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## Gestational attention during early prenatal care: an epidemiological study

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### ABSTRACT

**Aim:** To test the association between early prenatal care and the performance of the procedures recommended by the Program for the Humanization of Prenatal and Birth and the characteristics of mothers and newborns. **Method:** This was an epidemiological study, involving 227 pregnant women hospitalized in a maternity hospital located in Ponta Grossa, PR. **Results:** The demographic and obstetric characteristics of pregnant women and newborns were not associated with the beginning of prenatal care. However, the verification of weight, blood pressure, prescription of folic acid and ferrous sulphate as well as the realization of biochemical tests were associated with the beginning of an adequate prenatal care. **Discussion:** Essential procedures are performed inappropriately during consultations, even those considered simple, bringing greater risk to pregnant women and the newborn. **Conclusion:** The development of public policies related to the quality of prenatal care does not happen in the recommended manner, making clear the importance of nurses in this context.

**Descriptors:** Pregnancy; Prenatal Care; Delivery of Health Care.

## INTRODUCTION

In order to reduce maternal and perinatal mortality, the Ministry of Health established the Program for Humanization of Prenatal and Birth (PHPN), as a measure to expand health-care actions for pregnant woman, and to ensure humane and quality care from pre-natal to newborns, thus being one of the milestones in standardized prenatal care in Brazil<sup>(1)</sup>. The PHPN established not only the number of visits and the gestational age at the beginning of prenatal care, but also listed the laboratory, clinical and obstetric exams, and brought the usefulness of health practices and their precepts into accordance with the models employed throughout the world.

Thus, quantitative parameters to minimal care to be offered to the pregnant women were set, from primary care to the highest levels of complexity, which consist of: early initiation of prenatal monitoring, minimum of six consultations, two procedures of basic exams also including serology for HIV and syphilis, in addition to blood and urine tests. These procedures should be carried out in the first quarter of the year and repeated until the 30<sup>th</sup> week of gestation, and also a puerperal visit is to be made in up to 42 days. Moreover, the performance of clinical breast examination, cervical Pap smear, blood pressure check and the assessment of uterine height and weight are recommended. From the 20<sup>th</sup> week it is necessary to start supplementation with ferrous sulfate and to present complete immunization for tetanus within five years<sup>(2)</sup>.

Early initiation of prenatal care allows the diagnosis of various diseases that have serious repercussions to women's and baby's health, such as chronic hypertension, non gestational diabetes, anemia, syphilis and HIV infection, as well as providing better monitoring of fetal development<sup>(3)</sup>. With the regionalization of he-

alth services, it is possible to articulate and/or mobilize actions to improve the health of the population according to the specificity of each region, with consequent promotion of effective interventions at various levels of activity<sup>(4)</sup>. When considering a referral institution for delivery, there is an interest in outlining the profile of the patients assisted, to recognize their characteristics and to identify risk factors and complications that could be prevented or treated.

In Brazil, in 2010, the Stork Network was implemented as a strategy of the Ministry of Health (MOH), in order to complement the PHPN, promoting strategies that ensure access and improve prenatal quality, such as the provision of transport for consultations and for childbirth, linking the pregnant woman to the reference institution for childbirth, and including the right to a companion, healthcare for the child from birth to 24 months of life and ensuring access to family planning assistance<sup>(5)</sup>. Furthermore, mothers who receive the Family Allowance support through the program of the Ministry of Social Development and Hunger Combat have the right to receive a variable assistance during pregnancy, assisting in family income, regardless of the stage of pregnancy. This program may be discontinued if the mother does not attend the prenatal consultation and does not perform the required examinations. The goal of this discontinuation is to encourage these women to attend these consultations<sup>(6)</sup>.

Considering early detection, by performing the procedures advocated by PHPN in prenatal, of risky situations for pregnant women and fetuses as a priority, we justified the necessity for conducting a survey in Ponta Grossa, PR, to investigate the association between the initiation of prenatal care and the performance of the recommended procedures by the PHPN and the characteristics of women and their newborns.

