

## HYPERTENSIVE SYNDROME AND PERINATAL OUTCOMES IN HIGH-RISK PREGNANCIES

### SÍNDROME HIPERTENSIVA E RESULTADOS PERINATAIS EM GESTAÇÃO DE ALTO RISCO

### SÍNDROME HIPERTENSIVO Y RESULTADOS PERINATALES EN EMBARAZOS DE ALTO RIESGO

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## ABSTRACT

This study aimed to analyze the perinatal outcomes of high risk pregnancies of women with hypertensive syndrome. It was a cross-sectional study, with a documental basis, with 920 records of pregnant women from a high-risk outpatient clinic. The independent variable was hypertensive syndrome, considering arterial hypertension as pre-existing conditions, pre-eclampsia as obstetric antecedents and heart disease of pregnancy (HDP) as clinical complications. The dependent variables were prematurity, low birth weight, Apgar score below than seven in the 1<sup>st</sup> and 5<sup>th</sup> minutes of life, fetal death, infant death, normal delivery and cesarean delivery. To analyze the association between the variables, the Chi-square test was used and Relative Risk was compared in the 95% confidence interval (CI). Of the sample studied, 25.32% presented hypertensive syndrome; 14.36% were classified with arterial hypertension (group 1), 6.73% with preeclampsia (group 2); 4.02% presented DHEG (group 3) and a total of 30.65% normotensive (group 4). In group 1, there was a high risk for fetal death and normal delivery was a protective factor. In group 2, there was a high risk for cesarean section. In group 3, it was a high risk for prematurity and low birth weight. The three groups were at high risk for low Apgar at the 1st and 5th minute. Hypertensive syndromes during pregnancy were associated with unfavorable perinatal outcomes, evidencing the need for specialized care to the pregnant woman through a specialized prenatal and quality.

**Keywords:** Maternal and Child Health; Pregnancy Complications; Pregnancy, High-Risk; Hypertension.

## RESUMO

*Esta pesquisa teve como objetivo analisar os resultados perinatais de gestantes de alto risco com síndrome hipertensiva. Estudo transversal, de base documental, com 920 prontuários de gestantes de um ambulatório de alto risco. A variável independente foi a síndrome hipertensiva, considerando a hipertensão arterial como condições preexistentes, pré-eclâmpsia como antecedente obstétrico e doença hipertensiva específica da gestação (DHEG) como intercorrência clínica. As variáveis dependentes foram prematuridade, baixo peso ao nascer, Apgar inferior a sete no 1º e 5º minutos, morte fetal, morte infantil, parto normal e parto cesáreo. Para analisar a associação entre as variáveis, utilizou-se o teste qui-quadrado e comparou-se o risco relativo no intervalo de confiança (IC) a 95%. Da amostra estudada, 25,32% apresentaram síndrome hipertensiva; 14,36% foram classificadas com hipertensão arterial (grupo 1), 6,73% com pré-eclâmpsia (grupo 2); 4,02% apresentaram DHEG (grupo 3); e 30,65% eram normotensas (grupo 4). No grupo 1 constatou-se risco elevado para morte fetal e o parto normal foi fator de proteção. No grupo 2 verificou-se risco elevado para parto cesáreo. No grupo 3, constituiu risco elevado para prematuridade e baixo peso ao nascer. Os três grupos apresentaram risco elevado para Apgar baixo no 1º e 5º minuto. As síndromes hipertensivas na gestação relacionaram-se a resultados perinatais desfavoráveis, evidenciando a necessidade de cuidados especializados à gestante, por meio de um pré-natal especializado e de qualidade.*

