Factors of a social nature associated with prematurity risk in a city in São Paulo

Fatores de natureza social associados ao risco de prematuridade em município paulista

Factores de naturaleza social asociados al riesgo de prematuridad en un municipio del estado de São Paulo

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Abstract

Objective: To identify the associations of factors of a social nature with prematurity.

Methos: This is a cross-sectional study with a correlational method, carried out from a database of a medium-sized municipality in the countryside of São Paulo, containing information on all newborns from January 2018 to July 2020, aimed at the identification of social and biological risks after birth.

Results: The analysis included 4,480 newborns, of which 78.9% were classified as usual-risk babies and 21.1% as at-risk babies. Among the risk factors of a social nature for newborns analyzed in the present study, there was a higher prevalence of newborns whose head of household had no income, had mothers under 16 years of age, a dead sibling aged less than 5 years and mothers who did not undergo prenatal care, with the last two having association with prematurity.

Conclusion: Factors of a social nature were associated with prematurity. This study made it possible to improve the newborn surveillance database, facilitating the elaboration and planning of health care.

Resumo

Objetivo: Identificar as associações dos fatores de natureza social com a prematuridade.

Métodos: Estudo transversal com método correlacional, realizado a partir de um banco de dados de um município de médio porte no interior de São Paulo, contendo informações de todos os recém-nascidos no período de janeiro de 2018 a julho de 2020, voltadas para a identificação de riscos sociais e biológicos após o nascimento.

Resultados: A análise incluiu 4.480 recém-nascidos, dos quais 78,9% foram classificados como bebês de risco habitual e 21,1% como de risco. Dentre os fatores de risco de natureza social dos recém-nascidos analisados no presente estudo, observou-se maior prevalência dos recém-nascidos que possuíam o chefe de família sem renda, tinham mães com menos de 16 anos, irmão morto com idade inferior a 5 anos e mães que não realizaram o seguimento de pré-natal, sendo que os dois últimos tiveram associação com a prematuridade.

Conclusão: Os fatores de natureza social apresentaram associação com a prematuridade. Este estudo permitiu melhorar o banco de dados de vigilância do recém-nascido, facilitando a elaboração e o planejamento da assistência à saúde.

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Conflict of interest: nothing to declare.

Resumen

Objetivo: Identificar la asociación de factores de naturaleza social con la prematuridad.

Métodos: Estudio transversal con método correlacional, realizado a partir de un banco de datos de un municipio de tamaño mediano en el estado de São Paulo, con información de todos los recién nacidos durante el período de enero de 2018 a julio de 2020, orientada a la identificación de riesgos sociales y biológicos luego del nacimiento.

Resultados: El análisis incluyó a 4.480 recién nacidos, de los cuales el 78,9 % fue clasificado como bebés de riesgo habitual y el 21,1 % como de riesgo. Entre los factores de riesgo de naturaleza social del recién nacido analizados en el presente estudio, se observó una prevalencia de los recién nacidos cuyo jefe de familia no tenía ingresos, con madres menores de 16 años, hermano fallecido a una edad inferior a 5 años y madres que no realizaron el control prenatal, y los dos últimos estuvieron asociados con la prematuridad.

Conclusión: Los factores de naturaleza social presentaron asociación con la prematuridad. Este estudio permitió mejorar el banco de datos de control del recién nacido, lo que facilita la elaboración y la planificación de la atención a la salud.

Introduction

Neonatal and infant mortality subsidize the analysis of quality of health care offered to pregnant women, mothers and children and is a worldwide concern, since the number of deaths in the first month of life exceeds 2 million. In Brazil, mortality rate in children under 1 year of age is 12.5 per thousand live births, which may vary depending on the region of the country, ranging from 10.4% in the South to 15.43% in the North.[1,2]

The identification of risks during prenatal care, childbirth and the development of newborns is essential for implementing actions that significantly impact baby care and positive outcome. In that regard, the Ministry of Health defines criteria to help classify newborns at risk such as: low socioeconomic status; residence in a risk area; history of death of children under 5 years old in the family; adolescent mother (<20 years) with low education (<8 years of education); unwanted child; low birth weight (<2,500g); premature birth; 5-minute Apgar less than 7; and hospital admissions.[3]

Among the risks identified, prematurity stands out as the leading cause of infant mortality in the world, with an estimated occurrence of approximately 15 million premature births and 1.1 million deaths of babies due to complications of this condition.[4,5]

Prematurity is defined as the birth of babies alive before 37 weeks of gestational age, and can be divided into three classifications: extreme prematurity, when birth occurs before 28 weeks; very premature, when the baby is born between 28 and 31 weeks of gestation; and moderately premature, when delivery occurs between 32 and 37 weeks of gestation.[6]