Considering that there are public policies to ensure adequate prenatal care, and that currently there are existing policies underway throughout the national territory, it is necessary to verify whether the recommended procedures are being performed, and how they affect the quality of care. The objective of this study was to test the association between the onset of prenatal care and the realization of the procedures recommended by the PHPN and the characteristics of women and their newborns.

## METHOD

This is an epidemiological study of quantitative, exploratory and transversal approaches, involving the collection of medical records of 227 pregnant women who delivered in a reference maternity for low risk prenatal care of the city of Ponta Grossa, PR. These women were attended from March 13 to April 13, 2012. In order to enable the execution of the research, we opted for collecting data in a month/year, due to the annual birth rate of the municipality, which is higher than 16.43 births per thousand inhabitants.

Ponta Grossa has an area of 2,025,697 km<sup>2</sup> and is situated in the east center of the state of Paraná, Campos Gerais region, with an estimated population of 314,527 inhabitants <sup>(7)</sup>; it is a reference center for health care.

The inclusion criteria were: being a woman in labor who had performed prenatal care in the county and who had the pregnant woman card next to the records and the Liveborn Children Statement (LCS); the mothers of stillborn babies were, therefore, excluded.

The socio-demographic and obstetric data of pregnant women and newborns identified by the LCS were: maternal age, education, occupation, marital status, number of previous

pregnancies, type of delivery, number of prenatal consultations, gestational age, weight and Apgar scores on the 1st and 5th minutes of life.

To verify the realization of the procedures recommended by the MOH, the data in the pregnant women card was consulted: first consultation (up to 120 days of gestation and after 120 days of gestation); kind of insurance for the realization of prenatal care (UHS, private, or insurance coverage); minimum of six prenatal consultations (yes, no); tetanus vaccine (yes, no); H1N1 vaccine (yes, no); Hepatitis B vaccine (yes, no); blood typing (yes, no); first collection for syphilis serology (yes, no); second collection for syphilis serology (yes, no); first collection of urine (yes, no); the first collection of fasting blood glucose (yes, no); second collection of fasting blood glucose (yes, no); hemogram (yes, no); HIV test (yes, no); preventive examination (yes, no); ultrasound (yes, no); uterine height (yes, sometimes, no); blood pressure (yes, sometimes); prescription of ferrous sulfate (yes, no); prescription of folic acid (yes not); auscultation for fetal heartbeats in the consultation (yes, sometimes, no); and annotation of the probable date of delivery (yes, no).

The completion of the pregnant women card was only considered for procedures of auscultation of fetal heart rate and uterine height measurement, which depended on the gestational age in the consultation, after the second half of pregnancy. For the remaining procedures the filling since the first consultation was considered.

We considered the beginning of adequate prenatal care up to 120 days of gestation and the inadequate or late onset of prenatal care after 120 days of gestation.

The collected data were tabulated in the Excel® spreadsheets program, and arranged in absolute and relative frequency by means of tables. To analyze the association between the

beginning of prenatal care (up to 120 days and after 120 days) and the characteristics of the pregnant women and newborns and the realization of the necessary procedures in prenatal consultations, we used the Chi-square Test and Odds Ratio (OR), with a limit of statistical significance of values set at  $p < 0.005$  through the use of Stata 10.0 statistical software. Exposure was considered the beginning of prenatal care up to 120 days (yes or no) and the outcome of the socio-demographic and obstetric variables of the parturient and the newborn.

This work is part of the project entitled "Quality of prenatal care and its outcome in the city of Ponta Grossa", approved by the Ethics Committee in Research (COEP), State University of Ponta Grossa under opinion number 129/2010, in accordance with Resolution 196/96 for researches involving human beings.

## RESULTS

During the period considered we obtained the records of a total of 227 pregnant women. Of these, 52 (23%) began prenatal care late, that is, after 120 days of gestation. According to the information presented in Table 1, the proper start of prenatal care was more frequent in the age group between 20 and 34, in comparison with the other age groups.

Women who underwent the prenatal consultations in the services offered by the supplementary healthcare presented 1.75 times more chance of starting prenatal care before 120 days of gestation than those served by UHS. With respect to the place of birth, women who performed delivery by means of the Health Insurance Provider or private physician had 1.36 times more chance to get prenatal care earlier than women who delivered through UHS.

