

# Clinical Complications in Pregnancy and the Relationship with Low Birth Weight and Prematurity of the Newborn

ORIGINAL

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## Abstract

Study in order to know the results of prenatal care related to clinical complications of pregnancy, newborn's low birth weight and prematurity in the context of the users of the service. Descriptive, exploratory research with quantitative approach developed with 305 users who underwent prenatal care in primary care in the city of Mossoró-RN. The data collection occurred from the application of a validated questionnaire, the IPR-Prenatal index. The results indicate that over 50% of pregnant women had some type of complication during their pregnancy process, among intercurrent diseases in pregnancy, and experienced by users, the urinary tract infection was the most prevalent (28.0%), followed by anemia (19.3%) and hypertension (15.7%). Hypertension and anemia were the only events that interfere with the newborn's weight, which showed that the existence of complications contributes in three times to the occurrence of low birth weight. In this sense, the quality of prenatal care can minimize that type of complication.

## Keywords

Complications in Pregnancy; Newborn; Premature.

## Introduction

The complications during pregnancy tend to involve situations such as infectious diseases experienced during pregnancy intercourse

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(urinary tract infection, respiratory infection, toxoplasmosis, syphilis, etc.) or clinical diseases diagnosed during pregnancy (anemia, heart diseases, endocrine diseases, etc.) [1]. Those diseases are indirect obstetric and clinical complications of maternal death and illness, as they result from previous complications, or develop during that period aggravated by the physiological conditions of pregnancy [2].

For a long period, people considered deaths due to pregnancy as fatalities. Gradually, those events were being perceived as markers of the level of social development because, often, they are premature deaths that could be prevented by access to timely and qualified health services [3].

According to the World Health Organization [4], maternal mortality also reflects inequalities between developed and developing countries, in which developed countries have low maternal mortality ratio around 8 to 10 per 100,000 live births. As for developing countries, such as Brazil, there are 62 cases of maternal deaths per 100,000 births.

Most of the deaths and complications that arise during pregnancy, childbirth and postpartum are preventable, with the implementation of actions aimed at the detection and prevention of pregnancy complications. One should effect those strategies during prenatal care, with the dynamic evaluation of risk situations and the identification of problems, for an agile and precise performance and, depending on the problem found, being able to prevent an unfavorable outcome, increasing the risk to the mother or the newborn [5].

Among the high risks, one may infer that maternal clinical complications have close relationship with prematurity and low birth weight in newborns. Knowing problems during pregnancy can contribute to the analysis and development of more efficient practices to change the maternal and perinatal morbidity and mortality profile. Thus, this study aimed to evaluate the results of prenatal care relating clinical complications of pregnancy, low birth weight

of the newborn (NB) and prematurity of newborns in the context of the service users.

## Methods

This is an exploratory and descriptive research with quantitative approach developed with users who perform prenatal care in primary care in the city of Mossoró-RN. This production is an excerpt of the master's research entitled "Evaluation of the prenatal care of usual risk in the city of Mossoró-RN".

The delimitation of the space for research occurred by defining the Basic Health Units (BHU) in the districts of Mossoró in Rio Grande do Norte - Brazil, which had the work of family health teams (FHT). There are six zones that divide the districts of the city, namely: rural, central, east, west, south and north. The central and rural zones were excluded from the sample, since they do not have family health teams and a care dynamics different from the one provided in urban areas, respectively. Finally, the sample consisted of 25 units.

After the delimitation of the units, the population of the research consisted of pregnant women in prenatal care in those areas. The inclusion criterion was users aged over 18, who were in prenatal care and/or had children with up to six months old. Pregnant women who had some kind of mental disorder and/or were drug users were excluded. For the calculation of this sample, one used the formula for finite populations and considered the average of pregnant women in prenatal care, in 2013, in the investigated units. Finally, the sample was 305 users.

Data collection took place between November 2014 and February 2015, from the instrument called the IPR/Prenatal index, built on the guidelines of the Program of Prenatal and Birth Humanization (PHPN) of the Ministry Health, during a research of the MSc in nutrition sciences from the Federal University of Paraíba (UFPB) [6].