Most premature births take place in low- and middle-income countries. The highest rates occur in Southeast and South Asia and southern sub-Saharan Africa.[4] In Latin America and the Caribbean, less than 10% of births occur before 37 weeks of gestation, representing a prematurity rate of 8.6%. In this sense, although Brazil presents a scenario similar to that of other Latin American countries, 11.7% of births are premature, totaling approximately 300,000 premature births annually and placing the country in the tenth position among the countries with the most premature births in the world.[5]

Prematurity already classifies the baby as risk newborns, imposing differentiated monitoring, since it has a higher morbidity and mortality rate and the development of disabling sequelae in the long term, such as increased risk of brain disease, paralysis, visual disturbances, and increased chronic disease in later life.[2]

Although the numbers of preterm births are alarming, understanding of the global impact of prematurity on the psychosocial, economic and physical dimensions that affect mothers, babies and the community is still limited due to data availability and quality, making obtaining health surveillance information extremely important. In addition to this, the cause of prematurity is considered multifactorial, and may be related to economic, physical and psychosocial factors, associated with mothers and babies' families, making it even more difficult to estimate the real impact of prematurity.[7-9]

Research indicates associations of social factors with the occurrence of prematurity. Mothers who did not have access to or had incomplete

prenatal care, adolescent mothers and mothers with low socioeconomic conditions have a direct increase in the risk for prematurity and, consequently, for the complications that this outcome can generate.[8,10,11]

However, the development of studies capable of understanding the conditions and factors related to the pathogenesis of prematurity is still necessary.[9] In this sense, this study aims to identify the associations of factors of a social nature with prematurity.

Methods

This is a cross-sectional study with a correlational method, carried out in the city of Botucatu, located in the countryside of São Paulo, with an estimated population of 149,718 inhabitants and an infant mortality rate of 13.36 deaths per thousand live births, totaling 24 deaths of children under 1 year old in 2019.[12]

The municipality is composed of 22 Primary Health Care services distributed among Basic Health Units in the traditional model, Family Health and School Health Centers. Moreover, care for newborns has two maternity hospitals, being a reference for 68 municipalities in the region and a private institution.

All live newborns in the municipality between January 2018 and July 2020 were included in the sample. Stillbirths and babies born outside the data collection period were excluded.

Secondary data from an institutional database of restricted use from the Municipal Secretariat of the municipality in question was used, with information contained in the surveillance form for newborns at risk, which is completed for all newborns after birth. The information transferred to this database aimed to identify the biological and social risk factors.

Data collection was carried out by three nursing assistants in an interview with parturient women in the postpartum period or through secondary data from medical records, when they were not present during visits to the maternity hospitals in the municipality. At that time, the surveillance form for newborns at risk was filled out, which allows the classification of newborns, which can be classified as normal risk or high-risk newborns. It should be noted that the nursing assistants are part of the Municipal Health Department staff and received training to fill in the form in order to maintain the accuracy of the data obtained under a nurse's supervision.

After this stage, professionals feed the system manually with information contained in the form used during visits to the maternity ward, which is monitored by management and shared with Basic Health Unit teams.

This form was created according to the Ministry of Health suggestions, but adapted to the municipality's reality. Newborns are classified as biological risk if they present at least one of the following situations: birth weight <2,500g; prematurity (age at birth less than 37 weeks); major or multiple congenital malformation/genetic disease; hospitalization in the Intensive Care Unit/Intermediate Care Unit; and 5-minute Apgar less than 7. To be classified as high-risk newborns due to social risk, it is necessary to present two or more criteria, such as: having a dead sibling aged less than 5 years; maternal age less than 16 years; mother unable to take care of their child due to psychiatric disorders, chemical dependency, imprisonment, illness or other problem; illiterate mother; mother without partner and without family support; mother without prenatal care; and head of household without income.

However, for newborns to be considered at risk, the municipality considers that they have at least one biological risk and/or two or more social risks. In order to be classified as a usual risk, newborns must not present any biological risk, and at most a social risk.

The municipality considered maternal age as a risk when the mother is under 16 years old, but there is no concrete definition of age in the literature to define adolescent pregnancy, which ranges from 15 to 20 years. Evidence states that adolescent pregnancy risks are inversely proportional to maternal age.[3,13,14]

Women who had fewer than three consultations were considered without prenatal care follow-up.

The dependent variable consisted of the presence or absence of prematurity, since, among the biological risks, prematurity has a greater impact on infant and neonatal morbidity and mortality. Furthermore, prematurity may be related to other biological risks, such as the need for Intensive Care Unit admission, weight <2,500g and fifth-minute Apgar less than 7.[4,15] The independent variables were constituted by social risk factors.