Regarding education, there was less possibility for women with higher education to have performed prenatal before 120 days, when compared to women with less education. Furthermore, a lower frequency was found for women with a partner, who began prenatal before 120 days, when compared to those without a partner (OR=0.56), and the chance of remunerated women to have started prenatal care early is 1.26 times higher than those who had no income.

Despite the prevalence of the frequencies of socio-demographic characteristics of mothers who initiated proper prenatal care, no results showed significant statistics.

In Table 2 obstetric characteristics of pregnant women and newborns are presented, but no association between the studied variables and early prenatal care was found.

The measurement of blood pressure and the weight verification of the pregnant women were associated with the proper prenatal care, so that the chance of a woman with frequently checked blood pressure to have started prenatal care up to 120 days was seven times greater than the chance of women who had assessed it occasionally (Table 3). Thus the onset of proper prenatal care significantly favored the monitoring of weight and blood pressure. We also evaluated prevalence regarding frequency of prescription of folic acid, ferrous sulfate, vaccination and the realization of more than six prenatal consultations among the women who started the proper prenatal care, but without statistical significance.

In Table 4 the tests for hemogram, syphilis, first and second collection of fasting blood glucose, urine collection and the first collection for HIV were performed and were, respectively, 5.1, 3.6, 4.2, 4.6, 2, 6 and 2.5 times more frequent among mothers who underwent prenatal with adequate start, when compared to the group that initiated prenatal care later.

**Table 1.** Sociodemographic characteristics of pregnant women admitted to a maternity hospital in the city of Ponta Grossa, according to the beginning of prenatal care. Ponta Grossa, 2012.

Variables	Start prior to 120 days	Start after 120 days	Total	OR	X <sup>2</sup> (p)
<b>Parturient Age</b>					
<20 years	37 (75,51)	12 (24,49)	49	0,89	
20 to 34 years	128 (77,58)	37 (22,42)	165	1	0,09 (0,955)
≥ 35 years	10 (76,92)	03 (23,08)	13	0,96	
<b>Birth health insurance</b>					
SUS	132 (75,86)	42 (24,14)	174	1,36	0,64 (0,424)
Health insurance / private	43 (81,13)	10 (18,87)	53		
<b>Health insurance for pre-natal completion</b>					
UHS	128 (74,85)	43 (25,15)	171	1,75	1,97 (0,161)
Agreement / private	47 (83,93)	09 (16,07)	56		
<b>Education*</b>					
<8 years	61 (82,43)	13 (17,57)	74	1,58	1,64 (0,201)
≥ 8 years	113 (74,83)	38 (25,17)	151		
<b>Marital status</b>					
With partner	54 (70,13)	23 (29,87)	77	1,78	3,20 (0,074)
Without partner	121 (80,67)	29 (19,33)	150		
<b>Occupation*</b>					
Paid work	64 (80,00)	16 (20,00)	80	1,26	0,47 (0,494)
Unpaid work	111 (76,03)	35 (23,97)	146		

\* Two cases excluded for the schooling variable and a case for the occupation variable, which were not reported in the SLB (Statement of Live Birth).

Source: Statement of Liveborn Children, Pregnant women card.

**Table 2.** Obstetric characteristics and features of newborns, according to early prenatal care, Ponta Grossa, PR 2012.

Variables	Start prior to 120 days	Start after 120 days	Total	OR	X <sup>2</sup> (p)
<b>Number of previous pregnancies</b>					
None	75 (76,53)	23 (23,47)	98	1	0,02 (0,877)
One to two	79 (77,45)	23 (22,55)	102	1,05	0,00 (0,971)
More than two	21 (77,78)	06 (22,22)	27	1,01	
<b>Gestational age at delivery</b>					
<37 weeks	05 (71,43)	02 (28,57)	7		0,13 (0,717)
≥ 37 weeks	170 (77,27)	50 (22,73)	120	1,36	
<b>Type of delivery</b>					
Vaginal	113 (79,58)	29 (20,42)	142	1,45	1,33 (0,250)
Caesarean section	62 (72,94)	23 (27,06)	85		
<b>Birthweight</b>					
<2,500 g	08 (88,89)	01 (11,11)	9		0,74 (0,390)
≥ 2,500 g	167 (76,61)	51 (23,39)	218	0,41	
<b>Apgar score</b>					
<7 at 1st minute	05 (100)	—	77	—	—
<7 at 5th minute	01 (100)	—	150	—	—

Source: Statement of Liveborn Children.

