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Risk factors for preeclampsia in pregnant women in the province of Cienfuegos

Factores de riesgo de preeclampsia en gestantes de la provincia de Cienfuegos

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ABSTRACT

Introduction: preeclampsia is a relatively common hypertensive disorder during pregnancy, with progressive presentation, its cause is still unknown and frequently leads to serious maternal and perinatal complications.

Objective: to determine the risk factors for preeclampsia in pregnant women treated at the "Gustavo Aldereguía Lima" Hospital and in Maternity Homes, belonging to three Health Areas (Area IV, Area VII and Cruces Health Area), province of Cienfuegos, Cuba.

Methods: observational, descriptive, cross-sectional study in pre-eclamptic and non-pre-eclamptic pregnant women; during the period between 2020 and 2024. The universe was made up of 50 pregnant women and the sample was made up of 32, no sampling techniques were used. The variables of age, number of pregnancies, family pathological history, presence of toxic habits, obesity and multiple pregnancy were studied. Descriptive statistics were used.

Results: pregnant women between 21 and 35 years old (n=23; 72%), primigravida (n=18; 56%), without family pathological history of preeclampsia (n=17; 53%), without presence of toxic habits (n =18; 56%), non-obese (n=27; 84%) and without multiple pregnancy (n=29; 91%) were the most represented.

Conclusions: the number of pregnancies and the personal pathological history of

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preeclampsia constituted the risk factors of the pregnant women.

RESUMEN

Introducción: la preeclampsia es un trastorno hipertensivo relativamente común durante el embarazo, de presentación progresiva, su causa aún es desconocida y acarrea con frecuencia graves complicaciones maternas y perinatales.

Objetivo: determinar los factores de riesgo de preeclampsia en las gestantes atendidas en el Hospital "Gustavo Aldereguía Lima" y en Hogares Maternos, pertenecientes a tres Áreas de Salud (Área IV, Área VII y Área de Salud de Cruces), provincia de Cienfuegos, Cuba.

Métodos: estudio observacional, descriptivo, de corte transversal, en gestantes preeclámpticas y no preeclámpticas; durante el período comprendido entre 2020 y 2024. El universo estuvo conformado por 50 gestantes y la muestra por 32, no se emplearon técnicas de muestreo. Se estudiaron las variables edad, número de gestas, antecedentes patológicos familiares, presencia de hábitos tóxicos, obesidad y embarazo múltiple. Se empleó la estadística descriptiva.

Resultados: las gestantes entre 21 y 35 años (n=23; 72 %), primigestas (n=18; 56 %), sin antecedentes patológicos familiares de preeclampsia (n=17; 53 %), sin presencia de hábitos tóxicos (n=18; 56 %), no obesas (n=27; 84 %) y sin embarazo múltiple (n=29; 91 %) fueron las de mayor representación.

Conclusiones: el número de gestas y los antecedentes patológicos familiares de preeclampsia constituyeron los factores de riesgo de las gestantes.

INTRODUCTION

Hypertensive disorders constitute a public health problem, they are among the three leading causes of maternal death in the world, preeclampsia and eclampsia cause complications that end in maternal and perinatal morbidity and mortality and chronic disability, constituting one tenth of maternal and perinatal deaths that occur in developing countries in Asia and Africa, while a quarter occur in Latin American countries, represented by 25.7% of cases of preeclampsia and eclampsia for this region, being the first cause of maternal death. [1,2]

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According to the World Health Organization (WHO), the incidence of preeclampsia ranges between 2% and 10% of total pregnancies, and its prevalence is seven times higher in developing countries (2.4%) than in developed countries (0.4%). The WHO estimates that there are more than 166 thousand deaths from preeclampsia per year. Its incidence is 5% to 10% of pregnancies in adolescents, but mortality is five to nine times higher in developing countries. In Latin America, perinatal morbidity is 8% to 45% and mortality is 1% to 33%. [3,4]

In Cuba, an incidence of between 5% and 10% has been found, and it constitutes one of the first causes of maternal and perinatal morbidity. In the province of Cienfuegos, as in the whole country, multiple cases of preeclampsia are observed in all health sectors. [3,4]

Preeclampsia is the most frequent medical complication of pregnancy. It is a hypertensive disorder that has repercussions on both the mother and the fetus. Early detection of its risk factors is essential for its early treatment. The present research was developed with the objective of determining the risk factors for preeclampsia in pregnant women treated at the “Gustavo Alder Eguía Lima” Hospital and in Maternity Homes, belonging to three Health Areas (Area IV, Area VII and Cruces Health Area), Cienfuegos province, Cuba.

