Original article

IMPACT OF MATERNAL PROFILE ON BIRTH OUTCOMES*

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ABSTRACT: Objective: to identify the impact of maternal profile on birth outcomes. Method: Descriptive cross-sectional study with a sample of 244 postpartum women, as follows: 109 mothers of preterm infants and 135 mothers of full-term infants. The births occurred in the April-September 2015 period in a public maternity hospital in the Northeastern region of Brazil. Data was analyzed with Statistica 10 software and Chi-square test. Results: high prevalence of sedentary lifestyle; statistical significance for overweight and obesity before and during pregnancy; high prevalence of high blood pressure during the gestational period of mothers of preterm infants. Also, 58.1% (n = 63) of preterm infants were born with health problems and 96.3% (n = 130) of full-term infants were healthy. Conclusion: Maternal obesity and overweight is a risk factor for preterm births, an event that demands child healthcare.
DESCRIPTORS: Preterm; Prenatal care; Childbirth; Risk Factors; Maternal-Child Nursing.

PERFIL DE MÃES E O DESFECHO DO NASCIMENTO PREMATURO OU A TERMO

RESUMO: Objetivo: identificar o perfil de mães de bebês prematuros e a termo para o desfecho do nascimento. Método: trata-se de um estudo analítico-descritivo, seccional, com amostra de 244 puérperas, sendo 109 mães de bebês prematuros e 135 mães de bebês a termo, por partos ocorridos no período de abril a setembro de 2015, em uma maternidade pública do nordeste brasileiro. Os dados foram analisados pelo programa Statistica 10 e teste Qui-quadrado. Resultados: alta prevalência de sedentarismo; significância estatística para sobrepeso e obesidade antes e durante a gravidez; elevada prevalência de pressão arterial alta durante a gestação das mães de bebês prematuros. Logo, os bebês nasceram com problemas de saúde em 58,1% (n= 63) dos prematuros e nascimento saudável em 96,3% (n= 130) dos bebês a termo. Conclusão: o perfil de mães com obesidade e sobrepeso é fator de risco ao nascimento do bebê prematuro como evento que demanda cuidado à saúde da criança.
DESCRITORES: Prematuro; Cuidado Pré-Natal; Parto; Fatores de Risco; Enfermagem Materno-Infantil.

PERFIL DE MADRES Y EL DESENLACE DEL NACIMIENTO PREMATURO O A TÉRMINO

RESUMEN: Objetivo: identificar el perfil de madres de bebés prematuros y a término para el desenlace del nacimiento. Método: es un estudio analítico descriptivo, seccional, con muestra de 244 puérperas, siendo 109 madres de bebés prematuros y 135 madres de bebés a término, por partos ocurridos el periodo de abril a septiembre de 2015, en una maternidad pública de nordeste de Brasil. Se analizaron los datos por medio del programa Statistica 10 y test Chi-cuadrado. Resultados: hubo grande prevalencia de sedentarismo; significancia estadística para sobrepeso y obesidad antes y durante la gravidez; alta prevalencia de presión arterial alta durante la gestación de las madres de bebés prematuros. De ese modo, 58,1% (n= 63) de los bebés prematuros nacieron con problemas de salud y de los bebés a término hubo nacimiento saludable en 96,3% (n= 130). Conclusión: el perfil de madres con obesidad y sobrepeso es factor de riesgo para el nacimiento del bebé prematuro y eso demanda cuidado a la salud del niño.
DESCRIPTORES: Prematuro; Cuidado Prenatal; Parto; Factores de Riesgo; Enfermería Materno Infantil.

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INTRODUCTION

Preterm birth (infants born at gestational age of less than 37 weeks) is considered a global public health problem, as it is among the major risk factors for neonatal morbidity and mortality[1], leading to complications that demand high-complexity care, sometimes for a long period of time. Given that preterm births result from a set of interrelated factors that impact the quality of life of individuals living with sequelae or result in infant mortality, they impose high social and economic costs to the countries[2].

