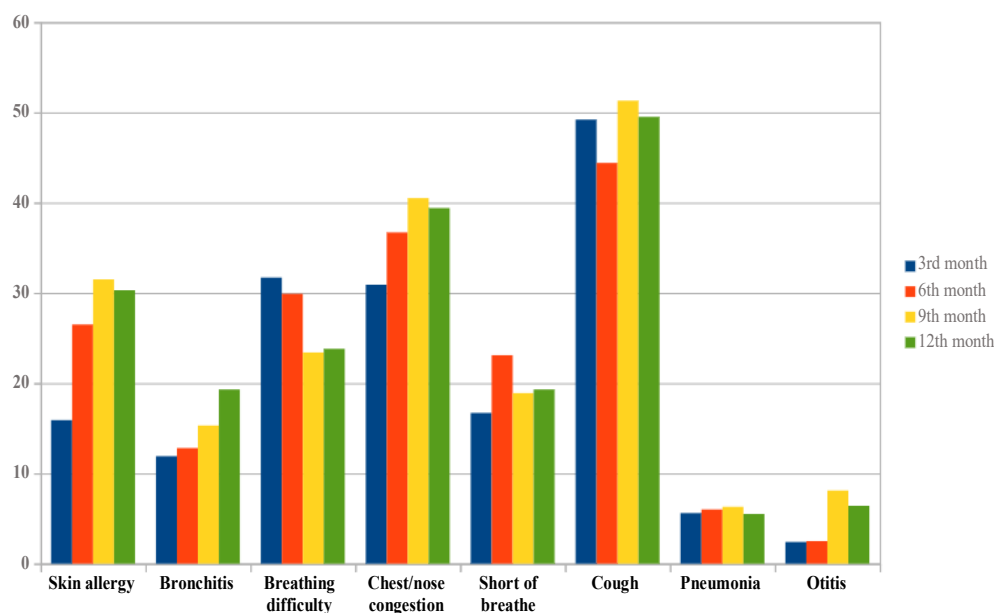


Table 1 – Correlation of age with the intensity of acute illnesses during the first year of life in moderate and late premature infants. *Santa Maria, RS, Brazil, 2022*

Acute illness	CI*	p-value
Colic	0.970	0.03
Diarrhea	-0.281	0.719
Vomiting	-0.998	0.002
Nausea	-0.502	0.489
Skin allergy	0.877	0.023
Bronchitis	0.963	0.037
Chest/nose congestion	0.881	0.119
Breathing difficulty	-0.923	0.047
Cough	0.341	0.659
Otitis	0.795	0.205

*CI = Pearson Correlation Index.

In the first assessment, the lower the Apgar score, the more frequent the conditions. Regarding the length of hospitalization, there was a positive correlation for the diarrhea, cough, pneumonia, and otitis variables, which suggests a worse immediate clinical condition, reflecting the development of illnesses in the first three months.

Birth weight was significantly negatively correlated with diarrhea. At 6 months of age, the only neonatal factor that was significantly negatively correlated was colic intensity and the first minute of Apgar. At the end of 9 months of age, some respiratory diseases showed a significant negative association. The variables shortness of breath, pneumonia and nausea were negatively associated with the independent variable birth weight: the lower the birth weight, the greater the intensity of these problems at 9 months of age. At the end of the first year of life, only the presence of colic presented intensity that correlated negatively with GA.

The analysis of this relationship shows that premature birth and low birth weight influence the intensity of the frequency of respiratory diseases such as chest pain, shortness of breath, cough, and pneumonia. Colic was also more intense in children with a lower GA. Neonatal factor such as GA, birth weight, length of stay in the intensive care unit, and initial 1- and 5-minute Apgar scores showed significant correlations with acute health status in the first year of life. The socioeconomic status of the participants did not significantly correlate at any time during the follow-up of this population.

Table 2 – Correlation of neonatal and socioeconomic factors with the intensity of acute illnesses during the first year of life of moderate and late preterm infants. *Santa Maria, RS, Brazil, 2021*

