

The influences of race/color on unfavorable obstetric and neonatal outcomes

As influências da raça/cor nos desfechos obstétricos e neonatais desfavoráveis

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ABSTRACT This is a cross-sectional study, which evaluated race/color influences on unfavorable obstetric and neonatal outcomes. Logistic regression models were constructed to calculate the odds ratio and to examine maternal and neonatal risk. Black pregnant women prevailed with statistical significance among those with low schooling, previous hypertension, three or more living children and with occupation. Black pregnant women presented no greater risk in unfavorable outcomes. Race/color does not behave as a genetic or biological marker, but as a social construct, which can influence health conditions as a social determinant.

KEYWORDS Health differences. Health equity. Ethnic group. Pregnancy result. Newborn.

RESUMO Trata-se de um estudo transversal, que avaliou as influências da raça/cor nos desfechos obstétricos e neonatais desfavoráveis. Foram construídos modelos de regressão logística para cálculo de razão de chance e exame do risco materno e neonatal. As gestantes negras prevaleceram com significância estatística entre aquelas com baixa escolaridade, hipertensão prévia, três ou mais filhos vivos e com ocupação. As gestantes negras não apresentaram maior risco nos desfechos desfavoráveis. A raça/cor não se comporta como um marcador genético ou biológico, mas como construto social, que pode influenciar as condições de saúde enquanto determinante social.

PALAVRAS-CHAVE Desigualdades em saúde. Equidade em saúde. Grupo étnico. Resultado da gravidez. Recém-nascido.

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Introduction

To evaluate inequities in health in Brazil, it is necessary to recover the historical differences that have determined the multiple ways of living, falling ill and dying in the Country. The living conditions of the Brazilian black population have a direct impact on their health, and institutional racism, understood as the inability of services to deal with ethnic differences, encourages the violation of human rights, especially, with regard to black women, who suffer from both sexism and racism¹.

The use of racial categories for the evaluation of inequities in health should consider this social construction of biological differences, not just genetic or geographic differences².

Studies of the categories of classification by race/color began in Brazil in 1976, with the National Household Sample Survey, and intensified mainly in the years 2000, following agreements signed at the World Conference against Racism, Racial Discrimination, Xenophobia and Related Intolerance³, held in Durban, South Africa.

The Policy of Integral Attention to the Health of the Black Population⁴ is a result of the continuous and intense actions of the black movement with the Ministry of Health, which allowed advances in the use of the race/color question in health information systems, and expansion of perception of the influence of race, in addition to physical, biological or genetically determined risks, involving health situations aggravated by the living conditions of the black population in Brazil and by the difficulty of access and/or adequate health care.

Race/color and ethnicity have been used in studies to measure social differences, treatments and outcomes in health. Differences in access, care and outcomes of health status due to race/color have already been observed in Brazil, the United States and the United Kingdom⁵⁻⁷.

The term race/color refers to phenotypic characteristics, especially skin color; ethnicity

emphasizes sociocultural characteristics. In Brazil, the official racial identification classification used by the Brazilian Institute of Geography and Statistics (IBGE) is based on skin color and includes five categories; white, black, brown, yellow and indigenous⁸.

The maternal morbimortality of black women may be related to the biological predisposition of black women to diseases such as hypertension and *diabetes mellitus*, but also to the factors related to the difficulty of access to the health system, the poor quality of care (for social reasons or discrimination) and the lack of actions or training of health professionals focused on the specific risks to which black women are exposed⁹.

Thus, studies that address the issue of racial health in Brazil need to be intensified in order to provide support to professionals, managers and the population in general, so that health care is more equitable. Care can play an important role in alleviating health disparities. Therefore, efforts to improve quality, and clear guidelines for a prenatal, childbirth and postpartum care delivery will increase the access and quality of obstetric care for all women¹⁰.

Those involved in the process of health production, be they workers, managers or users, should appropriate the differences found in indicators constructed with racial cut, so that they can adjust health care and produce health in an equitable way. Based on this scenario, this study aimed to evaluate the association of race/color with unfavorable obstetric and neonatal outcomes in a reference maternity hospital in the Southern region of Brazil.

Methods

This study was carried out in the municipality of Joinville (SC), at Darcy Vargas maternity hospital, a state public institution in the Macroregion of Joinville, to provide comprehensive health care for women, newborns and families.



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The hospital has 132 beds, of which 96 are obstetrical and 36 neonatal, of which 10 are neonatal Intensive Care Unit (ICU).

This is a cross-sectional study, in which all pregnant women hospitalized for delivery between October 2014 and September 2015, older than 18 years, age determined by data availability, were included.

Data collection was performed in the reports generated by the maternity database, with maternal and newborn variables. The race/color was used as an independent variable, respecting the already mentioned categories proposed by IBGE: white, black, brown, yellow and indigenous.