**Palavras-chave:** Saúde Materno-Infantil; Complicações na Gravidez; Gravidez de Alto Risco; Hipertensão.

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## RESUMEN

En esta investigación se busca analizar los resultados perinatales de embarazadas de alto riesgo con síndrome hipertensivo. Estudio transversal, de base documental con 920 registros de embarazadas de una clínica ambulatoria de alto riesgo. La variable independiente fue el síndrome hipertensivo, considerando la hipertensión arterial como condición preexistente, la preeclampsia como antecedente obstétrico y la enfermedad hipertensiva específica del embarazo (DHEG) como intercurencia clínica. Las variables dependientes fueron prematuridad, bajo peso al nacer, Apgar inferior a siete en el 1° y 5° minutos, muerte fetal, muerte infantil, parto normal y cesárea. Para analizar la asociación entre las variables se utilizó la prueba Chi-cuadrado y se comparó el riesgo relativo en el intervalo de confianza (IC) al 95%. De la muestra estudiada, 25,32% presentaron síndrome hipertensivo; 14,36% se clasificaron con hipertensión arterial (grupo 1), 6,73% con preeclampsia (grupo 2); 4,02% presentaron DHEG (grupo 3) y un total de 30,65% normotensas (grupo 4). En el grupo 1 se constató riesgo elevado para la muerte fetal y el parto normal fue un factor de protección. En el grupo 2 se observó riesgo elevado para la cesárea. En el grupo 3, riesgo elevado para la prematuridad y el bajo peso al nacer. Los tres grupos presentaron riesgo elevado para Apgar bajo el primero y quinto minutos. Los síndromes hipertensivos en el embarazo se relacionaron con resultados perinatales desfavorables, evidenciando la necesidad de cuidados especializados a la embarazada, por medio de un prenatal especializado y de calidad.

**Palabras clave:** Salud Materno-Infantil; Complicaciones del Embarazo; Embarazo de Alto Riesgo; Hipertensión.

## INTRODUCTION

Pregnancy is a natural, physiological and dynamic phenomenon, that mostly takes place with no complications. However, despite all types of care, there are cases of women who present health problems, grievances, or develop gestational problems. Hypertension syndromes (HS) are examples of that, and can happen in up to 30% of pregnancies and be classified as chronic hypertension, pre-eclampsia simultaneous with chronic hypertension, and gestational hypertension, with a high risk of maternal and perinatal deaths.<sup>1,2</sup>

HSs are one of the greatest causes of maternal death in the world, second only to hemorrhages.<sup>3</sup> Nearly 800 women die every year from pregnancy or birth complications. In 2013, 289 thousand women died during pregnancy or labor, and most of these deaths were considered to be avoidable.<sup>4</sup> Such problems can include HSs, heart failure, renal impairment, coagulopathy and the association of these ailments to pre-eclampsia. The fetus is also under great risk. Its intra-uterus growth can be restricted, there can be fetal suffering, intra-uterus death, low weight and prematurity.<sup>2,5</sup> In Brazil, the HSs are the main causes of maternal death, affecting from 5 to 17% of pregnant women. Due to their gravity, they are classified as one of the most important causes of gestational hospitalizations in intensive care units (ICUs).<sup>1</sup>

HS-related perinatal outcomes have been described in several studies. A research conducted in northern countries has shown that chronic arterial hypertension increased 5.5 times the risk a newborn has to be smaller than adequate for their gestational age when they are premature, and 1.5 times when they are not.<sup>6</sup> Another study conducted in Paraná found a high percentage 16.8% of infant deaths attributed to arterial hypertension during gestation.<sup>7</sup> These data show the ratio of unfavorable outcomes in pregnancies of women affected by HS. However, even with these results, new studies are necessary to evaluate a population that has been the target of public policies, whose attention is directed at high risk pregnancies.

These policies of attention to women who are in pre-natal, birth, and puerperium periods, aims at reducing mother and child mortality, and their structure is based on the actions of early detection of high risk pregnancies, pre-natal monitoring, risk stratification of the pregnant women and the children, care in a specialized outpatient clinic for pregnant women and children of up to one year of age in situations of risk, and the guarantee of hospital reference for birth, through a system of links to the hospital.<sup>8</sup>

Thus, considering the current policy of attention to high risk pregnancies, the high incidence of HS during gestation, the magnitude of this disease during gestation and its impact in the perinatal outcome, this study aimed at presenting to health professionals the many aspects of HSs manifestation, so that they can focus on strategies that are focused in minimizing unfavorable outcomes that may affect mother and/or child.