**Table 3.** Prevalence of performing procedures established by the Ministry of Health, according to notes from the maternity card, as early prenatal care, Ponta Grossa, 2012.

Variables	Start prior to 120 days	Start after 120 days	Total	OR	X <sup>2</sup> (p)
<b>Note the expected date of delivery</b>					
Yes	163 (77,62)	47 (22,38)	123	1,44	0,44 (0,507)
No	12 (70,59)	05 (29,41)	17		
<b>Verification of height</b>					
Yes	49 (72,06)	19 (27,94)	0,67	1,36	1,39 (0,238)
No	126 (79,25)	33 (20,75)	1		
<b>Tetanus vaccine</b>					
Yes	30 (73,17)	11 (26,83)	41	0,77	0,44 (0,509)
No	145 (77,96)	41 (22,04)	186		
<b>Hepatitis B Vaccine</b>					
Yes	13 (61,90)	08 (38,10)	21	0,44	3,02 (0,082)
No	162 (78,64)	44 (21,36)	206		
<b>Verification of pregnant women weight</b>					
Yes	147 (87,50)	21 (12,50)	168	7,75	39,64 (0,000)
No	28 (47,46)	31 (52,54)	59		
<b>Verification of blood pressure</b>					
Yes	134 (88,74)	17 (11,26)	151	6,89	
No	01 (100)	–	1	–	35,87 (0,000)
Occasionally	40 (53,33)	35 (46,67)	75	1	
<b>Verification of uterine height</b>					
Yes	35 (67,31)	17 (32,69)	52	1,02	0,00 (0,9816)
No	02 (66,67)	01 (33,33)	3	1	3,96 (0,138)
Occasionally	138 (80,23)	34 (19,77)	172	2,03	0,34 (0,560)
<b>Auscultation for fetal heartbeats</b>					
Yes	28 (68,29)	13 (31,71)	41	0,59	
No	04 (100)	–	4	–	1,98 (0,159)
Occasionally	143 (78,57)	39 (21,43)	182	1	–
<b>Prescription of Ferrous Sulfate</b>					
Yes	13 (81,25)	03 (18,75)	16	1,31	0,17 (0,681)
No	162 (76,78)	49 (23,22)	211		
<b>Prescription of Folic Acid</b>					
Yes	22 (88,00)	03 (12,00)	25	2,35	1,89 (0,169)
No	153 (75,74)	49 (24,26)	202	1	
<b>No. of pre-natal consultations</b>					
1-5 consultations	18 (69,23)	08 (30,77)	26	1	1,03 (0,311)
≥ 6 consultations	157 (78,11)	44 (21,89)	201	1,6	

Yes, when checked in every appointment; sometimes when verifying some consultations and not, when it is not performed.

Source: Pregnant women card.

## DISCUSSION

It is known that pregnancy for women younger than 15 years and older than 35 is characterized as a risk factor<sup>(1)</sup>. This study showed an increased risk for this age group due to the higher percentage of late onset of prenatal care.

The study<sup>(8)</sup> reviewed that over 90% of mothers had attended prenatal consultations in some healthcare facilities, of which the minority (12%) sought the private health service. This result is different from the results found in this study, but with the likelihood of prenatal to start properly in the private service. The high percentages and

the statistically significant differences between pre-natal care in public and private services has demonstrated the need for actions aimed at improving the care provided, especially in the UHS<sup>(9)</sup>.