The IPR/Prenatal emphasizes the evaluation of prenatal care results, having, as one of the require-

ments, the assessment of the presence of pregnancy complications and the newborn's condition, in the relation gestational age at delivery and birth weight.

The data collected were placed in spreadsheets of Microsoft Office Excel 2013, transformed into charts/tables and analyzed based on the references that justified the study. The identification of factors associated with the emergence of the newborn's low weight was performed using chi-square test or Fisher's exact. The last one was used when the expected frequencies were smaller than five. Finally, the correlation between the presence of complications given the newborn's low weight and gestational rating was quantified using odds ratios with confidence interval of 95%. Adjusted values were obtained by logistic regression. The established significance level was  $p < 0.05$ .

As for the ethical aspects, and in respect to Resolution No. 466/2012 of the National Health Council, this work was submitted to the Research Ethics Committee (CEP) of the State University of Rio Grande do Norte (UERN) and approved under opinion No. 854,846.

## Results

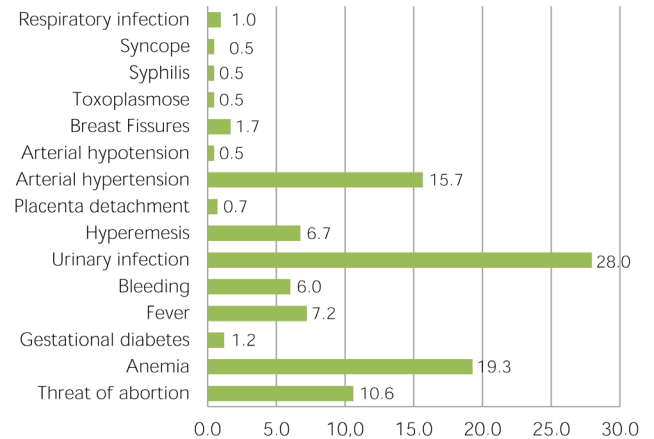
Over 50% of women had some kind of complications during their gestational process, as described in **Table 1**:

**Table 1.** Values of Complications during pregnancy. Mossoró, Rio Grande do Norte, Brazil. 2015.

Variable	Freq.	%	p-value
Complications during pregnancy			
Yes	180	59.0	0.002*
No	125	41.0	

**Figure 1** describes the complications mentioned by the users of the study. Among the intercurrent diseases in pregnancy, and experienced by users, the urinary tract infection was the most prevalent (28.0%), followed by anemia (19.3%) and hypertension (15.7%)

**Figure 1:** Distribution of complications (n=305) in women attended in Mossoró, Rio Grande do Norte, Brazil. 2015.



The following table shows the relationship of pregnancy complications with the newborn's weight. The data showed that hypertension and anemia were the only events that interfered with the newborn's weight. (**Table 2**)

**Table 2.** Values of the simple frequency (%) of the newborn's weight distributed in the studied complications. Mossoró, Rio Grande do Norte, Brazil. 2015.

Complications	Weight						p-value
	>3000		Low weight		Insufficient weight		
	n	%	n	%	n	%	
Threatened Miscarriage							
Yes	29	12.3	05	20.8	10	21.7	0.187
No	206	87.7	19	79.2	36	78.3	
Anemia							
Yes	51	21.7	11	45.8	18	39.1	0.004*
No	184	78.3	13	54.2	28	60.9	
Gestational Diabetes							
Yes	04	1.7	0	0.0	01	2.2	0.646
No	231	98.3	24	100.0	45	97.8	
Fever							
Yes	22	9.4	03	12.5	05	10.9	0.864
No	213	90.6	21	87.5	41	89.1	
Bleeding							
Yes	19	8.1	01	4.2	05	10.9	0.599
No	216	91.9	23	95.8	41	89.1	