In 2014, the countries in the first positions of the world ranking of infant mortality rates (IMR) had very high mortality rates, as follows: Afghanistan (1st place) with 117.3 deaths per thousand live births; Mali (2nd place) with 104.34 per thousand live births; and Somalia (3rd place) with 100.14 per thousand live births. The countries with the lowest IMR were Monaco (1.81 per thousand live births), Japan (2.13 per thousand live births) and Bermudas (2.48 per thousand live births) [3].

In Brazil, the neonatal mortality rate (0 to 27 days of life) is considered the main component of the Infant Mortality Rate (IMR), especially for early neonates (0 to 6 days of age) due to the frequent complications in preconception or during pregnancy. The IMR fell from 26.6 to 16.2 deaths per thousand live births between 2000 and 2010 due to the significant drop in post-neonatal mortality (27 days to 1 year of age), after the implementation of actions focused on prevention and treatment of infections. In the referred period, IMR in the Northeast fell from 38.4 to 20.1 deaths per thousand live births, and neonatal mortality rate fell from 22.7 to 14.3. Thus, in 2010, mortality rate was 5.8 in the post-neonatal period and 14.3 in the neonatal period, characterizing the period of concentration of infant mortality [4].

Complications of preterm birth were one of the leading causes of global neonatal deaths in 2008, and the number of preterm and low birth weight infants has been steadily increasing over the past few decades [5]. Prematurity was responsible for 14% of the causes of child deaths in the world [6]. Globally, 11.1% of babies are born preterm, which is equivalent to more than 15 million children or more than 1 in 10 children, and more than 60% of these births occur in Africa and South Asia. However, the 10 countries with the highest infant mortality rates include Brazil, USA, India and Nigeria [7].

The impact of maternal profile on birth outcomes is not known in the scientific environment. Preterm birth results from interrelated factors, and studies reported an association with preconception or gestational problems, environmental and social aspects, and high rates of cesarean sections without indication before fetal maturity [2,8-10].

The present study is based on the risk theory, with risk defined as "probability of a member of a defined population developing disease in a given period of time." Based on this concept, epidemiology seeks the association of certain risk factors with pathologies[11]. In view of the above, this study aims to identify the maternal profile of mothers and preterm and full-term births outcomes.

Therefore, according to Decree No. 94,406/87, which details the provisions of law No. 7.498/86 on the exercise of the nursing profession, nurses play a fundamental role in maternal and child health, monitoring low-risk pregnant women and postpartum women through prenatal and postpartum appointments[12]. In the case of high-risk prenatal care, nurses work with other health professionals, in a multidisciplinary team. Obstetric nurses also provide assistance in vaginal births without complications and to the newborns, according to resolution no 0478/2015 of Brazil's Federal Nursing Council (COFEN) [13].

METHOD

Descriptive, cross-sectional study with a quantitative approach carried out in a public maternity hospital, in the Northeastern region of Brazil, in the state of Rio Grande do Norte.

The referred maternity hospital provides prenatal care to high-risk pregnant women referred to higher levels of care. Moreover, the facility complies with the classification system for levels of maternal care, counts on obstetric center (pre-delivery and delivery), surgical center, mother-baby units, provides care for medium risk newborns, has a clinical unit for pregnant women and newborns,

a neonatal intensive care unit (NICU), human milk bank, ultrasound diagnostic service, and a center for cleaning, disinfection and sterilization of materials.

The referred maternity hospital was selected as the site of this study because the municipality integrates a network of maternal and child health care, with actions and services coordinate at levels of increasing complexity of care. Moreover, in 2012, the municipality revealed that 78.94% of the neonates that died in the first week of age were preterm newborns and the prevalence of preterm live births was 13.20%. Both prevalence rates were higher to the national rates[14].

The population consisted of 1,508 mothers of babies born in hospital facilities, from April to September 2015. Of these, 244 postpartum women were selected, and two groups were formed: one group of 109 mothers of preterm babies registered in the delivery room and obstetrical center books, since of the 155 mothers of preterm infants registered during the study period, 35 were excluded due to incompatibility and incorrect assessments of gestational age (GA). Also, four mothers were transferred to another maternity hospital and seven mothers could not be contacted because they were discharged from hospital less than 48 hours after delivery.