The conditions of lower education and the fact of not having a partner were more common for mothers who began prenatal care in an appropriate period. This reality should be

monitored when an uncertain marital status and low education characterize risk factors<sup>(1)</sup>. However, even with the associated risk, these mothers were ensured of the prenatal care for having started it at the right time. Of the women who began prenatal care, 57% began in the 4<sup>th</sup> month, and the main determinants for the utilization of prenatal care services were maternal age, education, wealth index, pregnancy

**Table 4.** Prevalence of examinations recommended by the Ministry of Health, according to note in the maternity card, as early prenatal care, Ponta Grossa, 2012.

Variables	Start prior to 120 days	Start after 120 days	Total	OR	X <sup>2</sup> (p)
<b>Blood typing</b>					
Yes	161 (78,16)	45 (21,84)	206	1,79	1,42 (0,233)
No	14 (66,67)	07 (33,33)	21		
<b>Hemogram</b>					
Yes	169 (79,34)	44 (20,66)	213	5,12	9,90 (0,002)
No	06 (42,86)	08 (57,14)	14		
<b>1st collection for HIV testing</b>					
Yes	35 (79,55)	09 (20,45)	44	1,2	7,34 (0,007)
No	140 (76,50)	43 (23,50)	183		
<b>2nd collection for HIV testing</b>					
Yes	35 (79,55)	09 (20,45)	44	1,2	0,19 (0,666)
No	140 (76,50)	43 (23,50)	183		
<b>1st collection syphilis serology</b>					
Yes	156 (81,25)	36 (18,75)	192	3,65	12,19 (0,000)
No	19 (54,29)	16 (45,71)	35		
<b>2nd collection syphilis serology</b>					
Yes	71 (84,52)	13 (15,48)	84	2	4,17 (0,041)
No	104 (72,73)	39 (27,27)	143		
<b>1st collection urine</b>					
Yes	153 (80,10)	38 (19,90)	191	2,6	6,19 (0,013)
No	22 (61,11)	14 (38,89)	36		
<b>1st collection of fasting blood glucose</b>					
Yes	168 (80,77)	40 (19,23)	208	4,2	
No	12 (50,00)	12 (50,00)	24		11,71 (0,001)
<b>2nd collection of fasting blood glucose</b>					
Yes	106 (89,08)	13 (10,92)	119	4,6	20,34 (0,000)
No	69 (63,89)	39 (36,11)	108		
<b>Cervical oncotic cytology</b>					
Yes	09 (81,82)	02 (18,18)	11	1,35	0,15 (0,702)
No	166 (76,85)	50 (23,15)	216		
<b>Ultrasonography</b>					
Yes	163 (78,37)	45 (21,63)	208	2,11	2,28 (0,131)
No	12 (63,16)	07 (36,84)	19		

Yes, when it was carried out and not, when it was not performed.

Source: Pregnant women card.

intention, childbirth order and the desire to have more children<sup>(10)</sup>.

We observed predominance in the occurrence of vaginal deliveries, and also a large impact on the number of cesarean sections, especially among those with late initiation of prenatal care. Taking into account the objective of PHPN, which is that the number of Caesarean sections should be reduced, the values observed are quite high when compared to the values considered appropriate by the World Health Organization. In the present study, the overall rate was 37%. However, the corresponding rate in Brazil, in the period from 2005 to 2009, was 44%, while the recommended-for conditions of habitual risk in the obstetric care must be between 5% and 15%<sup>(11)</sup>.

According to the Ministry of Health<sup>(1)</sup>, hypertension (HBP) is a disease that most often complicates pregnancy, affecting 5% to 10% of pregnancies. The Ministry of Health characterizes this as one of the main causes of maternal and perinatal morbidity and mortality, and therefore early diagnosis and appropriate treatment are critical to improving these results. Another study revealed that, among the pregnant women surveyed, 9.6% presented hypertension<sup>(12)</sup>, compared to the values of blood pressure, of which 99% were very well recorded, while the record weight in 78% of cases still needed improvement<sup>(13)</sup>.

Given that pregnancy can induce hypertension in normotensive women, as well as aggravating a pre-existing hypertension, the blood pressure measurement is one of the most important procedures made during all prenatal consultations. Moreover, it is for the professional to identify the factors that may favor hypertension, including excessive weight gain<sup>(1)</sup>. The results of the study showed that starting prenatal early was associated with better performance in the verification of weight and blood pressure,

which reveals better prenatal quality when started early.

