ORIGINAL ARTICLE

PRENATAL CARE AND SYSTEMIC ARTERIAL HYPERTENSION PREVIA IN WOMEN WITH PRE-ECLAMPSIA

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Highlights: (1) Knowledge of the characteristics of women with preeclampsia. (2) Promotion of the development of intersectoral policies for high-risk pregnancies. (3) Strengthening Primary Health Care, not just for women's health.

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ABSTRACT

Hypertensive syndrome in pregnancy has become a serious global health problem, resulting in high hospitalization rates. The objective was to characterize women with preeclampsia treated at a public maternity hospital. This was a retrospective cross-sectional study of pregnant women hospitalized in a public maternity hospital in Piauí between 2017 and 2021, using the International Classification of Diseases (ICD)-10 O14. The sample consisted of 186 medical records. Measures of central tendency, separatrices, simple and relative frequencies, and a chi-

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square test with p<0.05 were used. The measure of the effect of the independent variables on the outcomes was the Prevalence Ratio (PR), measured by Poisson regression. Clinical and obstetric characterization revealed that 70.6% were multigravidae, 37.5% were nulliparous, and 17.7% had already had some type of abortion. The majority of deliveries were cesarean sections (76.2%). A total of 85.7% of pregnant women received prenatal care and 38.4% had up to 6 prenatal appointments, with 31% of pregnant women having their first appointment in the third trimester of pregnancy. Regarding the association of clinical characteristics with previous Systemic Arterial Hypertension (SAH), compared to full-term, preterm gestational age increases the chances of previous SAH by 2.78 times. Regarding clinical characteristics and postpartum complications, preterm births increase the prevalence of postpartum complications by 5.0 times compared to full-term births. The prevalence of previous systemic arterial hypertension was 20.6%. Regarding prenatal care, 85.7% reported having attended prenatal care, with 38.4% reporting up to six appointments. Furthermore, 31% reported late initiation of prenatal care.

Keywords: preeclampsia; prenatal care; pregnant women; hypertension.

INTRODUCTION

Preeclampsia (PE) and eclampsia, also known as Pregnancy-Related Arterial Disease (PDAD), belong to the Gestational Hypertensive Syndromes (GHS), as do chronic systemic arterial hypertension (SAH), PE superimposed on SAH, gestational hypertension, and HELLP syndrome (Hemolysis, Elevated Liver enzymes, and Thrombocytopenia). HELLP syndrome is among the leading causes of maternal-fetal mortality in developing countries, accounting for 60% of direct obstetric maternal deaths [1].

In Brazil, these syndromes are the main isolated cause of maternal morbidity and mortality and the majority of maternal deaths occur in a hospital environment [2]. Hypertensive syndrome in pregnancy has become a serious global health problem, resulting in high hospitalization rates [3]. According to the Sociedade Beneficente Israelita Brasileira Albert Einstein [4], hypertensive syndromes in pregnancy affect 5% to 10% of pregnancies, with a national incidence of 1.5% of preeclampsia and 0.5% of eclampsia.

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The Brazilian Guidelines for Hypertension classify hypertensive disorders of pregnancy as gestational hypertension, preeclampsia, eclampsia, and chronic hypertension with superimposed preeclampsia. Preeclampsia is defined as SBP ≥140 mmHg or DBP ≥90 mmHg, or both, generally after 20 weeks of gestation and often with proteinuria. In the absence of proteinuria, the diagnosis can be considered when there are signs of severity: thrombocytopenia (<100,000.109/L), creatinine >1.1 mg/dL or 2x baseline creatinine, 2x elevation of hepatic transaminases, acute pulmonary edema, abdominal pain, visual symptoms or headache, seizures, without other alternative diagnoses [5].

High blood pressure is responsible for more than 50% of cardiovascular diseases [6], affects 1% to 1.5% of pregnancies, and can be aggravated by preeclampsia in 13% to 40% of cases. It is classified as essential or primary in the vast majority of cases [7]. It can be detected by measuring blood pressure with low-cost medication.

Because it is a pre-existing disease, it is important that the patient undergoes an evaluation before pregnancy by a multidisciplinary team, with the aim of optimizing and/or changing medications with potential risk to fetal health, as well as promoting a healthy lifestyle and assessing the degree of target organ involvement [7].