## METHOD

A control-case study, with a documental base, was conducted. It consisted in the evaluation of medical records of pregnant women who were monitoring their cases in the high-risk outpatient clinic of the Mãe Paranaense Network (RMP) of a philanthropic hospital in the South of Brazil, on a contract with the Unified Health System (SUS) — a reference for 26 municipalities from the state of Paraná.

The studied population was selected through the evaluation of 920 medical records of pregnant women under medical monitoring in the high-risk outpatient clinic from September 2012 to September 2013. This period was intentionally selected, as it referred to the first year of implementation of this public health policy in the city. From these, 515 medical records were selected for the study and became part of the case and control groups. Data was collected from May to August 2014, through consultations with the then expecting women and the newborn in the outpatient and the maternity of the hospital, and inserted in a form for the later transcription of the information

necessary for the study. Later, the data was transferred to an electronic sheet. It is worth noting that the medical records of the mother and of the newborn are unified after birth, and that made data collection easier.

The independent variable was the HS, which is defined as arterial pressure equal or above 140/90mmHg, based on the average of at least two different measurements. It can also be classified as: chronic hypertension, pre-eclampsia/eclampsia, pre-eclampsia coupled with chronic hypertension and gestational hypertension — also known as hypertensive disease of pregnancy (HDP).<sup>2</sup> According to the risk stratification used in the region, the pregnant women participating in this study were classified in: group I — pregnant women with a pre-existing clinical condition of chronic arterial hypertension; group II — pregnant women with previous cases of pre-eclampsia; group III — pregnant women with HDP in the current gestation; and group IV — normotensive pregnant women (control-group).

The inclusion criteria for the groups I, II and III included only pregnant women with HS who had given birth in the aforementioned hospital (233). Regarding group IV, all normotense pregnant women, homogenized by age, were considered. They were paired by one or two, until all women in the sample had been analyzed (282). Pregnant women who had given birth outside of the health establishment to which the high-risk outpatient clinic referred its patients were excluded from the study (173), as well as those who did not fit the homogenization criteria (different age from those present in the case-group) — 232.

The dependent variables were those related to the newborn: low weight when born (< 2,500 g), low Apgar score in the 1st and 5th minutes of life (<7), prematurity (gestational age < 37 weeks), type of birth (normal or c-section), fetal death and infant death.

The statistical analysis was conducted through the software Open Epi, version 3.03, comparing the relative risk (RR) of the control-group and that of the case-groups. P was considered significant when < 0.05 and the confidence interval (CI) was 95%.

The research respected the Regulation of Directives and Norms of Researches Involving Human Beings of the National Health Council (Resolution CNS 466/2012) and was approved according to Protocol nº 681317/2013 of the Permanent Committee in Ethics and Research with Human Beings of the Maringá State University (COPEP).

## RESULTS

Among the 920 medical records of pregnant women who had been under medical monitoring in the high-risk outpatient's clinic, 25.3% (233) were found to have HS, from which 14.36% (134) had arterial hypertension (group I); 6.7% had history of pre-eclampsia (group II); and 4.02% (37) had presented HDP as a clinical complication in their current gestation (group III). In the control-group (group IV), 30.65% (282) of the expecting woman were included, due to their age and to being considered normotense (Figure 1).