The second group was formed by sample calculation based on the average births between 2012 and 2013, resulting in 135 mothers of randomly selected full-term babies. Of every 10 mothers registered in the delivery registration book, one was randomly interviewed.

The definition of preterm and term pregnancy considered the gestational age (GA) calculated based on the accurate dating of the last menstrual period (LMP) by the mother, determined by obstetric ultrasound performed less than 20 weeks ago and registered by a pediatrician or obstetrician.

The inclusion criteria were as follows: a) participant should reside in the municipality of Parnamirim-RN; b) have performed prenatal care at Parnamirim Family Health Units or Parnamirim private health plans or no prenatal visits; c) hospital delivery at Hospital Materno Infantil Divino Amor. All newborns whose gestational age was not registered or was inaccurate were excluded. Newborns from mothers with possible mental disorders that impaired their cognition, with impact on data collection, were also excluded.

Four instruments were used in data collection: 1) books of the delivery room and obstetrical center of Hospital Materno Infantil Divino Amor; 2) nursing documentation for inpatients; 3) collection of information contained in the documents: card and medical records of the pregnant woman; 4) adapted interview form [13].

The mothers were interviewed during their stay in the maternity ward, in a separate room, and after the signing of the Informed Consent Term. Part of this study was retrospective. Information included in the records was confirmed by recollections of events by the postpartum women, and there was no loss of data.

After data compilation, descriptive statistics was assessed through Statistica 10 software, for identification of frequencies and percentages and finally, a significance level of $p < 0.05\%$ was considered for the chi-square test.

The parameters of normality used in the study regarding weight and nutritional status of mother and baby, blood pressure of the pregnant women, Apgar score were defined as:

- The pre-pregnancy nutritional status of the mother was calculated by the Body Mass Index (BMI): weight (Kg) divided by square of measured height. Normal (eutrophic) BMI: ≥ 20 kg/m^2 and <25 kg/m^2; overweight BMI ≥ 25 kg/m^2 and <30 kg/m^2; obesity BMI: ≥ 30 kg/m^2. During pregnancy, BMI was also used, but according to Gestational Age (GA). Normal blood pressure levels were <140x90 mmHg[15].

- Low birth weight defined by the World Health Organization (WHO) as weight at birth less than 2500 g [16]. The Apgar score recommended by the WHO. Heart rate, respiratory rate, muscle tone, reflex irritability and skin color are assessed at the first and fifth minutes of age, and scores of 8 to 10 indicated no asphyxia, scores of 5 to 7 indicated mild asphyxia, scores of 3 to 4, moderate asphyxia, and scores of 2 to 0, severe asphyxia[16].

The project was submitted to the Research Ethics Committee of Universidade Federal do Rio Grande

do Norte, with a favorable statement No. 1,047,431/15.

RESULTS

The results show the socioeconomic profile, characteristics and conditions of mothers of preterm and full-term infants during gestation for each birth outcome: preterm and term birth.

As shown in Table 1, the socioeconomic profile of mothers of preterm and full-term infants revealed low educational level, family income lower than one minimum wage, as well as overcrowded houses of 2 or 3 rooms. Even worse, most mothers of preterm infants lived in rented houses and were adolescents (Table 2).

Table 1 – Socioeconomic conditions of mothers of preterm and full-term babies. Parnamirim, RN, Brazil, 2015 (continues)

Variables	Preterm		Term	
	%	f	%	f
Age <20 years	16.51	8	2.96	37
20 to 35 years	76.15	83	85.19	82
≥36 years	7.34	8	11.85	16
Type of union				
Married/living together with a partner	85.32	93	88.89	120
Single	11.93	13	8.89	12
Others	2.75	3	2.22	3
Education				
Completed primary school	22.02	24	26,67	36
Completed secondary school	33.94	37	31.85	43
Higher education	9.17	10	6.67	9
Income				
< 1 minimum wage	11.93	13	7.41	10
1- 2 minimum wages	64.22	70	71.85	97
3-5 minimum wages	21.10	23	19.26	26
≥ 6 minimum wages	2.75	3	1.48	2
Number of children				
3 children	36.70	40	37.40	50
4 children	31.19	34	28.89	39
5 children	20.18	22	19.26	26
Housing				
Rented house	80.73	88	92.59	125
Own house	71.56	78	55.56	75
Number of rooms				
2 to 3 rooms	21.10	23	20.74	28
4 rooms	42.20	46	34.81	47
5 rooms or more	36.70	40	42.96	37
Pregestational nutritional status				
Low weight	4.59	5	5.19	7
Normal weight	46.79	51	52.59	70
Overweight	33.94	37	27.41	38
Obesity	14.68	16	14.81	20