Prenatal care assesses women during a special period of their lives, in which anxiety, fears, anguish, expectations and uncertainties are directed in a capricious way towards the time of birth, the culminating moment of a period of vigilant waiting and extreme emotion [8].

Based on the context experienced in the author's work routine as a nurse in an obstetric clinic, it was observed that preeclampsia occurs among a variety of patient profiles. Thus, the following research question arose: What are the sociodemographic, clinical, and obstetric characteristics of women with preeclampsia treated in a public maternity hospital?

Thus, the article aims to analyze the sociodemographic, clinical and obstetric aspects of women with pre-eclampsia treated at a public maternity hospital.

METHODOLOGY

Type of study

This is a cross-sectional study, carried out based on medical records of hospitalized pregnant women, from 2017 to 2021, diagnosed with pre-eclampsia in a public maternity hospital in the state of Piauí.

Study location

The study was conducted at the Dona Evangelina Rosa Maternity Hospital (MDER) in Teresina, Piauí state, Brazil. This is a public referral and counter-referral service for tertiary obstetric care, both at the state and municipal levels.

Population and Sample

The population consisted of medical records of pregnant women hospitalized from 2017 to 2021 with a diagnosis of preeclampsia (ICD-10 O14), regardless of gestational age. To calculate the population, a survey of pregnant women was conducted with the Billing department. During the period from January 1, 2017, to August 31, 2021, 36,902 deliveries were performed. The formula for calculating the finite population sample was used, resulting in a sample of 186 medical records. Due to the use of data contained in the patient records, the Data Commitment and Use Agreement (TCUD) and the Confidentiality Agreement were used, respectively.

Inclusion and Exclusion Criteria

Medical records of pregnant women diagnosed with preeclampsia, regardless of gestational age, hospitalized in the aforementioned maternity hospital between January 1, 2017, and August 31, 2021, were included. Unavailable medical records or those with a high number of missing data were excluded.

Data Collection

Data collection was conducted through secondary source research: the medical records of pregnant women hospitalized between 2017 and 2021. A total of 300 medical records were randomly selected; 114 of these had a significant amount of missing data or were not found, and were excluded from the study. A total of 186 medical records were considered eligible. This information was accessed within the service setting, preventing its use outside the hospital.

For data collection, a form was prepared in accordance with pre-established objectives, with the aim of analyzing the association between sociodemographic, prenatal and clinical risk factors and the occurrence of previous systemic arterial hypertension among pregnant women with pre-eclampsia.

Study Variables

The following predictor variables were considered: age, race, education, marital status, origin, parity, mode of delivery, number of prenatal consultations, prenatal location, first consultation, anthropometric data, health habits (smoking, alcoholism, illicit drug use), family and personal history of hypertension, blood pressure measurement, preexisting comorbidities, use of antihypertensive medications, gestational age at delivery, reason for hospitalization, postpartum complications, sulfate therapy, ICU admission, length of hospital stay, and pregnancy outcome. The dependent variable was the occurrence of preeclampsia. Finally, the independent variable consisted of previous hypertension and prenatal care.

Data Analysis

Microsoft Office Excel 2016 was used to tabulate the data. Initially, the participants' characteristics were described using measures of central tendency and separatrices for numerical variables, and simple and relative frequencies for nominal variables. Subsequently, they were associated with two outcomes: previous hypertension and postpartum complications. The chi-square test was used to verify these associations, with $p<0.05$ considered significant. The effect of the independent variables on the outcomes was measured by the Prevalence Ratio

(PR), measured using Poisson regression with a robust variance estimator. Furthermore, a 95% confidence interval was calculated. All analyses were performed using Stata 13 *software*.

Ethical and legal aspects

This study was developed in accordance with the requirements of the Resolution of the National Health Council of Brazil (CNS) No. 466, of December 12, 2012. The research was approved by the Ethics Committee of the Federal University of Piauí, with CAAE number: 55374721.0.00005214 and opinion number: 5,397,397.

RESULTS

The study included 186 pregnant women, with a mean age of 28.1±6.9 years, 80.2% (n=73) self-identified as brown, 56.2% (n=59) had completed secondary education, 54.2% (n=96) were married or in some type of stable union and 47% (n=87) were from the interior of Piauí (Table 1).