METHOD

A descriptive, observational, cross-sectional study was conducted on pregnant women treated in the obstetric wards of the “Gustavo Aldereguía Lima” Hospital and in Maternity Homes, belonging to three Health Areas (Area IV, Area VII and Cruces Health Area), Cienfuegos province, Cuba; during the period between 2020 and 2024.

The universe consisted of 50 pregnant women and the sample of 32; sampling techniques were not used. All pregnant women who attended the obstetric services of the “Gustavo Aldereguía Lima” Hospital and the Maternity Homes, belonging to the three Health Areas with which the study worked, were included. Patients whose recorded information did not provide the necessary data to evaluate the study variables were excluded.

Data collection was carried out by reviewing the individual medical records of the patients. The

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variables studied were: age (under 20 years, 21-35 years, over 36 years); number of pregnancies (primiparous, secundigestous and multiple pregnancies); family history of preeclampsia (present, not present); presence of toxic habits (present, not present); obesity (present, not present) and multiple pregnancy (present, not present).

For the processing and analysis of the information, a database was created in a Microsoft Excel 2016 spreadsheet. Descriptive statistics were used as the fundamental method for processing the variables, through the use of contingency tables and the calculation of central tendency measures. The levels of association for qualitative variables were calculated (chi square of independence of variables). A $p \leq 0.05$ value was considered statistically significant, so a 95% reliability was used. The Yates correction was applied to all variables that presented values less than 5 in any of their fields. In addition, Cramer's V coefficient was calculated to determine the strength of association between the variables.

The work was approved prior to its completion by the Scientific Council and Medical Ethics Committee of the institution. The direct participation of the patients was not required. The ethical standards set forth in the Second Declaration of Helsinki were respected. The bioethical principles of beneficence and non-maleficence, respect for autonomy and justice were taken into account, respecting the confidentiality of the data obtained, which were only used for research purposes.

RESULTS

Table 1 showed a predominance of pregnant women between 21 and 35 years of age (n=23; 72%) without the presence of preeclampsia (n=14; 88%). The mean age was 26.13 years. The highest proportion of pregnant women with preeclampsia was also found in the group between 21 and 35 years of age (n=9; 56%). When calculating the chi-square test for the independence of variables with a significance level of 5%, no statistically significant differences were found, which is why it is stated that there is no association between the age of the pregnant women and the presence of preeclampsia.

Table 1. Distribution by age and presence of preeclampsia in pregnant women treated in the obstetric

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wards of the "Gustavo Aldereguía Lima" Hospital and in Maternity Homes, belonging to three Health Areas, Cienfuegos province, Cuba; during the period between 2020 and 2024.

Age	Presence of preeclampsia		No presence of preeclampsia		Total	
	No.	%	No.	%	No.	%
Less than 20 years	4	25	0	0	4	13
From 21 to 35 years old	9	56	14	88	23	72
More than 36 years	3	19	2	0	5	16
Total	16	50	16	50	32	100

Source: individual medical records.

Table 2 showed that the highest percentage of pregnant women were primiparous (n=18; 56%) and 88% of them had preeclampsia. The chi-square test of independence of variables was calculated and statistically significant differences were obtained, suggesting that there is an association between the number of pregnancies and the appearance of preeclampsia. In addition, Cramer's V coefficient was calculated, which showed that there is a moderate association between these variables.

Table 2. Distribution according to number of pregnancies and presence of preeclampsia in pregnant women treated in the obstetric wards of the "Gustavo Aldereguía Lima" Hospital and in Maternity Homes, belonging to three Health Areas, Cienfuegos province, Cuba; during the period between 2020 and 2024.

Number of pregnancies	Presence of preeclampsia		No presence of preeclampsia		Total	
	No.	%	No.	%	No.	%
Multigestations	2	13	0	0	2	6

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Secundigest	0	0	12	75	12	38
Firstborns	14	88	4	25	18	56
Total	16	50	16	50	32	100

Source: individual medical records.