As for the identification method, there was a low degree of disagreement between self-attribution and hetero-attribution. In this study, this information was self-declared heterosexual, according to institution routine. Negative obstetric and neonatal outcomes were compared between white and black pregnant women³.

The evaluation of markers of social insertion used information from the Live Births Information System (Sinasc) and from the database of the IBGE System of Automatic Recovery (Sidra), since this item is not recommended in the maternity database. The absence of the income variable in the banks used was a limitation of this study.

Data were statistically treated using the software Statistical Package for Social Sciences (SPSS), version 21.0. Initially, all variables were analyzed descriptively. With the aim of testing the homogeneity of the groups in relation to the proportions, the Chi-square test or the Fisher's exact test was used for frequencies smaller than 5.

The socioeconomic, demographic and health variables were: age (in complete years grouped into four age groups: <20, 21 to 29, 30 to 34, > 34 years); schooling (grouped in illiterate, literate, incomplete elementary school, complete elementary school, incomplete secondary school, complete secondary school, incomplete higher education and

complete higher education); marital status (with or without partner); current occupation (formal or informal) with occupation, without occupation, retired; number of live children ≥ 3 , >3; number of dead children ≤ 2 , >2; number of prenatal visits: ≤ 6 , >6; pre-gestational diseases: chronic hypertension, pre-gestational diabetes.

For the univariate analysis, the following outcome variables gestational diseases were used: gestational diabetes, gestational hypertension; type of delivery: vaginal, cesarean; gestational age <37, 37 to 41, > 41 weeks; birth weight: <2.500, 2.500 to 4.000, >4.000 grams; apgar at the 1st and 5th minutes <7, ≥ 7 ; malformation (present, absent); and perinatal death (present, absent).

Multivariate logistic regression models were constructed to calculate the odds ratio, in order to examine the maternal risk in the unfavorable outcomes evaluated: gestational diabetes, gestational hypertension; cesarean delivery; premature <37 weeks; low weight <2.500 grams; macrosomia >4.000 grams, apgar 1^o and 5 minutes <7; malformation and perinatal death. The potential effects of the confounding variables were adjusted: age, schooling, marital status, occupation, dead children, prenatal consultation and previous diseases. Confidence intervals of 95% (95%CI) were established, being considered significant values when $p < 0.05$.

The project was submitted to the evaluation of the ethics committee of the University of the Region of Joinville and was approved with opinion number 1.210.357. The confidentiality of the information was guaranteed during the use of the data collected, which will remain in the possession and custody of the researchers and, after five years of publication, will be erased from the digital medium.

Results

In the study period, 5.289 participants of single gestation were evaluated, with 4.557

(86.2%) declared as race/color white and 732 (13.8%), black (black plus brown). 89 twin pregnancies were excluded and 2 were declared as yellow.

The variables occupancy, number of children alive, dead and marital status had a loss of 10% in relation to the others, since they were obtained from different databases, which configured a limitation of the study.

The prevalent age range was between 21

and 29 years old, with no significant differences by race/color. On the other hand, schooling presented a significant difference ($p < 0.01$), with a higher prevalence of black women among those who were literate and with incomplete and complete elementary school, reversing the prevalence of white women among those with complete secondary school and higher education, as shown in *table 1*.

Table 1. Sociodemographic and health characteristics of pregnant women, according to race/color. Joinville, Santa Catarina, Brazil, 2014-2015

	White N=4557 (%)	Black N=732 (%)	Value of p
Age (years)			
≤20	979 (21,5)	166 (22,7)	0,48*
21-29	2.172 (47,7)	335 (45,8)	
30-34	808 (17,7)	123 (16,8)	
>34	598 (13,1)	108 (14,8)	
Schooling			
Illiterate	4 (0,1)	2 (0,3)	<0,01†
Literate	86 (1,9)	32 (4,4)	
Incomplete elementary school	790 (17,3)	184 (25,1)	
Complete elementary school	926 (20,3)	196 (26,8)	
Incomplete secondary school	586 (12,9)	92 (12,6)	
Complete secondary school	1.736 (38,1)	196 (26,8)	
Incomplete higher education	171 (3,8)	14 (1,9)	
Complete higher education	257 (5,6)	15 (2)	
Marital status			
Without partner	829 (18,2)	150 (20,5)	0,06*
With partner	3.249 (71,3)	489 (66,8)	
Occupation			
With Occupation	1.943 (42,6)	344 (47)	<0,01†
With no occupation	2.131 (46,8)	293 (40)	
Retired	4 (0,1)	2 (0,3)	
Number of live children			
≤3	3.623 (79,5)	522 (71,3)	<0,01*
>3	455 (10)	117 (16)	
Number of dead children			
≤2	3.944 (86,5)	619 (84,6)	<0,83*
>2	134 (2,9)	20 (2,7)	

Table 1. (cont.)