Complications	Weight						p-value
	>3000		Low weight		Insufficient weight		
	n	%	n	%	n	%	
Urinary infection							
Yes	90	38.3	09	37.5	17	37.0	0.984
No	145	61.7	15	62.5	29	63.0	
Hyperemesis							
Yes	20	8.5	03	12.5	05	10.9	0.753
No	215	91.5	21	87.5	41	89.1	
Abruptio Placentae							
Yes	03	1.3	0	0.0	0	0.0	0.455
No	232	98.7	24	100.0	46	100.0	
Hypertension							
Yes	46	19.6	10	41.7	09	19.6	0.04*
No	189	80.4	14	58.3	37	80.4	
hypotension							
Yes	01	0.4	0	0.0	01	2.2	0.462
No	234	99.6	24	100.0	45	97.8	
Mammary fissures							
Yes	05	2.1	02	8.3	0	0.0	0.104
No	230	97.9	22	91.7	46	100.0	
Toxoplasmosis							
Yes	02	0.9	0	0.0	0	0.0	0.592
No	233	99.1	24	100.0	46	100.0	

Complications	Weight						p-value
	>3000		Low weight		Insufficient weight		
	n	%	n	%	n	%	
Syphilis							
Yes	01	0.4	0	0.0	01	2.2	0.462
No	234	99.6	24	100.0	45	97.8	
Syncope							
Yes	02	0.9	0	0.0	0	0.0	0.592
No	233	99.1	24	100.0	46	100.0	
Respiratory infection							
Yes	02	0.9	02	8.3	0	0.0	0.055
No	233	99.1	22	91.7	46	100.0	

\*: Statistical significance (p<0.05).

Next, **Table 3** shows the association of complications in relation to the newborn's weight. There was evidence that the existence of complications contributes three times to occurrence of low birth weight.

The investigation found no relationship between complications and pregnancy time experience (**Table 4**).

**Table 3.** Values related to the association of complications given the newborn's weight.

Complications	Weight											
	>3000		Insufficient weight				Low weight					
	n	%	n	%	OR <sub>gross</sub>	CI95%	p-value	n	%	OR <sub>gross</sub>	CI95%	p-value
Threatened Miscarriage												
Yes	133	56.6	27	58.7	1.08	0.54 – 2.19	0.792	20	83.3	3.83	1.22 – 15.83	0.011*
No	102	43.4	19	41.3	1			04	16.7	1		

OR (CI95%): Odds ratio (95% confidence interval) \* Statistical significance (p<0.05)

**Table 4.** Association of complications given gestational rating.

Complications	Gestational rating											
	>3000		Insufficient weight				Low weight					
	n	%	n	%	OR <sub>gross</sub>	CI95%	p-value	n	%	OR <sub>gross</sub>	CI95%	p-value
Threatened Miscarriage												
Yes	150	64.7	02	66.7	1.09	0.05 – 65.2	1.0	50	71.4	1.36	0.73 – 2.59	1.0
No	82	35.3	01	33.3	1			20	28.6	1		

OR (CI95%): Odds ratio (95% confidence interval) \* Statistical significance (p<0.05)

## Discussion

Pregnancy is a natural physiological process, and comprises a sequence of specific physical, psychological and social changes, which require adaptations in the body and life of the woman [1]. Most of the time, pregnancy and childbirth evolve uneventfully, although there are cases in which women develop diseases or health problems that increase the likelihood of an unfavorable outcome for the fetus and herself [5].

The risk of gestational complications may vary according to the exposure to which the pregnant woman is subject, whether by economic issues and/or maternal age, parity, ethnicity, body mass index (BMI) before pregnancy and weight gain during gestation. There are maternal behavioral conditions that also interfere, as the habit of smoking, drinking alcohol and using other drugs [7].

According to the table, 4.59% of the study patients presented some kind of complication during pregnancy. Most interurrences can lead to serious complications and the best way to avoid such complications is through an appropriate and qualified health care [8]. Some studies have identified factors and behaviors that can minimize the effects of pregnancy complications, such as increased educational level, ease of access to the health facility, the availability of the transport system, family support, experience of a previous pregnancy, favorable economic conditions and qualified health care [9, 10]

In fact, one highlights the importance of ensuring those users a qualified prenatal care, since, through that service, health professionals can perform the monitoring of the main pregnancy complications seeking to avoid major complications for mother and child [2].

Studies show that asymptomatic bacteriuria affects between 2 and 10% of all pregnant women, of which approximately 30% will develop pyelonephritis if not treated properly [11].