Table 3 shows a predominance of pregnant women without a family history of preeclampsia (n=17; 53%), of which most did not have preeclampsia (n=15; 94%). Preeclampsia was observed in a higher proportion in pregnant women with a family history of preeclampsia (n=14; 88%). After calculating the chi-square test for the independence of variables, statistically significant differences were obtained, which leads to the conclusion that there is an association between family history of preeclampsia and the appearance of preeclampsia. Cramer's V coefficient was calculated and a strong association was found between these variables.

Table 3. Distribution according to family history of preeclampsia and the presence of preeclampsia in pregnant women treated in the obstetric wards of the Gustavo Aldereguía Lima Hospital and in Maternity Homes, belonging to three Health Areas, Cienfuegos province, Cuba; during the period between 2020 and 2024.

APF	Presence of preeclampsia		No presence of preeclampsia		Total	
	No.	%	No.	%	No.	%
Presents	14	88	1	6	15	47
Does not present	2	13	15	94	17	53
Total	16	50	16	50	32	100

Source: individual medical records.

Table 4 shows a predominance of pregnant women without toxic habits (n=18; 56%), of which the majority did not present preeclampsia (n=10; 63%). After calculating the chi square of independence of variables with a significance level of 5%, no statistically significant differences were obtained, so it is concluded that there is no association between toxic habits and the appearance of preeclampsia.

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The majority of pregnant women did not present obesity (n=27; 84%). Preeclampsia was observed in a higher proportion in pregnant women who did not present obesity (n=13; 81%). The chi square of independence of variables was calculated and no statistically significant differences were obtained, so it is suggested that there is no association between obesity and the appearance of preeclampsia.

Table 4. Distribution according to toxic habits, obesity and presence of preeclampsia in pregnant women treated in the obstetric wards of the "Gustavo Aldereguía Lima" Hospital and in Maternity Homes, belonging to three Health Areas, Cienfuegos province, Cuba; during the period between 2020 and 2024.

Toxic habits	Presence of preeclampsia		No presence of preeclampsia		Total	
	No.	%	No.	%	No.	%
Presents	6	38%	8	50%	14	44%
Does not present	10	63%	8	50%	18	56%
Total	16	100%	16	100%	32	100%
Obesity	Presence of preeclampsia		No presence of preeclampsia		Total	
	No.	%	No.	%	No.	%
Presents	3	19	2	13	5	16
Does not present	13	81	14	88	27	84
Total	16	50	16	50	32	100

Source: individual medical records.

Table 5 showed a predominance of pregnant women without multiple pregnancy (n=29; 91%) and without the presence of preeclampsia (n=15; 94%). Preeclampsia prevailed in pregnant women who did not have multiple pregnancy (n=14; 88%). When calculating the chi-square of independence of variables with a significance level of 5%, no statistically significant differences were obtained, therefore it is stated that there is no association between multiple pregnancy and the presence of

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preeclampsia.

Table 5. Distribution according to multiple pregnancy and presence of preeclampsia in pregnant women treated in the obstetric wards of the "Gustavo Aldereguía Lima" Hospital and in Maternity Homes, belonging to three Health Areas, Cienfuegos province, Cuba; during the period between 2020 and 2024.

Multiple pregnancy	Presence of preeclampsia		No presence of preeclampsia		Total	
	No.	%	No.	%	No.	%
Presents	2	13	1	6	3	9
Does not present	14	88	15	94	29	91
Total	16	50	16	50	32	100

Source: individual medical records.

DISCUSSION

According to Garrido Gomez [1] the incidence of preeclampsia is reported to be increased in women whose maternal age is less than 21 years or more than 35 years; Medina et al [5], differs from these results because he found that the majority of pregnant women were between 21 and 35 years old, a result that coincides with the study carried out. Franco Lopez [6] also obtained similar results.

For some authors, extreme ages of life (under 20 and over 35 years) are part of the main risk factors for hypertensive disease of pregnancy, and it has been reported that in these cases the risk of suffering from PE doubles. Aro toma Ore [6] showed age as a risk factor for preeclampsia, which does not coincide with this research.

The risks of preeclampsia for the fetus include lack of oxygen and nutrients, which causes poor fetal growth due to preeclampsia itself. Castro Quinde et al [8] found that the highest percentage of pregnant women were primiparous, results that coincide with this study. Checya Segura et al [9], however, observed that the highest proportion of pregnant women who presented preeclampsia were multiparous.