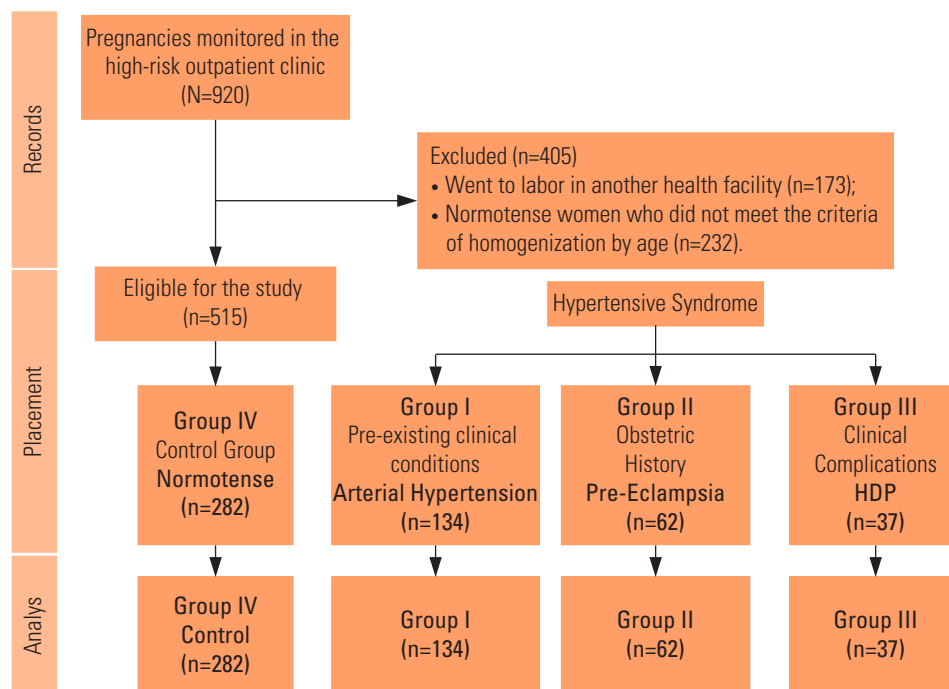


Figure 1 - Sample eligibility.

When group I was compared to the control-group, an increased relative risk was found for Apgar scores below 7 at the 1st (RR =1.88,  $p<0.001$ ) and 5th minutes (RR = 2.48,  $p<0.001$ ); and fetal death (RR=2.36;  $p=0.03$ ). Normal births (RR=0.64,  $p=0.01$ ) was a protective factor for women who suffered from arterial hypertension (Table 1).

In the analysis of group II, women who had had pre-eclampsia in previous pregnancies had a high risk of newborns with an Apgar score below seven in their 1st (RR= 2.33,  $p<0.001$ ) and 5th (RR= 2.96,  $p=0.003$ ) minutes of life. The cesarean section was considered an unfavorable risk factor to the perinatal outcome (RR=4.41,  $p<0.001$ ), while normal labor was a protective factor (Table 1).

Women who had had HDP as a clinical complication in the current gestation (group III) have shown a higher risk for prematurity (RR=2.06,  $p=0.017$ ), low weight upon birth (RR=2.33,  $p=0.009$ ), and low Apgar score in the 1st (RR=2.51,  $p=0.006$ ) and 5th (RR=3.04,  $p=0.038$ ) minutes of life, when compared to the women from the control-group (Table 1).

## DISCUSSION

The results found in this research on the prevalence of pregnant women with HS presented a higher result than that found in the Southeast region of Brazil, which was 17.6%.<sup>9</sup> However, in another research conducted for a hospital that is a regional reference for high risk pregnancies, the rate of HS pregnant women was of 32.7%.<sup>10</sup> This result shows the importance of programs targeted at high risk pregnancies, specialized prenatal care and the assistance to women that need special care to their HSs, since, if they do not receive proper care in the regular prenatal in primary care, secondary health care, with higher technological resources, can provide better attention regarding rooms for labor and, consequently, diminish damage.

In the three HS groups analyzed in this study, the low Apgar scores in the 1st and 5th minutes of life of the newborn were identified as unfavorable perinatal outcomes, in agreement with a study that showed the existence of an association between the Apgar score and epidemiological factors, neonatal mortality, and extreme low weight.<sup>11</sup> Therefore, the Apgar is an important tool for the assessment of the newborn's health, since values below seven indicate moderate or severe anoxia and the need for immediate intervention. For that matter, the valuing of space and teams prepared to act in urgency and emergency neonatal situations can be suggested, whether they are occasioned by low Apgar scores or any other complications. Such a context shows the need for high risk pregnant women to undergo labor in hospitals that are references of high risk care, so they have at their disposal specialized assistance and technological support, aiming at the safety of mother and child.