Number of prenatal visits			
≤6	228 (5)	36 (4,9)	0,97*
>6	3.431 (75,3)	538 (73,5)	
Pre-gestational diseases			
Chronic hypertension	129 (2,8)	31 (4,2)	0,04†
Pre-gestational <i>diabetes</i>	33 (0,7)	9 (1,2)	0,15†

Source: Own elaboration.

Statistical tests: *Chi-Square; †Fischer exact.

Among the participants, 3.738 (79%) lived with a partner, with no statistical significance due to race/color. There were 2.424 (51%) of them, with a significant difference ($p < 0.01$), with black pregnant women being the majority of those with occupancy.

In relation to the number of children, 4.145 (88%) had less than three live, with statistically significant differences ($p < 0.01$) by race/color, being black among those with more than three live children; and 4.563 (97%) of the participants, with less than two children dead, as provided.

Among the participants, 3% had chronic hypertension. In black pregnant women,

this percentage rises to 4.2%, with statistical significance ($p = 0.04$). It is also worth noting that 42 (1%) pregnant women had pre-gestational diabetes and 3.969 (84%) performed more than six prenatal visits.

Table 2 presents the univariate analysis of obstetric and neonatal outcomes; the participants had 7% of gestational diabetes, 5% of gestational hypertension, 62% had cesarean delivery, 92% with gestational age at 37 and 41 weeks. Regarding birth weight, 86% of newborns presented adequate weight, with 96% having apgar ≥ 7 in the 5th minute. None of the outcomes showed a significant difference according to race/color.

Table 2. Univariate analysis of gestational and perinatal outcomes, according to race/color. Joinville, Santa Catarina, Brazil, 2014-2015

	White N=4557 (%)	Black N=732 (%)	Value of p
Gestational diseases			
Gestational <i>diabetes</i>	297 (6,5)	54 (7,4)	0,38*
Gestational hypertension	215 (4,7)	40 (5,5)	0,38*
Type of delivery			
Vaginal	1.214 (26,6)	200 (27,3)	0,98*
Cesarean	2.830 (62,1)	467 (63,8)	
Gestational age			
<37	371 (8,1)	59 (8,1)	
37-41	4.183 (91,8)	673 (91,9)	0,78†
>41	3 (0,1)	0 (0)	

Table 2. (cont.)

Birth weight (g)			
<2.500	330 (7,2)	48 (6,6)	
2.500-4000	3.944 (86,5)	634 (86,6)	0,671*
>4.000	283 (6,2)	50 (6,8)	
Apgar at the 1st minute			
<7	879 (19,3)	157 (20,1)	
≥7	3.637 (79,8)	574 (78,4)	0,56*
Apgar at the 5th minute			
<7	150 (3,3)	21 (2,9)	
≥7	4.366 (95,8)	699 (95,5)	0,57†
Congenital malformation			
	15 (0,3)	4 (0,5)	0,36†
Death			
Stillborn	41 (0,9)	10 (1,4)	0,231†
Neonatal death	6 (0,1)	0 (0)	

Source: Own elaboration.

Statistical tests: *Chi-Square; †Fischer exact.

For the evaluation of the odds ratio of the unfavorable obstetric and neonatal outcomes according to race/color, a multivariate analysis was performed, with adjustment of potential effects of the confounding variables,

according to *table 3*. The confounding variables used were chosen considering their known relation with the evaluated outcomes.

The unfavorable obstetric outcomes in black pregnant women presented, for

Table 3. Multivariate analysis of obstetric and neonatal outcomes, according to race/color. Joinville, Santa Catarina, Brazil, 2014-2015

	Group (Race/ color)	N (%)	OR Gross (95%)IC	Value of p	OR Adjusted (IC95%)	Value of p
Gestational <i>diabetes</i>	White	297 (6,5)	-	-	-	-
	Black	54 (7,4)	0,87 (0,64-1,18)	0,38	1,06 (0,70-1,60)	0,77
Gestational hyper- tension	White	215 (4,7)	-	-	-	-
	Black	40 (5,5)	1,16 (0,82-1,65)	0,38	1,18 (0,72-1,94)	0,49
Cesarean delivery	White	2.830 (62,1)	-	-	-	-
	Black	467 (63,8)	0,99 (0,84-1,19)	0,98	1,10 (0,87-1,37)	0,40
Prematurity	White	371 (8,1)	-	-	-	-
	Black	59 (8,1)	0,98 (0,74-1,31)	0,93	1,29 (0,83-2,01)	0,24
Low weight at birth	White	330 (7,2)	-	-	-	-
	Black	48 (6,6)	0,82 (0,53-1,26)	0,37	0,72 (0,38-1,37)	0,32
Macrosomia	White	283 (6,2)	-	-	-	-
	Black	50 (6,8)	0,91 (0,66-1,24)	0,55	0,96 (0,64-1,44)	0,86
Apgar 1st <7	White	879 (19,3)	-	-	-	-
	Black	157 (20,1)	1,06 (0,87-1,28)	0,56	1,17 (0,90-1,52)	0,22
Apgar 5th <7	White	150 (3,3)	-	-	-	-
	Black	21 (2,9)	0,87 (0,55-1,39)	0,57	0,71 (0,36-1,38)	0,31

Table 3. (cont.)