Acute illnesses		*GA	Birth weight	Days of hospitalization	Days of stay in †NICU	1st min-Apgar	5th min-Apgar	Socioeconomic level
3rd Month (n = 126)								
Colic	‡CI	-0.02	-0.074	0.091	0.200	-0.116	-0.179	0,007
	§p	0.827	0.412	0.310	0.160	0.194	0.045	0,934
Diarrhea	‡CI	-0.07	-0.184	0.122	0.399	-0.218	-0.248	0,043
	§p	0.391	0.039	0.172	0.004	0.014	0.005	0,631
Skin allergy	‡CI	-0.12	0.038	0.125	0.037	-0.217	-0.260	0,061
	§p	0.155	0.670	0.163	0.797	0.015	0.003	0,499
Bronchitis	‡CI	-0.12	0.038	0.125	0.037	-0.217	-0.260	0,043
	§p	0.155	0.670	0.163	0.797	0.015	0.003	0,630
Cough	‡CI	0.021	-0.032	0.020	0.388	-0.102	-0.114	-0,04
	§p	0.813	0.721	0.827	0.005	0.255	0.203	0,685
Pneumonia	‡CI	0.120	-0.023	-0.099	0.419	0.021	0.026	-0,036
	§p	0.181	0.797	0.271	0.002	0.815	0.772	0,685
Otitis	‡CI	-0.10	-0.172	0.144	0.444	-0.281	-0.406	-0,029
	§p	0.240	0.054	0.109	0.001	0.001	0.000	0,747
6th Month (n = 117)								
Colic	‡CI	-0.01	0.049	-0.014	-0.036	-0.189	-0.174	-0,119
	§p	0.910	0.598	0.855	0.809	0.041	0.061	0,202
9th Month (n = 111)								
Bronchitis	‡CI	-0.08	0.013	-0.062	0.006	-0.221	-0.208	0,008
	§p	0.397	0.896	0.688	0.952	0.020	0.029	0,935
Breathing difficulty	‡CI	-0.09	0.067	-0.071	0.044	-0.302	-0.260	0,016
	§p	0.324	0.487	0.643	0.646	0.001	0.006	0,864
Nausea	‡CI	-0.01	0.007	-0.082	0.065	-0.232	-0.136	-0,078
	§p	0.865	0.943	0.591	0.500	0.015	0.156	0,421
Short of breathe	§p	0.027	-0.214	-0.062	0.023	-0.105	0.001	-0,111
	‡CI	0.775	0.015	0.688	0.812	0.274	0.991	0,245
12th Month (n = 109)								
Pneumonia	§p	0.004	-0.288	-0.101	-0.069	0.077	0.026	-0,043
	‡CI	0.971	0.002	0.509	0.469	0.419	0.784	0,655
Colic	‡CI	-0.15	-0.096	0.009	-0.014	-0.138	-0.151	0,044
	§p	0.039	0.319	0.926	0.927	0.152	0.117	0,646

*GA = Gestational age; †NICU = Neonatal Intensive Care Unit; ‡CI = Pearson Correlation Index; §p = Significance value.

DISCUSSION

In the present study, the occurrence of at least one acute event had a similar frequency in the four moments evaluated. Gastrointestinal disorders were more common in the first months of life, and respiratory diseases and skin allergies appeared at the end of the first year of life.

Colic was common in 3-month-old premature infants, and its intensity was greater in younger children. The

results corroborate the literature, which states that the most common signs of changes in the first months of life are gastrointestinal, such as regurgitation/vomiting and colic. Although these clinical symptoms are not considered diseases, they are a concern for parents, especially in the case of premature babies, who already have specific vulnerabilities. Many of these symptoms may be transient,

and are believed to be due in part to the immaturity and/or development of the gastrointestinal tract⁽¹¹⁾.

Closely associated with physiological immaturity, colic causes excessive crying and is responsible for 10–20% of pediatric consultations in children aged 2 weeks to 3 months, becoming more pronounced in the first months⁽¹²⁾. In this study, earlier GA at birth had an effect only if colic persisted until 12 months of age.

This immaturity is associated with changes in gastrointestinal motility, which will present colonic hyperperistalsis, increased rectal pressure and excess hormonal load (motilin). Thus, the motility of intestinal peristalsis is further increased, and excess intragastric air occurs, which is related to aerophagia due to crying or inappropriate gripping/sucking, also including the presence of intestinal inflammatory processes^(12,13). Furthermore, maternal depression, parental anxiety and problems in family relationships are perceived by the infant and are considered associated non-gastrointestinal factors⁽¹²⁾.

Corroborating the findings, authors indicate that the peak of intensity is noticeable at 6 weeks of life, and in premature infants there is a similar pattern of crying and colic, compared to full-term NBs⁽¹³⁾. Studies show that GA is not a factor related to the development of colic^(13,14). However, the correlation in the present study showed that, as colic develops in the 12th month of life, it is more intense when GA of birth is lower.

In this sense, for infants with lower GA, the considerations that parents caring for a baby with colic can be reassured, because “time is on their side”, are invalid for the population of moderately premature infants⁽¹⁴⁾. It is important to highlight that the prevalence of colic in premature infants is around 30% in the first year of life⁽¹⁵⁾. A meta-analysis of 30 articles dealing with the prevalence of colic in the pediatric population, regardless of GA at birth, highlighted an average prevalence of 18% in the first year of life⁽¹⁶⁾. This information, at the end of the first year of life, reinforces the findings found in the population of premature infants in this study.