Nutritional status at the end of pregnancy				
Low weight	0.91	1	0	0
Normal weight	20.18	22	14.81	20
Overweight	36.69	40	37.77	51
Obesity	42.20	46	47.40	64
High blood pressure during pregnancy	32.11	35	17.04	27
Practicing sports before pregnancy	43.12	47	28.89	39
Practicing sports during pregnancy	7.34	8	7.41	10
Smoking during pregnancy	9.17	10	7.41	10
Illicit drugs before pregnancy	9.70	19	3.70	5
Illicit drugs during pregnancy	8.26	9	3.70	5
Alcohol before pregnancy	29.36	32	22.96	31
Alcohol during pregnancy	11.01	12	4.44	6

Table 2 - Results of the chi-square test. Parnamirim, RN, Brazil, 2015

Variables	p value
Age (<20 years and>35years)	≤0.000032
Obesity and pre-pregnancy overweight	≤0.012573
Obesity and overweight at the end of gestation	≤0.006397

Regarding maternal conditions and characteristics, overweight and obesity before and during pregnancy are risk factors for preterm births (Table 2). There was an increase in the prevalence of pregnant women with overweight and obesity BMI during pregnancy. Also, most mothers reported sedentary lifestyle since the preconception period (Table 1).

Finally, Table 1, identified the following habits that are harmful to maternal and child health: use of alcohol, tobacco and illicit drugs during pregnancy. Therefore, most mothers with high blood pressure during pregnancy were overweight and obese.

Table 3 shows that the Apgar score at 5 minutes of age revealed asphyxia of some preterm babies, while none of the full-term babies persisted with asphyxia. In addition, less than half of the preterm infants were born with normal weight and 11.93% (n = 13) were born with extremely low birth weight; while 91.11% (n = 123) of the full-term babies were born with normal weight. Finally, 58.10% (n = 63) of preterm infants encountered difficulties adapting to the extra-uterine environment or had asphyxia, while 96.30% (n = 130) of the full-term infants were healthy.

Table 3 – Characteristics of the birth of preterm and full-term babies. Parnamirim, RN, Brazil, 2015 (continues)

Variables	Preterm		Term	
	%	f	%	f
Gender				
Male	54.13	59	40	54
Female	45.87	50	60	81
Apgar 1'				
< 5	13.89	15	1.48	2
From 5 to 7	14.81	16	7.41	10

from 8 to 9	71.30	77	91.11	123
10	0	0	0	0
Apgar 5′				
< 5	9.26	10	0	0
From 5 to 7	3.70	4	0	0
From 8 to 9	86.11	93	94.7	127
10	0.93	1	5.93	8
Birth weight				
<1000g	11.93	13	0	0
<1500g	5.50	6	1.48	2
<2500g	39.45	43	7.41	10
≥2500g	43.12	47	91.11	123
Health status at birth				
Healthy	41.90	46	96.30	130
With health problems	58.10	63	3.70	5

Only 35.29% of preterm infants of mothers with normal weight at the end of pregnancy had normal weight at birth (Figure 1), unlike 97.62% of full-term infants who were born with normal weight (Figure 2).