Data were tabulated in Microsoft Excel spreadsheets, and the bivariate associations between social risk factors and prematurity were estimated using simple Cox regressions. Bivariate associations allow us to understand how two variables behave in the presence of each other, whether or not a cause/effect relationship can be established between them. Associations were considered significant if $p<0.05$. We used a 95% confidence interval.

The research was carried out after approval by the Research Ethics Committee of the *Faculdade de Medicina de Botucatu*, under Opinion 4,063,497, of June 2, 2020, and CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 31985020.6.0000.5411.

Results

The sample consisted of 4,480 newborns, in which 78.9% were classified as habitual risk and 21.1% as newborns at risk. Biological and social risks are described in Table 1.

Table 1. Distribution of biological and social risks

Risks	n(%)
Biological	
Death shortly after birth	2(0.04)
Weight <2,500g	391(8.7)
Gestational age <37 weeks	445(9.9)
Congenital malformation/genetic disease	53(1.2)
Intensive Care Unit admission	491(11.0)
5-minute Apgar less than 7	49(1.1)
Social	
Dead sibling <5 years	69(1.5)
Maternal age under 16 years	31(0.7)
Mother unable to care for their child	10(0.2)
Illiterate mother	3(0.1)
Mother without partner and without family support	16(0.4)
No prenatal care follow-up	27(0.6)
Head of family without income	63(1.4)

In this study, bivariate associations pointed to a relationship between having a sibling who died before the age of 5 (prevalence ratio 2.23; 95%CI 1.33-3.73), mother unable to care for their child (prevalence ratio 3.03; 95%CI 0.97-9.44) and mother without prenatal care (prevalence ratio 3.40; 95%CI 1.76-6, 59) with the occurrence of prematurity (Table 2).

Table 2. Bivariate associations to explain prematurity

Variables	PR	95%CI	p-value
Dead sibling under the age of 5	2.23	1.33-3.73	0.002
Mother under 16	0.65	0.16-2.60	0.540
Mother unable to care for their child	3.03	0.97-9.44	0.055
Illiterate mother	3.36	0.47-23.91	0.226
Mother without partner and without family support	0.63	0.09-4.47	0.643
Mother without prenatal care follow-up	3.40	1.76-6.59	0.000
No income	1.12	0.53-2.36	0.765

PR - prevalence ratio; 95%CI - 95% confidence interval.

Table 3 shows a significant association between having a dead sibling younger than 5 years (prevalence ratio of 2.09; 95%CI 1.23-3.54) and not to follow up prenatal care with prematurity (prevalence ratio of 3.04; 95%CI 1.46-6.31).

Table 3. Multiple regression to explain prematurity

Variables	PR	95%CI	p-value
Dead sibling under the age of 5	2.09	1.23-3.54	0.006
Mother unable to care for their child	1.26	0.35-4.54	0.725
Mother without prenatal care follow-up	3.04	1.46-6.31	0.003

PR - prevalence ratio; 95%CI - 95% confidence interval.

Discussion

Among the social risk factors of analyzed newborns, there was a higher prevalence of those whose head of household had no income, mothers younger than 16 years old, dead sibling aged less than 5 years old and mothers who did not perform prenatal follow-up – the last two were associated with prematurity.

Social issues are closely related to the positive or negative outcomes of pregnancy and the development of newborns. Socioeconomic condition, maternal age, fragility in the support network structure and difficulty in accessing health services are directly related to increased prematurity.[7,16]

Mothers under the age of 16 fall into the extremes of age (<19 years and >35 years) and are

more likely to have their newborns born at less than 37 weeks, which is aggravated when associated with lack of prenatal care. Moreover, adolescent pregnancy concentrates many risks to maternal health, in addition to the higher occurrence of prematurity, including low maternal weight gain, perinatal complications, preeclampsia and cephalopelvic disproportion.[16]

A national study, which included 23,894 puerperal women and their newborns, identified a higher prevalence of prematurity in adolescent mothers. They were divided into early adolescents (12 to 16 years old) and late adolescents (17 to 19 years old), presenting more chances of newborns being premature, with an odds ratio of 1.65 and 95%CI 1.30-2.09 for precocious adolescents and with an odds ratio of 1.39 and 95%CI 1.14-1.71 for late adolescents. Moreover, more chances of spontaneous prematurity were observed in early adolescents when compared to late adolescents.[17]

In the present study, having a dead sibling younger than 5 years old was associated with the occurrence of prematurity and, despite the need to qualify the data with knowledge of the sibling's age and the causes of death, considering that in Brazil 439,204 deaths of children under 5 years of age were registered and 65.3% of deaths were preventable, it is possible that this result is related to the maintenance of social risks of women who already had a child dead before the fifth year of life.[18]