The prescription of ferrous sulfate and folic acid was missing on most cards of pregnant women, although in a previous study<sup>(14)</sup>, no association was found between the use of ferrous sulfate by pregnant women and the relationship and the birth of premature babies, who had low-weight and very low birth weight. The authors reinforced the need for further studies on the benefits of supplementation with ferrous sulfate in pregnant women. Supplementation with folic acid is essential for the prevention of neural tube disorders in fetuses, because during pregnancy there is an increase in the demand for this vitamin<sup>(15)</sup>. The study showed that only 4.4% of the studied women used folic acid in the preconception period, emphasizing the need for guidance from health professionals about the importance of folic acid and the need to fortify foods with folic acid<sup>(16)</sup>.

The initiation of early prenatal favors the realization of important laboratory tests during pregnancy, which must already be ordered during the first appointment. The collection of fasting blood glucose should be requested at the first appointment, serving as a screening test for gestational diabetes mellitus (GDM), and must be requested again close to 30 weeks gestation<sup>(1)</sup>. The peripartum diabetes control is very important for the well-being of the newborn, in which case it is an increased incidence of neonatal hypoglycemia in maternal hyperglycemia during this period. In all the patients there is a sudden drop of insulin after the removal of the placenta, and in pregnant women with diabetes there will be, therefore, a necessity for careful monitoring and the need for an insulin prescription<sup>(17)</sup>.

A urinary tract infection is common in young women, and is the most frequent clinical pregnancy complication, occurring in 17 to 20%



of women in this period. It is associated with the premature rupture of membranes, miscarriage, premature labor, chorioamnionitis, low birth weight and neonatal infection, and is a major cause of septicemia in pregnancy<sup>(1)</sup> and the most common maternal factor associated with stillbirth<sup>(18)</sup>.

As important as the complete blood count for anemia screening, since during pregnancy anemia may be associated with the risk of perinatal mortality, low birth weight and pre-term labor<sup>(1)</sup>. This is because, as evidenced in a national<sup>(19)</sup> and international<sup>(20)</sup> study, the early onset of prenatal care is one of the strategies for better control of vertical transmission of these diseases.

## CONCLUSION

From the results of this study, it is concluded that early prenatal favors the implementation of measures recommended by the PHPN, as well as demonstrating the importance of these interventions for the health of both mother and child, and guaranteeing the outcome of a safer childbirth.

The purpose of this study was to determine whether the onset of adequate prenatal favors the implementation of actions and outcomes with less risk to pregnancy, and, taking into account the results, it becomes evident that the onset of prenatal care up to 120 days allows a better monitoring for pregnant women, ensuring that all the recommended examinations are performed, that all recommended tests will be conducted, that the woman starts taking vitamin supplements, and also includes the guarantee of immunization. It is important to remember that the earlier prenatal care begins, the greater the possibility of action for any situation.

The main limitations of this study are related to the fact that it was a cross-sectional study and are due to the use of secondary data. We can mention, as an example, the vitamin supplementation, in which the recorded prescription was considered; therefore, in cases in which prescriptions were not found, we cannot say that the mother did not receive supplementation, but only that the annotation of the prescription was not performed. The SLC category compromises the presence of a partner regarding the marital status, since mothers cohabiting with a partner are classified as unmarried and are considered married only when registered by a public notary's office. The fact that the data collection was done in just one month, and was performed in only one institution of the municipality may also have been limiting factors.

The main contributions of this study were: to reaffirm the importance of early initiation of prenatal care so that it may be done with quality, taking into account that there is little reference to studies on the subject related to early prenatal care, and that there are no previous researches in the municipality.

It is possible to perceive that, despite all the encouragement of public policies and social programs, many pregnant women still end up not performing quality prenatal. The nurse is an active professional in primary healthcare; therefore he or she has a duty to ensure that public policies are carried out according to what is recommended. The nurse is supposed to organize the service, do an active search, work with the entire team and carry out family planning and low risk prenatal consultations (along with the doctor), run educational activities, and promote comprehensive, safe and quality care.

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