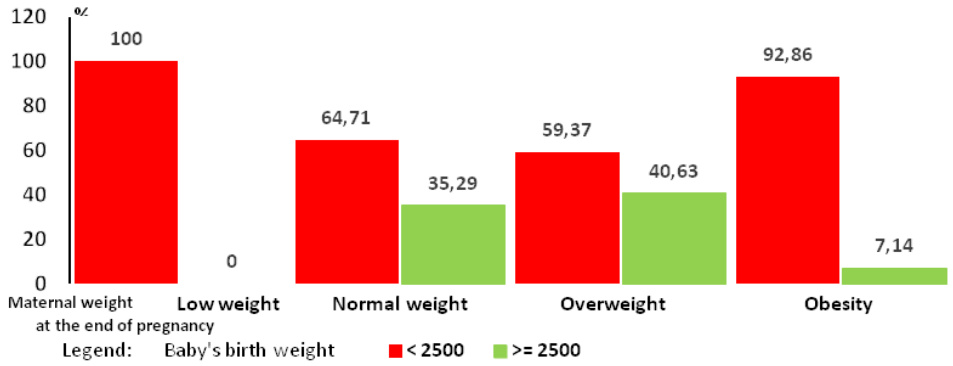

Figure 1 – Maternal weight at the end of pregnancy X Birth weight of preterm baby. Parnamirim, RN, Brazil, 2015

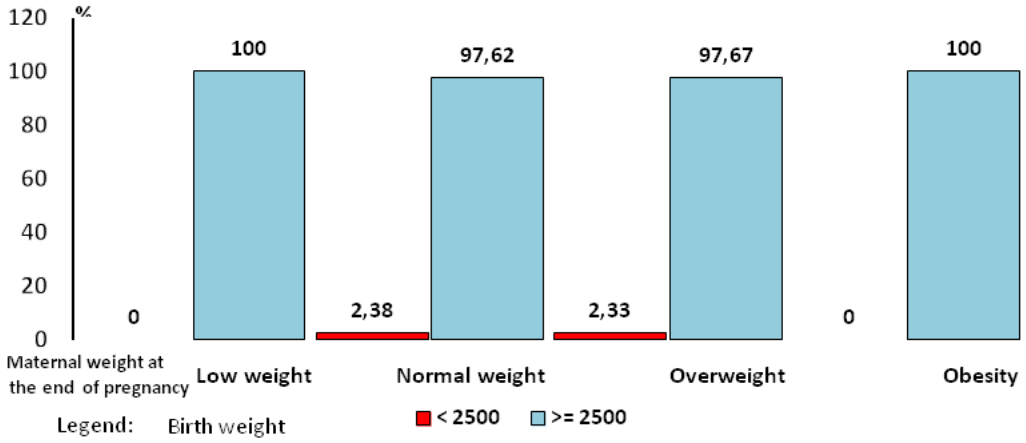

Figure 2 – Maternal weight at the end of pregnancy X Birth weight of full term babies. Parnamirim, RN, Brazil, 2015

Mothers with low educational level and low income are predisposed to poor nutrition. Thus, obesity and overweight, illicit drug users during pregnancy and high blood pressure may be risk factors for preterm birth as an unfavorable event that poses risk to the health of the child.

DISCUSSION

The socioeconomic profile of mothers of preterm and full-term infants showed similar prevalence rates for low level of schooling and income. In a cohort study conducted with different income groups, this situation is considered a risk factor for premature birth, as it reduces access to health information and to the delivery of effective care [17].

Besides, other studies reported that overcrowded houses (where the mothers and the families are not protected and have no privacy) and rented homes are also a risk factor for premature birth [17-19].As shown in Table 1, about one-fifth of mothers of preterm and full-term babies live in a 2or 3-room home, and only a little more than half of mothers of full-term babies live in their own houses.

Regarding marital status, most mothers of preterm and full-term babies reported being married or living with a partner. This factor is important to be emphasized in order to include paternity throughout the puerperal pregnancy cycle, as the participation of men, when there is affection, increases women's safety and establishes a consistent family bond [20].

Nutrition and poor nutritional status of pregnant women before and during pregnancy may impact fetal development and growth, as well as the evolution of pregnancy[21]. Therefore, studies indicate that pregnant women with low weight and obesity are risk factors for preterm birth [19,22], with an odds ratio of 3,030 for obese pregnant women [23].