The association of not having prenatal care with the occurrence of premature birth in this study is notorious, being 3.4 times greater than the chance of occurring with mothers who underwent this follow-up, converging with data from the literature.[19,20]

In a survey carried out in a state in southern Brazil that assessed 143,290 newborns, it was found that women who had inadequate prenatal care were three times more likely to have a preterm delivery. Prenatal care was considered the main protective factor to prevent prematurity, and women who had seven or more consultations had a 68% reduction in the chance of having premature birth.[19] A study that compared prenatal care in the public network in Brazil concluded that the Southeast, Midwest and South had a higher prevalence, while the North had numbers of women who had no prenatal care 60% higher than the national average.[20]

A literature review study proved that the greater the number of prenatal care visits, the lower the risks of newborns having low birth weight and needing hospitalization.[21] Inadequate performance or absence of prenatal care significantly increases neonatal mortality by 2,182 and 6,799 times, respectively.[22]

An analysis carried out in southern Brazil concluded that there are several factors that influence non-adherence to prenatal care, including socioeconomic conditions, poor social support for pregnant women, difficulty accessing health services, lack of knowledge about pregnancy symptoms, lack of family planning, non-acceptance of pregnancy, vulnerability of housing conditions and social stigma related to unwanted pregnancies.[23]

Welcoming, support, empathy and comprehensive and qualified assistance to pregnant women increase the frequency of consultations. To this end, it is necessary for health professionals to be prepared to value soft technologies, facilitate access and carry out early detection and active search of pregnant women, understanding the social context in which these women are inserted, including the support network and ensuring that care is user-centric.[23]

After birth, monitoring of newborns should preferably be carried out in the first week of life, as this is the most opportune time to help and encourage care for babies and puerperal women, in addition to strengthening the family support network and identifying risks and vulnerability. This follow-up is attributed to Primary Health Care and has the capacity to reduce neonatal mortality, through health surveillance actions, such as guidance to puerperal women, carrying out neonatal tests, strengthening the bond between the family of newborns and the health service, home visits, vaccination, assessment of growth and development.[3,24]

In this regard, the Health Care Network must be structured so that the assistance is effective so that care levels are articulated, but there are still

challenges to be overcome. A study carried out with 23,368 women identified that carrying out the first routine consultation for newborn assessment in the first week of life, carrying out a puerperal consultation in the first 15 days postpartum and receiving the result of the heel prick test in the first month and baby's life occurred in less than 50% of the analyzed population.[9,25]

In Brazil, Family Health Strategy implementation has a positive impact on reducing neonatal and infant mortality and is present in 98.4% of the country's municipalities. Family Health Strategy coverage can reduce infant mortality rates from 3% to 9% after the second year of service implementation; after 8 years, the rate can drop from 20% to 34%. In the state of Paraná, a study concluded that the greater the Family Health Strategy coverage, the more the infant mortality rates tend to reduce. This occurs due to increased access to health services, reduced hospitalizations due to preventable causes and faster improvements in health indicators.[26,27]

Thus, improving planning actions that value preventive care and encourage the expansion of coverage and quality of prenatal care is extremely important, considering that this assistance increases the effectiveness of the Ministry of Health strategies and emphasizes the humanization of care throughout pregnancy, childbirth and postnatal periods, reducing complications that are related to prematurity.[28]

Among the limitations of this study, the fact that the research reflects the local reality stands out. Thus, generalization and comparison with other municipalities should consider the characteristics of a medium-sized city. Furthermore, it is impossible to assess factors that were not included in the database, such as type of delivery, family income, gestational age at which the delivery occurred, cause and age of siblings' death. In that regard, it was proposed to the municipality to include this data in the surveillance form for newborns at risk, aiming at strengthening the monitoring of children, contributing to improving health planning and specialized care for newborns and enhancing service integration in the Child Health Care Network and strengthening public policy actions.

Conclusion

There was an association of newborns who had a dead sibling aged less than 5 years and mothers who did not undergo prenatal care with the occurrence of prematurity. Other social risks may still be present in the family context of premature newborns, understanding that socioeconomic vulnerability correlates with several social determinants. In this regard, it is necessary to improve newborns' health surveillance, starting with obtaining relevant data that involve them in the face of each region's reality, enabling the planning of health care with a view to scientific evidence and aiming at reducing neonatal and infant mortality.

Collaborations

Cruz AAMB, Santos LC, Minharro MCO, Romanholi RMZ, Prearo AY and Alencar RA contributed to project design, relevant critical review of the intellectual content, data interpretation and approval of the final version to be published.

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