

LOW BIRTH WEIGHT AND PREMATUREITY X CAESAREAN

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Abstract: The World Health Organization (WHO) defines low birth weight (LBW) as less than 2.5 kg. Prematurity is a worldwide problem, mainly due to its relationship with neonatal mortality. The objective of the study was to correlate low birth weight and prematurity with cesarean section, in the period between 1998 and 2017. It was an observational, ecological study, with a quantitative approach, using secondary data from the database of data from the Information System on Live Births (SINASC) from which the regression coefficients were analyzed, with 95% confidence intervals, the respective p-values, using the Breusch Godfrey test, and the correlation was calculated using the Pearson test. Initially, the rates of cesarean section, low birth weight and prematurity in the time frame of the study were surveyed and calculated. It was observed that the correlations are significant and high according to the LBW and prematurity scores, the obtained values of 0.8870 and 0.8868, respectively. The values show that the increase in cesarean sections is intrinsically correlated with LBW and prematurity, since the data were positive and strong. Thus, directly implying a major public health problem, since in 2017 this percentage has been progressing again.

Keywords: Cesarean section; Low birth weight newborn; Premature newborn; Epidemiology.

INTRODUCTION

The World Health Organization (WHO) defines Low Birth Weight (LBW) as a value less than 2.5 kg. It is estimated that 15 to 20% of Newborns (NBs) worldwide have LBW, which would simulate more than 20 million appearances per year. Still, there are differences in LBW magnitudes between regions, being 28% in South Asia, 13% in sub-Saharan Africa and 9% in Latin America. In Brazil, the search carried out using data from the Information System on Live Births (SINASC), in the

period between 1996 and 2011, was 8.0% for LBW in the 26 state capitals, as well as in Brasília, presenting greater representation in the Southeast (8.4%) and South (8.0%) Regions and smaller in the North (7.2%), Northeast (7.6%) and Midwest (7.4%) Regions (MOREIRA ; SOUSA; SARNO, 2018).

LBW rates are expected to be lower in more developed contexts. Both the Ministry of Health (MS) and the Ministry of Education plan strategies to reduce this rate and the lower the LBW rates, the lower the Infant Mortality Rates (IMR) (SILVA et al., 2010).

However, not only are the highest percentages of LBW observed in the more developed regions of Brazil, but also the reduction of BMR (Brazilian Mortality Rate) in all Brazilian regions with improved health care. The explanation that the LBW paradox is due to underreporting of live births in less developed regions has been questioned and needs to be revised. Data from population studies, which are less predisposed to underreporting of live births, consistently indicated a higher LBW rate in the more developed city of Ribeirão Preto than in the less developed city of São Luís. It is not clear that this paradox is a true epidemiological effect, as this phenomenon is similar to that described in first world countries, where the increase in LBW rates has been associated with increasing medical interventions (SILVA et al., 2010).

Prematurity is a subject of extraordinary esteem worldwide, and is a priority in Public Health, as it is the most important cause of neonatal death and the second leading cause of death in children under 5 years of age (GUIMARÃES et al., 2017).

Prematurity is considered by the WHO as a worldwide difficulty, especially due to its analogy with neonatal mortality. Brazil is among the ten countries with the most significant rates, which are responsible for 60%

of premature births in the world. According to the WHO, in 2008, the main cause of death in children under 5 years of age was related to premature birth. In Brazil, currently, neonatal mortality is associated with prematurity and is responsible for almost 70% of deaths in the first year of life, and adequate care for the NB has become challenging in order to reduce infant mortality rates (OLIVEIRA et al, 2016).

The chances of indicating a cesarean section increased according to a better socioeconomic coefficient, adequate prenatal consultations, primigravidae, multipregnancy and twin pregnancies, recognizing that such indication was not based only on technical standards, but also on reasons without scientific basis. Women who had fewer prenatal consultations had a lower risk of having a cesarean section. The lower the number of prenatal visits, the greater the chances of vaginal delivery (CARNIEL; ZANOLLI; MORCILLO, 2007).

Given these assumptions involved in social, cultural, political and strategic aspects, this study aims to correlate LBW and rematurity with cesarean section, in the period between 1998 and 2017.

METHODOLOGY

STUDY DESIGN

This is an ecological study, carried out based on secondary data available in the SINASC database. Such database is determined by the Department of Informatics of the Unified Health System (DATASUS) in collaboration with the National Center of Epidemiology (Cenepi). SINASC is a system that enables a significant contribution of data about live births, with their most significant characteristics.

Its quantitative approach, which has its roots in logical positivist thinking, consists of emphasizing deductive reasoning, the rules of logic, and the measurable attributes of human experience. Quantitative research resorts

to mathematical language to describe the causes of a phenomenon and the relationships between its variables (MINGOTI, 2005).

SINASC was chosen as the database, as it provides a significant contribution of data on live births, with their main characteristics, such as sex, place of birth, type of delivery, birth weight, among others.

SINASC, propagated in Brazil since 1990 by the Ministry of Health, uses the Declaration of Live Births as a data collection instrument, an individualized and standardized document, with constitutional data on the mother and birth (MELO; MATHIAS, 2010).