It characterizes as worrying in the production of health services, especially in the eyes of profes-

sionals responsible for attention to prenatal care, increased incidence of symptomatic urinary tract infections among pregnant women. In that moment, a woman's life the drug therapeutic possibilities are limited due to toxicity of certain drugs for the conceptual product (embryo/fetus and placenta). Therefore, early diagnosis, followed by appropriate and immediate therapy is essential during prenatal care, avoiding compromising maternal prognosis and gestational [12].

In addition to the minimum routine tests during prenatal care, there are others, such as urine culture for screening of asymptomatic bacteriuria, for the urinalysis I generally does not provide diagnostic suspicion in those cases [13].

Anemia also appears as one of the most common obstetrical complications during pregnancy. Study shows that the worldwide prevalence of anemia in pregnant women, in 2011, was 38%, and shows that iron deficiency is the leading cause of anemia during pregnancy [14].

For official documents, anemia in pregnancy occurs when hemoglobin levels are less than 11 g/dl. MOH recommends requiring the levels of hemoglobin and hematocrit (Hb/Ht) in the first prenatal consultation for investigation of anemia, and iron sulfate supplementation prescription (40 mg elemental iron/day) for prophylaxis [13].

Hypertensive disorders of pregnancy, including gestational hypertension and preeclampsia, remain among the most common causes of maternal and perinatal morbidity. The incidence of those complications comprises approximately 12% of the global burden of deaths from hypertension during pregnancy [15].

In the first consultation of a pregnant woman, it is important that the health professional assess the diagnosis of chronic hypertension. If the user does not present, in subsequent consultations, he/she should always measure the blood pressure of pregnant women for early detection of possible pregnancy-induced hypertension [16, 3].

Gestational hypertension without proteinuria occurs when the diastolic blood pressure is > 110 mmHg at any time or when the diastolic blood pressure is > 90 mmHg in two or more consecutive measurement times at intervals > 4 hours after the 20th week. Gestational hypertension with proteinuria characterizes by the results of 24-hour urine test with a total score of protein excretion > 3000mg/24h [16].

The measurement and control of blood pressure during the second half of pregnancy, compared together with the blood pressure in early pregnancy and other maternal risk factors, can improve the identification of women who are at risk of developing preeclampsia. This facilitates the orientation of care for women who tend to be more susceptible to complications during pregnancy [17].

Among the 305 interviewed women, there were two cases of toxoplasmosis. A study carried out between September 1995 and July 2009 that examined cases of congenital toxoplasmosis in 10,000 newborns who underwent neonatal screening, in each Brazilian state, has identified that, in this period, the state of Rio Grande do Norte was the one with the smallest number of cases: 2/10,000 infants with diagnosis of toxoplasmosis. Other states, such as Rondônia and Pará, had the highest numbers. In both, there were 20/10,000 infants with diagnosis of toxoplasmosis [18].

Congenital toxoplasmosis occurs when the mother is infected with *Toxoplasma gondii*, during pregnancy, and the infection spreads to the fetus through the placenta. That transition may cause serious problems for the fetus, including chorioretinitis, intracranial calcifications, hydrocephalus and even fetal death [19, 20]. The degree of severity of the disease depends on the gestational age. So, when infection occurs during the first trimester, the risk becomes greater to the fetus [20]. Therefore, early diagnosis of toxoplasmosis is a crucial step to start the treatment in time, minimizing trans-placental transmission [18, 20].

IgM and IgG toxoplasma are the usual tests for diagnosis of toxoplasmosis, and the health care professional must request them in the first consultation of pregnant women, for early identification of the disease [21].

Another complication identified among pregnant women, to a lesser extent, but that inspires concern, was syphilis. Syphilis is an infectious disease caused by a bacterium, *Treponema pallidum*, predominantly sexually transmitted. Congenital syphilis (CS) is a grievance of mandatory reporting and results from hematogenous spread of *Treponema pallidum* of pregnant women untreated or inadequately treated for their fetus, via the placenta. The presence of the disease is considered a marker event of the quality of care for maternal and fetal health, due to the effective reduction of risk of trans-placental transmission, its relative diagnostic simplicity and easy clinical/therapeutic management [21, 22].