In Table 2, overweight and obesity before and during gestation are a risk factor for preterm infants. In addition, Table 1 shows an increasing number of mothers with inadequate weight gain during pregnancy, contrasting with a study carried out in a university hospital in São Paulo where the pregnant women had a weight gain of 45% [24].

Thus, the practice of moderate-intensity physical exercises during pregnancy and even before pregnancy may be beneficial to mothers, since it prevents obesity, hypertension and gestational diabetes[25]. However, Table 1 shows that only one-third of the mothers who participated in the study practiced physical exercises prior to pregnancy, contributing to the sedentary lifestyle during gestation.

Systematic review and meta-analysis indicate that excessive alcohol consumption during pregnancy increases the risks of preterm birth, so prevention measures should be encouraged during prenatal visits [26]. Table 1 shows that the pregnant women used alcohol, though the mothers of preterm babies reduced the percentage of use of alcohol, before and during gestation, from 29.36% to 11.01% and the mothers of full-term babies reduced alcohol intake from 22.96% to 4.44% in the referred period.

In addition, family-based and school-based intervention strategies should be adopted to raise awareness among pregnant women of healthy living habits such as non-use of alcohol, smoking and other drugs, since these habits are harmful for maternal and child health [27]. In this sense, Table 1 shows tobacco consumption by mothers of preterm and full-term babies, and which is even more worrying, the prevalence rates of use of illicit drugs (marijuana, crack) before and during pregnancy were practically identical to the prevalence rates in other periods.

The Apgar score is one way to assess the conditions of the newborn. Table 3 shows a high prevalence of full term infants born without asphyxia. However, 13.89% of preterm infants were born with severe asphyxia and 14.81% with moderate asphyxia in the first minute of age, with improvement in the prevalence of the Apgar classification at the fifth minute of life. The Apgar classification predicts the care necessary to ensure adequate adaptation of the infant to the extra-uterine environment.

Birth weight is also a determinant of the health status of newborns, and may be influenced by several factors, such as low socioeconomic level, poor nutrition, smoking, and morbidity during pregnancy. Maternal nutritional status has a significant impact on fetal growth and development [28].

In this regard, Figure 2 shows that most mothers who had normal weight at the end of pregnancy had full-term babies with normal weight. On the other hand, as shown in Figure 1, only one third of the preterm infants had normal birth weight, suggesting association of low birth weight with maternal morbidities during pregnancy and/or resulting from birth conditions before infant growth and development, according to a study in which length of gestation was strongly related with birth weight [29].

Therefore, about half of the preterm infants were born with health problems, while almost all full-term infants were healthy, as shown in Table 4. Thus, it is essential to identify the risk factors for preterm births, since most of them can be prevented through appropriate prenatal care and access to health education. Moreover, it is worth mentioning the importance of family planning, through which valuable guidance related to planned pregnancies is available, ensuring good birth conditions.

The limitations of the present study included patient's dependence on the recollections (remembering) of their past health and pregnancy histories, and on data from patients' records and on the delivery registration books of pregnant women. Therefore, we stress the need to ensure appropriate registration of daily care provided to patient. In order to minimize the referred limitations, we combined the information reported by the mothers and the data recorded by the professionals. Further studies with higher levels of evidence on the determinants of preterm births are needed.

CONCLUSION

Low educational level, adolescent pregnancy and low income predispose to poor nutrition and sedentary lifestyle. The high blood pressure, obesity and overweight of pregnant women who participated in this study were found to be risk factors for preterm births, which may have a negative impact on children's health.

In view of the maternal profile and conditions identified in this study, it was found that most preterm babies had difficulty adapting to the extra-uterine environment and full-term babies were born healthy. Preterm infants were born with asphyxia and low birth weight, regardless of the nutritional status of their mothers, suggesting association with the maternal morbidities that occurred during gestation.

Thus, it is essential to perform family planning and facilitate access to contraceptive methods and health education to stimulate healthy life habits since preconception, appropriate prenatal care for early diagnosis, monitoring and control of blood pressure disorders, as well as for the diagnosis of intercurrences during pregnancy.

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