SINASC elements, such as type of delivery, number of prenatal consultations, birth weight and socioeconomic characteristics have been used as health indicators for the mother, the NB and, consequently, the community where they live. The exposition and analysis of these elements also benefit the understanding of changes in the health and disease profile, in time and space, and help in weighing advances or setbacks in the availability and attribute of health services, disclosing probable inequalities in the conditions of health. life of the population (SOUZA JUNIOR, 2007).

The studied population is composed of all records of live births in the period between 1998 and 2017, corresponding to a period of 20 years. Thus, in this study, low birth weight is considered when weight is less than 2,500 grams and prematurity is birth with gestational age less than 37 weeks of gestation.

DATA ANALYSIS

The data used initially were organized in the Excel program for Windows, in which it was possible to calculate the rates of cesarean section, LBW and prematurity of the established and, subsequently, analyzed in the statistical program Stata 13.0. Where analyzes of temporal trends were performed using linear regression, after testing the correlation

of standard errors over time, using the Breusch Godfrey test.

In the linear regression analysis, the cesarean section, LBW and prematurity rates were considered as dependent variables and the years of the period were considered as an independent variable.

With the aim of estimating the increase or decrease in cesarean section rates, LBW and prematurity in the studied period, the regression coefficients, their 95% confidence intervals and the corresponding p-values were exposed. Above all, the annual percentage change was calculated using the ratio of the regression coefficient in relation to cesarean section, LBW and prematurity rates at the beginning of the analyzed period. Variations in rates with a value of $p \leq 0.05$ in the linear regression were considered significant.

Correlation was calculated using Pearson's correlation test. Considering that values of r equal to or close to 1 or -1 indicate that there is a strong correlation between the variables, and in the first case the relationship is direct, while in the second the relationship is inverse and values close to zero show little or no correlation between the variables.

ETHICS IN TEAMS

This is a research that exceptionally used secondary data from the public domain, given the above, this study was not submitted to the Ethics Committee for Research with Human Beings (CEP), in accordance with Resolution 466/2012 of the National Health Council.

RESULTS

Significant correlations (r) were observed between the general cesarean section scores and the LBW and preterm infant scores from 1998 to 2017. A correlation was identified in both and the scores were significantly high, showing that the increase in cesarean sections directly implies with the increase in

LBW and prematurity. The correlations are significant and high, showing a strong and positive correlation through the data obtained between cesarean and LBW scores, and preterm infants and the values were 0.8870 and 0.8868 respectively.

Graph 1 and table 1 point to the existence of a strong and positive correlation when we correlate the cesarean scores (1,000) with LBW and present a significant, strong and positive correlation of 0.8870 when analyzed in the statistical program Stata 13.0.

Among the various possible cuts in the analysis of the issue of the association of cesarean section with LBW and prematurity, the study pointed out a strong influence of the choice of mode of delivery for complications presented to the NB in Brazil.

The study showed an association of elective cesarean delivery with better socioeconomic conditions of the population. The low coverage of prenatal consultations showed a positive association in relation to the mother's age, schooling and parity, with infant mortality and ESF coverage (MELO et al., 2013).

Between 1995 and 2007 there was no significant trend in the LBW rate and this was evident in Brazil in all states. Between 1995 and 2000, there was a decrease, then until 2003 it remained practically stable from then on. However, trends varied across Brazilian regions. There were significant increases in the North region between 1999 and 2006 and in the South and Midwest region between 1995 and 2007. Thus, the Brazilian regions seem to be in different stages of the perinatal epidemiological transition. BPN rates are still increasing in some regions, while they have stabilized in others. An increase in the LBW rate was also described in developed countries, in the years mentioned above, such as the United States of America (USA) and Canada (SILVA et al., 2010).

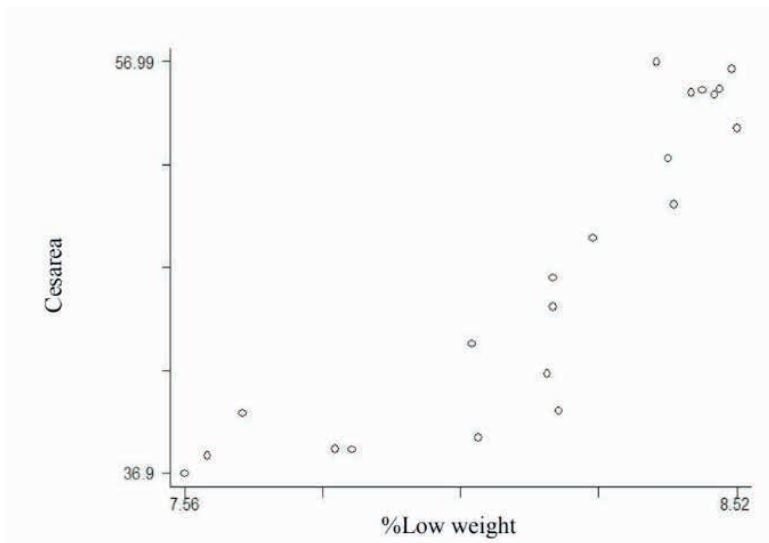
In study by Karlström; Lindgren;

Hildingsson (2013), babies born by cesarean section had more complications, such as LBW and prematurity, when related to vaginal delivery in this study, regardless of whether the surgery was performed based on the mother's request (with no reported medical indication) or whether it occurred after the spontaneous onset of labor.