Fetal death was the outcome of 2.2% of pregnancies in this study, considering the group of pregnant women with pre-existing arterial hypertension. In another study that analyzed deaths of newborns with hypertensive mothers, only 1.3% of the cases related to pre-existing arterial hypertension had the same outcome.<sup>12</sup> It should be highlighted that hypertensive pregnant women had 2.5 times more chance of fetal death when compared with non-hypertensive women. Undergoing prenatal monitoring is also an isolated risk factor, both in developed countries and in developing ones.<sup>13</sup> For that matter, the offer of quality prenatal care in the country becomes necessary, including the early identification of grievances to the health of the mother and fetus, a rigorous control of pressure levels, in addition to raising the awareness of hypertensive mothers regarding a reproductive planning, so that their pregnancy can take place with few risks of negative outcomes.

Table 1 - Analysis of hypertensive syndromes during pregnancy and control group regarding the perinatal results, Maringá, PR – Brazil, 2014

Perinatal Results	Group Control		Group I – Arterial Hypertension				Group II – Pre-eclampsia				Group III – HDP			
	(n=282)		(n=132)				(n=62)				(n=37)			
	n	%	n	%	RR	p	n	%	RR	p	n	%	RR	p
Prematurity (<37 weeks)	70	24.8	43	32.1	1.27	0.119	21	33.9	1.42	0.143	16	43.2	2.06	0.017
Low weight when born (<2,500 g)	38	13.5	23	17.2	1.21	0.320	9	14.5	0.05	0.828	11	29.7	2.33	0.009
Apgar 1 <sup>st</sup> min (< 7)	31	11	35	26.1	1.88	<0.001	17	27.4	2.33	<0.001	10	27	2.51	0.006
Apgar 5 <sup>th</sup> min (< 7)	6	2.1	17	12.7	2.48	<0.001	6	9.7	2.96	0.003	3	8.1	3.04	0.038
Fetal death	1	0.4	3	2.2	2.36	0.032	1	1.6	2.81	0.238	–	–	–	–
Infant death	–	–	1	0.7	–	–	–	–	–	–	1	2.7	–	–
Normal labor	90	31.9	27	20.1	0.64	0.012	4	6.5	0.18	<0.001	7	18.9	0.53	0.106
Cesarean section	191	67.7	103	76.9	1.38	0.055	57	91.9	4.41	<0.001	29	78.4	0.61	0.188

RR: relative risk; CI: confidence interval.  
Source: authors. Data collection.

Regarding perinatal outcomes of women with pre-existing arterial hypertension and those with pre-eclampsia in previous pregnancies, the results presented normal labor as a protective factor, that is, pregnant women who undergo normal labor had better perinatal results than those who went through C-sections. A study conducted in the Netherlands with 756 hypertensive women and women with previous history of pre-eclampsia had favorable results considering the induction of labor from the 37th week of pregnancy on.<sup>14</sup> In addition, another research conducted with 15,354 women in Brazilian hospitals from 2004 to 2005, on factors associated to the performing of C-sections, showed that hypertension and/or pre-eclampsia are factors that directly influence the prevalence of cesarean sections.<sup>15</sup> On the other hand, if the hypertension is aggravated, immediate interventions must be conducted, including this very type of labor, which can also have complications in the procedure itself, such as reactions to the anesthetics, bleeding and infections, risks that are less common during regular labor.