Due to the diversity of diagnostic criteria, there is extensive variability in prevalence data. In a national study on the prevalence of colic in infants, a difference of 64% was highlighted between the mother's perception and the analyzes carried out, with these analyzes being carried out using specific instruments for this purpose (colic). There is no coherence between the clinical prevalence results and the parents' perception, since the impacts of colic are greater in family dynamics than in the medical and clinical dimensions⁽¹⁴⁾.

Another condition with great variability in definitions and diagnoses, and consequently difficult to determine its prevalence, is vomiting. The study shows a prevalence of 53% in the 3rd month of life, and at the end of the first year of life this prevalence reduced to 27%. However, there is a huge variation between study data, considering parents' opinions and expectations, as well as the instruments used for collection. Vomiting in children in the first year of life can occur physiologically, and its prevalence varies from 5 to 50% of children, decreasing from birth to the end of the first year⁽¹⁷⁾.

In contrast, the tendency for gastrointestinal disorders, skin allergies, and respiratory disorders follow different developmental paths during the first year of life. Skin allergies are less dominant in the first trimester of life and progressively increase up to 12 months, becoming more intense.

Skin lesions in infants, closely associated with skin and food allergies, develop within two years, often within a month, and their incidence is related to the characteristics specific to each skin, such as racial, nutritional and environmental particularities⁽¹⁸⁾. Premature babies' skin is underdeveloped and is therefore more susceptible to inflammatory and erosive processes than full-term babies. This low adherence, which is also present in full-term infants, makes the first months of life more vulnerable⁽¹⁹⁾.

It is noteworthy that skin allergies often begin during breastfeeding and are closely associated with food allergies. The prevalence generally increases in line with the child's age, considering the increase in exposure to food and the environment. From this perspective, the research findings are reinforced by showing, after the 6th month, when complementary foods are introduced and cow's milk is offered, a jump in the prevalence of skin allergies and the development of atopic disease in premature babies, as well as sensitization or tolerance to allergens in the infant population⁽²⁰⁾.

Regarding respiratory dysfunction, a significant correlation was found between breathing difficulty and the age of the children: the younger the age, the more severe the breathing difficulty may be. The other respiratory variables tend to increase over the first year of life, while breathing difficulty shows a slight decrease.

In a study that investigated respiratory disorders in children and adolescents, the prevalence of diseases increased up to 14 years of age. Furthermore, it is pointed out that the older the child's age, there is an increased risk of suffering from chronic conditions such as bronchitis, sinusitis and rhinitis self-reported by the family⁽²¹⁾.

Research investigating respiratory disorders in extremely premature or very low birth weight infants has shown a prevalence of 50% of these in the first year of life. Clinical signs such as airway obstruction, identified as stuck, and pneumonia were the most common conditions⁽²²⁾.

Lung maturation in moderate and late preterm infants is superior to that of extremely premature infants. However, the tendency to develop respiratory diseases, as well as the occurrence of hospitalizations in infancy and early childhood, is almost twice as high when compared to those born at term. Studies that monitored the outcomes of late and moderate prematurity and its respiratory clinical manifestations are still incipient in the literature. When considering the lung capacity of moderate and late preterm infants with those born at term, it is expected that there will be a reduced lung capacity, as occurs in extremely premature infants, especially for moderate premature infants⁽²³⁾.

Furthermore, studies highlight that, in children with a history of early respiratory dysfunction and neonatal interventions, there is an increased risk for the manifestation of chronic respiratory diseases. Furthermore, there is a lack of literature regarding the association between respiratory dysfunctions and late and moderate prematurity⁽²⁴⁾.

In this sense, clinical conditions and their relationship with late and moderate prematurity are relatively new in the literature, hindering discussions regarding the data. This relationship is evident as the repercussions develop during the first year of life.

The first year of an infant's life is when premature babies are most vulnerable⁽²⁵⁾. This fact highlights the importance of analyzing the development of health demands, as well as the need for a multidisciplinary service that welcomes and monitors premature infants. Given that one of the limitations of this study was that the health status of borderline preterm infants was analyzed without comparison with the population of full-term NBs, moderate and late preterm infants should not be considered "almost full-term". Another limitation of this study is the evaluation methods based on the perception of the intensity of the injuries of parents and caregivers, who judge subjective perceptions of the phenomenon under study.

CONCLUSION

Acute gastrointestinal disorders predominate in the first months of life and are replaced by respiratory

disorders and skin allergies after six months of age. The intensity of the conditions was significantly correlated with several neonatal factors, including Apgar scores, low birth weight and longer hospital stays, only in the first trimester. This finding raises the hypothesis that neonatal factors influence the first months of life in this population.

This result reinforces the importance of properly referring these NBs to primary health care services, regardless of GA, as the needs of these NBs are sensitive to primary care. It is suggested that even if this newborn was born borderline premature or almost full-term, it should be included in the group of premature babies that require specialized attention from services.

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