Table 1 – Sociodemographic characteristics of women with preeclampsia treated at a public maternity hospital (n=186). Teresina, Piauí, Brazil.

	N	%
Age at admission		
Mean±SD	28.1±6.9	-
Median (IIQ)	27 (23 – 33)	-
Min – Max	13 – 44	-
Race		
Not brown	18	19.8
Brown	73	80.2
Education		
Illiterate	1	1.0
Elementary School	33	31.4
High School	59	56.2
Higher education	12	11.4
Marital status		
Single	79	44.6
Married/Living together/Stable union	96	54.2
Not informed	2	1.1
Origin		
Teresina	78	42.2
Interior of Piauí	87	47.0
Other states	20	10.8

Source: Research data. Prepared by the author .

Regarding the clinical and obstetric characterization, it was observed that 70.6% (n=130) were multigravidas, 37.5% (n=69) were nulliparous and 17.7% (n=32) had already had

some type of abortion and the majority of births were by cesarean section (76.2%; n=177). In addition, 85.7% (n=156) of the pregnant women had prenatal care and 38.4% (n=61) had up to 6 prenatal consultations, with 31% (n=48) of the pregnant women having their first consultation only in the third trimester of pregnancy (Table 2).

Table 2 – Clinical and obstetric characteristics of women with preeclampsia treated at a public maternity hospital (n=186). Teresina, Piauí, Brazil.

	N	%
Gestation		
Firstborn	54	29.4
Multigravida	130	70.6
Parity		
Nulliparous	69	37.5
Primiparous	61	33.2
Multiparous	54	29.3
Abortion		
Yes	32	17.7
No	149	82.3
Type of delivery		
Vaginal	2	1.1
Caesarean section	182	98.9
Had prenatal care		
Yes	156	85.7
No	5	2.8
Ignored	21	11.5
Number of prenatal consultations		
Up to 6	61	38.4

Over 6	98	61.6
First prenatal consultation		
1st quarter	106	68.4
2nd quarter	1	0.6
3rd quarter	48	31.0
Family history of hypertension		
Yes	85	46.7
No	97	53.3
Previous hypertension		
Yes	38	20.6
No	146	79.4
Pressure measurement		
Normal BP	28	15.3
Gestational hypertension	155	84.7
Other comorbidities		
Yes	29	15.7
No	156	84.3
Hypertension medications		
Yes	69	37.3
No	116	62.7
Proteinuria		
Yes	7	3.8
No	177	96.2
Liver enzymes		
Yes	184	100.0

No	0	00.0
Labstix		
Yes	12	6.5
No	172	93.5
Creatinine		
Yes	181	1.6
No	3	98.4
Hemoglobin		
Yes	183	0.5
No	1	99.5
Hematocrit		
Yes	179	97.3
No	5	2.7
LDH		
Yes	145	78.8
No	39	21.2
Platelet		
Yes	183	99.5
No	1	0.5
Uric Acid		
Yes	177	96.2
No	7	3.8
Urea		
Yes	126	68.5
No	58	31.5
Gestational age at delivery		
Preterm	51	21.2

Term	129	71.3
Post-term	1	0.5
Postpartum complications		
Yes	20	10.9
No	164	89.1
Sulfatherapy		
Yes	167	91.8
No	15	8.2
ICU admission		
Yes	15	8.2
No	169	91.8
Length of hospital stay		
Mean±SD	6.1±5.8	
Median (IIQ)	4 (3 – 6)	
Min – Max	2 – 42	
Gestational outcome		
Term	150	81.1
Preterm	33	17.8
Fetal death	2	1.1

Source: Research data. Prepared by the author.

Regarding the association of clinical characteristics with previous hypertension, it was identified that the presence of other comorbidities decreased the prevalence of previous hypertension by 59% (95% CI: 0.23–0.71). On the other hand, the use of medications for hypertension increased the prevalence by 19.9 times (95% CI: 6.34–61.45). It is noteworthy that, compared to full term, preterm gestational age increases the chances of previous hypertension by 2.78 times (95% CI: 11.29–5.98) (Table 3).