Pre-eclampsia affects from 3 to 5% of pregnancies, and can happen again in future pregnancies,<sup>16</sup> which justifies its stratification of risk as obstetric history. In another study,<sup>17</sup> it was found that the risk of pre-eclampsia was 4.1% in the first pregnancy and 1.7% in future ones. This study, however, shows that the risk was that of 14.7% in the second pregnancy for women who had pre-eclampsia in their first one, and of 31.9% for those who had pre-eclampsia in the last two pregnancies. This result shows the relevance of raising awareness of women regarding the importance of their obstetric history, so they know that previous pregnancies with pre-eclampsia already classify them as high-risk pregnancies. They must also be made aware of the relevance of undergoing reproductive planning, thus avoiding unfavorable outcomes. Considering this condition, the Ministry of Health highlights the need for pregnant women to receive care in specialized outpatient clinics, even if they present no other pregnancy risks.<sup>8</sup>

In this research, prematurity had a significant statistical value in the group of women who had HDP as their clinical complication. This result corroborates the one found by authors who analyzed 5,602 medical records in a hospital in São Paulo, identifying prematurity as one of the main perinatal repercussions of pregnant women with HDP, increasing perinatal morbidity and mortality, with possible immediate or late sequelae.<sup>18</sup> Pregnant women with severe HS have a high risk of premature labor, newborns with low weight when born, newborns too small for their gestational age, admissions in neonatal ICUs, neonatal mortality and/or stillbirth. That is probably due to the worsening of the hypertension and/or the interruption of pregnancy.<sup>19</sup>

As to low weight at birth, studies report that mothers with HDP had 2.6 times more chance of giving birth to low

weight babies.<sup>20</sup> Considering these findings, the importance of specialized monitoring of the gestational and puerperal periods can be clearly seen, since low weight at birth is also associated to prematurity and can bring consequences to the newborn on the short and long-terms.<sup>21</sup> It is worth to note the importance of high-risk prenatal care (HRPN), which will provide pregnant women with specialized consultations, focused exams, labor reference, among other factors that make the monitoring of the whole gestational process easier, minimizing possible risks and aiding on primary care. The follow up must be conducted by physicians and nurses, independently of the level of care in which they work, to implement the connection between the health services needed by high risk pregnancies. The presence of the nurse in this setting, aiming to care for hypertensive pregnant women, is felt through work targeted at raising the awareness of pregnant women when it comes to pregnancy care, food, use of medication, pressure values monitoring, not to mention outpatient clinic care, guidance on the scheduling of consultations and direct communication with primary health care services.

The findings of this research identified unfavorable perinatal outcomes in pregnant women with HS as a pre-existing clinical condition, obstetric history, and previous clinic complications in the current gestation. Among the many variables analyzed in the three groups, the low Apgar score has shown a direct connection to the HS, which requires attention from the HRPN consultations, to improve the habits of pregnant women and the maternal and perinatal outcomes.

Additionally, some of the results found indicate the importance of reproductive planning, as in the case of pre-existing clinical conditions and obstetric history. These findings serve as warnings of the importance of incorporating this subject in the day-to-day care for pregnant women, so they can understand the role of the HRPN during their gestational process, making them feel assisted by different professionals from the field, that can help them in this moment, which is so important for any women.

Future researches that aim to study this subject should also be conducted, considering HS, the habits of pregnant women and family planning, in addition to researches that recognize and value the specialized services connected to secondary care, as those found in this study, since specialized care has such an effective role in the diminution of unfavorable outcomes.

As a limitation of this work, one must mention that data collection took place in a high-risk outpatient clinic, which means that the study can only describe a specific population. Another recommendation of this research are future investigations, contemplating other outpatient clinics to compare the perinatal outcomes that resulted from HS.



## CONCLUSION

Hypertensive syndromes during pregnancy relate to unfavorable perinatal outcomes, evidencing the need for specialized care for the pregnant women, through a specialized and high-quality prenatal care.

The increased risk of fetal death, prematurity, low weight at birth, cesarean sections and low Apgar scores found in the pregnancy of women with HS needs to be considered by the professionals, who should ponder on the best ways to approach previous conducts and propose humane and quality care, diminishing the complications due to HSs.

Considering that the need to create new health strategies targeted at the early identification of grievances during the prenatal period stands out, individualized follow-up and adequate treatment must be considered by the recently implanted public policy of attention for high risk pregnancies. The results found in this study can also contribute to the networks of women's health care, developing lines of care specific to the HSs, with a direct approach that strengthens women during her gestational process.

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