The high socioeconomic level is directly linked to an unfavorable progress, visibly, in view of the proportion of preterm infants, a tendency intrinsically caused by the choice of cesarean section and leading to an increase in the proportion of cesarean sections. A survey involving live births in a hospital in Recife, Pernambuco (1991-2000), concluded a relationship by the progressive trend in cesarean section, LBW and prematurity rates. In this research, the highest representation of LBW (22.8%) occurred in the year 2000, and a high rate of cesarean sections, ranging from 29.4% in 1993 to 35.2% in 2000. Such results show relationships in which the increase in the number of cesarean sections and prematurity is added to the increase in the magnitudes of LBW (MORAES et al., 2011).

A possible justification for the increase in the proportions of LBW or prematurity is the termination of pregnancy due to the indication or request of the pregnant woman for cesarean delivery, which has become increasingly frequent (MORAES et al., 2011).

The ideal form for what is believed to be preterm labor is controversial. Claims that preterm birth that was planned by caesarean section reduces the chances of fetal or neonatal death as well as birth trauma, which have actually been met by counterclaims that this policy leads to high risk of serious morbidity for mother and baby. In a study carried out in 1991, it was not shown that cesarean sections could be somewhat protective for premature NBs, especially for babies with very low birth weight (less than 1500 g), but the same



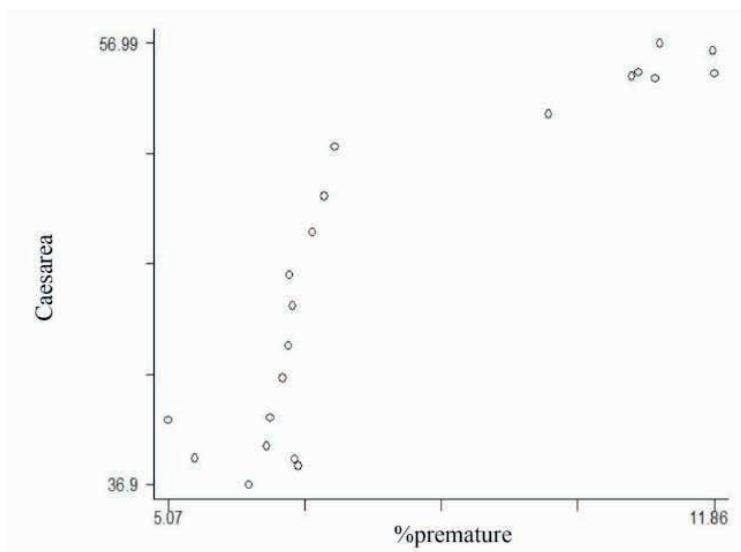
Graphic 1– Cesarean section correlation with low birth weight.

Source: Own authorship, elaborated in *Stata* 13.0 statistical program.

CESAREAN SECTION - LOW WEIGHT	
Cesarean section	1.0000
Low weight	0.8870 - 1.0000

Table 1– Data analyzed from cesarean sections with preterm infants.

Source: own authorship, elaborated in the statistical program *Stata*13.0.



Graph 2– Cesarean section correlation with preterm infants.

Source: Own authorship, elaborated in *Stata* 13.0 statistical program.

CESAREAN SECTION-LOW WEIGHT	
Cesarean section	1.0000
Prematurity	0.8868 - 1.0000

Table 2– Data analyzed from cesarean sections with preterm infants.

Source: Own authorship, elaborated in *Stata* 13.0 statistical program.

researchers, in 2009, in the longitudinal continuity of the study, published additional evidence that, for low-risk intermediate or late preterm neonates (32 to 36 weeks), primary cesarean section can lead to neonatal mortality and morbidity, such as pulmonary hypoplasia, necrotizing enterocolitis or sepsis (ALFIREVIC; MILAN; LIVIO, 2012).

CONCLUSION

Initially, it is necessary to mention that today little is questioned about the importance of understanding the factors that lead to prematurity and LBW, being essential the development of effective public health programs and interventions to reduce the occurrence of unfavorable outcomes to birth.

It must also be said that it is necessary to further investigate the factors associated with prematurity and LBW and to strengthen

the use of quality prenatal care by women, ensuring access to humanized care during pregnancy, childbirth and the puerperium.

It is also opportune to allude that the topic must continue to be investigated, as it can be useful to inform governments and local and international partners, collaborating to reduce prematurity and LBW rates.

Therefore, it remains to be admitted that the values that were analyzed and correlated showed that the increase in cesarean sections is intrinsically correlated with low birth weight NBs and prematurity, since the number of cesarean sections increases, prematurity and low birth weight increase together, according to the Pearson correlation data, which proved to be positive and strong, thus directly implying a major public health problem, since in 2017 this percentage has been progressing again.

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