Table 3 – Association of clinical characteristics and previous hypertension of women with preeclampsia treated at a public maternity hospital (n=186). Teresina, Piauí, Brazil.

	Previous hypertension				
	Yes (%)	**No (%)**	**PR**	**IC**	**p-value**
Pressure measurement					
Normal BP	5 (17.9)	23 (82.1)	1	-	-
Gestational hypertension	14 (20.9)	53 (79.1)	1.17	0.46 – 2.95	0.739
Severe gestational hypertension	19 (21.8)	68 (78.2)	1.22	0.50 – 2.98	0.658
Other comorbidities					
Yes	12 (41.4)	17 (58.6)	0.41	0.23 – 0.71	0.002
No	26 (16.8)	129 (83.2)	1	-	-
Hypertension medications					
Yes	35 (51.5)	33 (48.5)	19.9	6.34 – 61.45	< 0.001
No	3 (2.6)	113 (97.4)	1	-	-
Gestational age at delivery					
Preterm	17 (34.0)	33 (66.0)	2.78	1.29-5.98	0.011
Term	20 (15.5)	109 (84.5)	1	-	-
Post-term	0 (00.0)	1 (100.0)	*	*	*
Postpartum complications					
Yes	7 (36.8)	12 (63.2)	1.94	0.99 – 3.81	0.051
No	31 (18.9)	133 (81.1)	1	-	-

Source: Research data. Prepared by the author
*Could not calculate

Regarding clinical characteristics, it was observed that, in relation to gestational age, the prevalence of postpartum complications increases by 5.0 times (95% CI: 1.86-14.66) (Table 4).

Table 4 – Association of clinical characteristics and postpartum complications of women with preeclampsia treated at a public maternity hospital (n=186). Teresina, Piauí, Brazil.

	Postpartum complications				
	Yes (%)	No (%)	PR	IC	p-value
Pressure measurement					
Normal BP	2 (7.1)	26 (92.9)	1	-	-
Gestational hypertension	8 (11.8)	60 (88.2)	1.65	0.37 – 7.30	0.512
Severe gestational hypertension	10 (11.6)	76 (88.4)	1.63	0.38 – 7.01	0.513
Other comorbidities					
Yes	2 (6.9)	27 (93.1)	0.59	0.15 – 2.43	0.469
No	18 (11.6)	137 (88.4)	1	-	-
Hypertension medications					
Yes	6 (8.7)	63 (91.3)	0.71	0.29 – 1.78	0.469
No	14 (12.2)	101 (87.8)	1	-	-
Gestational age at delivery					
Preterm	12 (24.0)	38 (76.0)	5.0	1.86-14.66	**0.001**
Term	7 (5.8)	114 (94.2)	1	-	-
Post-term	0 (00.0)	1 (100.0)	*	*	*

Source: Research data. Prepared by the author.
*Could not calculate

DISCUSSION

This type of study addressing the early identification of maternal characteristics and risk factors for pre-eclampsia is necessary for specific care, in addition to contributing to the reduction of morbidity and mortality rates of the disease and costs caused by hospitalization of the mother and child.

Regarding maternal age, a retrospective documentary study of 94 pregnant women from six Family Health Strategy teams in a municipality in Piauí showed that the ages ranged from 15 to 47, with 1.1% being over 40.9 This result is consistent with our study, in which the mean age was 28.1 years (standard deviation = ± 6.9). This age group is considered a determining factor for complications arising during pregnancy. However, age alone should not be generalized; professionals should assess other risk factors for the development of PE during prenatal consultations.

Ethnicity, race, or skin color is a difficult variable to assess in the Brazilian population due to racial mixing and because it is self-reported and subjective. This imprecision can hinder data analysis. Our research shows that 80.2% of pregnant women self-identified as brown. A systematic review and meta-analysis study [10] concluded that, in Black women, the respective risks of total preeclampsia and preterm preeclampsia were 2 times and 2.5 times higher, respectively, than in White women. Race is frequently associated as a risk factor for preeclampsia; however, social sciences show that this construct is not a robust biological category, but rather a social, cultural, and political concept with deep historical roots [11].