A third of pregnant women infected by *Treponema pallidum*, and not properly treated, can have complications, such as fetal loss, and another third can expose the fetus to congenital syphilis [23]. The CS can cause mortality, prematurity, low birth weight, acute complications, deformities, neurological damage and other consequences for the newborn [24]. Regarding the incidence rate of congenital syphilis in Brazil, in 2011, there was a rate of 3.3 cases per 1,000 live births, while the Northeast and Southeast regions had the highest rates in the year, 3.8 and 3.6, respectively [2].

Syphilis in pregnancy requires immediate intervention, in order to reduce to the maximum the possibility of vertical transmission. The Brazilian MOH guides the research of the disease through the application of the VDRL serological examination during the first prenatal consultation. If the test result is positive for syphilis, one has to establish the treatment and monitoring of the pregnant woman [13].

Authors demonstrate that advances in prenatal care need to be intensified, especially in relation

to preventing infections that can cause congenital diseases to the newborn, and in the control of other gestational complications that can evolve to unfavorable conditions for maternal and fetus health [25].

The data show that anemia and hypertension, events that had significant prevalence values in this study, contribute three times more to the occurrence of low birth weight of the newborn. In the study by Haider [26], anemia diagnosed during prenatal significantly increased the risk of low birth weight compared to the weight of newborns of mothers who did not have anemia. The research stated that the increase in hemoglobin concentration expressed in the exams of pregnant women assisted in the prenatal favors the linear increase in the birth weight of the newborn. Data of such dimension show that gestational complications can lead to unfavorable outcomes for the mother and the fetus, and emphasize the importance of proper monitoring to minimize risks [26].

There are studies that show an association between increased blood pressure during pregnancy and the presence of a shorter gestation and low birth weight of the newborn [17]. The research of Luján [27] supports that result, showing that hypertension is a disease that contributes to fetal growth retardation and low birth weight.

Urinary infection, which had a number of significant cases in this study, did not show any relationship with low birth weight. This finding was similar to the one displayed by Stein-Backes [28], which showed no association between urinary infection and low birth weight, even analyzing in a crude and adjusted form.

The most prevalent complications of this study characterize as complicating situations of pregnancy. Thus, the MOH advises that, when diagnosing any of those events during low-risk prenatal consultations, pregnant women should be referred for high-risk prenatal monitoring offered by SUS [5].

Monitoring the main pregnancy complications in the area covered by the teams of the Family Health

Strategy (FHS), during the low-risk prenatal, meets the ministerial policy. This policy aims to develop and offer a qualified and humanized prenatal and puerperal care to women, with the incorporation of cozy conducts, without unnecessary interventions. Even after guiding that pregnant woman to high-risk prenatal, her follow-up should happen in primary care in a preserved and continuous way to ensure comprehensive health care [2, 11].

Unlike the data from this study, which only verified an association between complications and low birth weight, Haider [26] observed that anemia related to a significantly increased risk of premature birth. In the study, when analyzing the complications and the risk of preterm birth, there was no statistical significance.

Given the presented data, it is important to perform a qualified and humanized prenatal care from early pregnancy to ensure attending the user's real needs. It is necessary to identify signs and symptoms of the main gestational complications, investigating the causes and treating them in order to reduce future complications for the fetus and the mother, since the complications of pregnancy and childbirth are important risk factors for perinatal death [1].

## Conclusion

The study addressed the number of users who had complications during pregnancy, highlighting the most prevalent (urinary infection, anemia and hypertension) and the complications associated with low birth weight and prematurity of newborns. In this case, over 50% of pregnant women had some type of complication during their gestational process and, among the intercurrent diseases in pregnancy, and experienced by users, the urinary tract infection was the most frequent (28.0%), followed by anemia (19.3%) and arterial hypertension (15.7%).

Those data indicate that the complications in pregnancy are not only implications for maternal health, but potentiate the fetal risks, particularly

related to low birth weight. In this sense, the low weight is a concern, since it tends to characterize major difficulties for the newborn and his/her family.

In this dimension, adequate assistance during prenatal care that develops all the protocols established for such monitoring constitutes an important tool to minimize complications of such magnitude and, consequently, reduce risks and costs for maternal and newborn health.

Therefore, becoming aware of problems during pregnancy and their articulation with prematurity and low birth weight in newborns can contribute to the analysis and development of more efficient practices regarding the changes in maternal and perinatal morbidity and mortality profile.

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