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Hinselmann [10] carried out a review of 6,498 cases in the literature, among which 74% of preeclamptic women were primiparous, and was able to calculate that there is a six-fold higher risk in this group of patients compared to multiparous women. In this sense, nulliparous women have a risk for preeclampsia estimated at 5% to 6%, compared to multiparous women, whose risk is less than 1%. [11]

On the other hand, it has also been said that the primigravida woman, because the uterus has not been previously subjected to the distension of a pregnancy, has throughout her evolution a greater tone of the myometrium which, by compression, decreases the caliber of the spiral arterioles, and this limits the blood perfusion to this area, with the consequent possibility of trophoblastic hypoxia, a phenomenon that has also been implicated in the genesis of PE. Thus, inadequate perfusion of the placenta is followed by its pathological changes, the escape of trophoblast into the circulation, and the consequent and slow development of a systemic intravascular coagulation with important deleterious effects on the whole organism. [11]

If preeclampsia occurred between 34 and full term, the risk of recurrence is 16%. Only in 5% of cases does preeclampsia present itself in a form as severe as in the first pregnancy. In the vast majority of cases, it usually begins later and, therefore, has a better prognosis for the mother and the fetus. In any case, having had a hypertensive disorder in a pregnancy predisposes one to suffer another hypertensive disorder in a subsequent pregnancy. It is noted that preeclampsia has a 20% recurrence rate. [4,11]

In Castro Quinde and Salazar Chunga [8], the pregnant women mostly did not present APF of preeclampsia. Hidalgo Carrera et al [12], showed that APF were found in greater proportion in those pregnant women who presented preeclampsia, and that these constituted risk factors, a result that is in agreement with this study.

Recent epidemiological studies show that preeclampsia has hereditary characteristics and that the mother and the father contribute to the risk of it. It is suggested that first-degree relatives of a woman who has suffered from PE have a 4 to 5 times greater risk of developing the disease when they become pregnant. Likewise, second-degree relatives have a 2 to 3 times greater risk of suffering from it,

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compared to those women in whose families there is no history of PE. It is also suggested that the age of the father may be a risk factor for preeclampsia because the development of the placenta and the fetus depend on the expression of genes of paternal origin. [5,6,11]

PE is considered a complex disease, in which genetic factors contribute to its origin. The genes that are involved in the emergence of PE, of which more than 26 have been found, have been grouped, according to their etiological role in 4 groups: those that regulate the placentation process, those that intervene in the control of blood pressure, those that are involved in the phenomenon of placental ischemia and, finally, those that govern the process of damage/remodeling of the vascular endothelium. [13,14]

Toxic habits in general constitute important risk factors in preeclampsia; during pregnancy they can cause spontaneous abortion, fetal death and a variety of physical, intellectual and behavioral disabilities for life. In Arotoma Ore [7] toxic habits did not constitute risk factors for preeclampsia, a result that coincides with this study.

In developed countries, obesity is a prevalent cause of other diseases, such as cardiovascular disorders or carbohydrate metabolism disorders. Obesity, insulin resistance or carbohydrate intolerance are strongly associated with arterial hypertension outside of pregnancy. Obesity is a predisposing factor for the development of preeclampsia, although the exact mechanism by which obesity favors its appearance is not fully known. It is believed that the association of obesity - hypertension, which is frequent outside of pregnancy, may be the cause of its association in these patients, especially when there is a greater volume of blood and a greater cardiac output in relation to pregnancy. [13,14,15]

In Goicochea Silva [16] obesity was found in the majority of pregnant women, which differed from this study carried out, however, in Martínez Rodríguez [14] a predominance of non-obese and preeclamptic pregnant women was found, results that coincide with those found in this research.

Hidalgo Carrera et al [12] and Checya Segura [9] found in their research that multiple pregnancy is a risk

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factor, a result that is in disagreement with this study.

Blood pressure in pregnant women with multiple pregnancy increases faster from 30 weeks and, in preeclampsia, blood pressure is higher from early in pregnancy and increases faster later. Increased uterine artery flow impedance by Doppler is associated with a higher risk of preeclampsia in twins. [5]

CONCLUSIONS

In conclusion, pregnant women between 21 and 35 years of age, primiparous, without a family history of preeclampsia, without the presence of toxic habits, not obese and without multiple pregnancies were the most represented. Risk factors for preeclampsia were the number of pregnancies and a family history of preeclampsia.

DECLARATION OF CONFLICT OF NTEREST

The authors declare that they have no conflict of interest in the conduct of the research.

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