In the present study, 32.4% (n=35) of the women had low education, which was also evidenced in a descriptive study carried out in a reference maternity hospital in Ceará, in which, of the 120 interviewees, 87.5% (n=105) had 6 to 11 years of education [12]. A higher risk of developing preeclampsia is evident for women with intermediate education, as well as for those with lower income. Furthermore, low education is related to less access to information and a limited understanding of the importance of health care [13].

Regarding clinical and obstetric characteristics, this research identified that the majority of pregnant women were multigravidae, 70.6% (n=130) and 37.5% (n=69) were nulliparous,

which is in line with a prospective observational study carried out in Pakistan, where women diagnosed with pre-eclampsia and eclampsia were allocated to a specific group, and their characteristics were compared with women with pre-eclampsia and eclampsia, observing that 6.5% (n=112) were nulliparous, this characteristic being associated with an increased risk of eclampsia and pre-eclampsia [14].

In agreement with this result, a Canadian retrospective cohort concluded that, regardless of gestational age, nulliparity can be considered a risk factor for all outcomes (severe preeclampsia, hemolysis, elevated liver enzymes, and low platelet count and eclampsia syndrome) [15].

On the other hand, Zhang et al. (2020) [16] reported in their study that nulliparity is a risk factor for PE, and the incidence of PE is higher in primiparous than in multiparous pregnancies in the Eastern, Western, and developing worlds. They also point out that parity in the Western world has been consistently in the range of 1–3 compared to the East, as Western women pursue careers, and high childcare expenses limit the number of pregnancies. This suggests regional differences in risk factors and predictors of pregnancy-related disorders, which may be related to each country's birth policies.

Our study revealed that 85.7% (n=156) of pregnant women received prenatal care, and 38.4% (n=61) had up to six prenatal appointments, with 31% (n=48) having their first appointment only in the third trimester of pregnancy. This finding is alarming, given that a worse outcome can be avoided through timely healthcare provision early in pregnancy. In this context, the quest to effectively predict PE in the first trimester of pregnancy aims to identify women at high risk of developing PE, so that necessary measures can be initiated early enough to improve prevention or at least reduce its frequency. This will allow personalized prenatal surveillance to anticipate and recognize the onset of the clinical syndrome and treat it promptly[17].

In Brazil, the Ministry of Health [7] highlights that this risk identification should begin at the first prenatal consultation and recommends that it be carried out dynamically and continuously, and should be reviewed at each consultation. It is essential that the hierarchy of prenatal care is well planned, designed and efficient.

Our findings revealed that women with prior hypertension have a higher risk of preterm and early term birth. As demonstrated by Corrigan et al. (2021) [18] in their study, women with a previous diagnosis of hypertensive disorders were 3.7 times more likely to have preterm labor.

Previous systemic arterial hypertension increases the risks of an unfavorable maternal and child outcome. According to Greenberg et al. (2020) [19], chronic hypertension increases pregnancy morbidity, with higher rates and severity of hypertensive disorders of pregnancy, fetal growth restriction, iatrogenic preterm birth, and stillbirth.

This study had some limitations. Data collection was performed solely from medical records, which prevented the collection of computerized data. Another limitation was that the medical records were not completed properly or contained incomplete information, making it impossible to collect all the variables required for this study. Furthermore, because the study was cross-sectional, it was not possible to longitudinally monitor the impact that maternal characteristics and risk factors had on women's health.

CONCLUSION

The prevalence of pre-existing systemic arterial hypertension was 20.6%. Regarding prenatal care, 85.7% reported having attended prenatal care, with 38.4% reporting up to six visits. Furthermore, 31% reported late prenatal initiation. Preterm gestational age increases the chances of pre-existing hypertension by 2.78 times, while preterm births increase the prevalence of postpartum complications by 5.0 times.

The characteristics of women with preeclampsia treated at a public maternity hospital reveal the importance of a focused approach to this condition, as well as its consequences through interventions, with the aim of reducing maternal mortality. Strengthening primary health care, professional training, and encouraging prenatal care are recommended. This study could contribute to the development of intersectoral policies that encompass different contexts in the pursuit of health promotion by improving the living conditions of high-risk pregnant women. Further research on this topic is needed to better understand the predictors of preeclampsia.

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Mauricio Batista Paes Landim:	Conceptualization; Methodology; Software; Writing – original draft; Writing – review & editing.
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