Malformation	White	15 (0,3)	-	-	-	-
	Black	4 (0,5)	1,66 (0,55-5,03)	0,36	1,98 (0,50-7,81)	0,32
Stillbirth	White	41 (0,9)	-	-	-	-
	Black	10 (1,4)	1,52 (0,76-3,05)	0,23	1,27 (0,61-2,66)	0,51
Neonatal death	White	6 (0,1)	-	-	-	-
	Black	0 (0)

Source: Own elaboration.

OR - Odds Ratio; CI - Confidence Interval.

Note: Adjusted variables: age, schooling, marital status, occupation, number of live children, number of dead children, number of prenatal consultations, presence of pre-gestational diseases (chronic hypertension and pre-gestational diabetes).

gestational diabetes: (OR=1.06, 95%CI 0.70-1.60), gestational hypertension (OR=1.18, 95%CI 0.72-1.94), cesarean delivery (OR=1.10, 95%CI 0.87-1.37), and prematurity: (OR=1.29, 95%CI 0.83-2.01).

As for the unfavorable neonatal outcomes, the newborns of black pregnant women showed, for low birth weight: (OR=0.72, 95%CI 0.38-1.37), macrosomia: (OR=0.96, 95%CI 0.64-1.44), apgar <7 at the 5th minute: (OR=0.71, 95%CI 0.36-1.38), and malformation: (OR=1.98, 95%CI 0.50-7.81).

Discussion

The comparison of race/color influences between white and black pregnant women proposed in this study, identified significant differences in black pregnant women in relation to chronic hypertension, low education, multiple births and occupation.

The relationship between race/color and socioeconomic, demographic and health variables was also evidenced.

In the analysis of the odds ratio of unfavorable outcomes, no significant differences were found according to race/color.

In Brazil, the conditions, most common diseases or grievances in the black population can be divided into four categories: genetically determined (sickle cell anemia, arterial hypertension, *diabetes mellitus*),

acquired or derived from unfavorable socioeconomic conditions (malnutrition, iron deficiency anemia), evolution aggravated or difficult treatment (myoma, high blood pressure, *diabetes mellitus*), and physiological conditions altered by socioeconomic conditions (growth, pregnancy, childbirth)¹¹.

Poverty, lack of access to health services, and genetic variations may contribute to racial disparities, as to the occurrence of arterial hypertension and *diabetes mellitus*¹².

High blood pressure, which presented a higher prevalence among black women, is considered a public health problem due to its high cost to health services and its social impact. The prevalence varied according to age, gender, race/color, and degree of obesity and the presence of associated pathologies, such as *diabetes mellitus* and renal disease. In women of childbearing age, the prevalence ranged from 0.6% to 2%, between the ages of 18 and 29 years old, and from 4.6% to 22.3%, between the ages of 30 and 39 years old. Although the literature shows black race as a risk factor for pregnancy-specific hypertensive disease, no association was found in this study¹³.

Often, racial disparities can be corrected by adequate access to the health service. Thus, this variable may have been influenced by the adequate number of prenatal consultations. Recognition of racial susceptibilities can help guide care and target interventions to reduce the risk of developing

cardiovascular disease during and after pregnancy¹⁴.

Race/color is a structuring element of social inequalities in Brazil, along with social class, gender and the region of residence. Although racial classification is based on the physical characteristics of individuals, racial discrimination and racism in Brazilian society occur from the pejorative relationship that is made between cultural and physical aspects, observable in body aesthetics, which has effects on social insertion, that is a product of social relations^{5,15}.

The disadvantages of the black population can extrapolate socioeconomic indicators and extend to indicators of access to health services and mortality indicators¹⁶.

The issue of social inequalities in health can be approached from the verification of absolute differences in the living conditions of different populations or through the relative differences between them¹⁷.

Social indicators such as occupation, education and income are determinants of the health status of the population, acting both on the morbidity and mortality profile and on the access and use of health services¹⁸.

Even if it is recognized that race/color is not a risk factor alone, it is necessary to consider the adverse social insertion of the black population, which is an aggravating factor of their vulnerability to health conditions¹⁶.

Maternal schooling can be considered an obstetric risk marker, both for the pregnant woman and the newborn, as it influences when and how the pregnant woman accesses the health service, and the extent to which she understands the self-care and care guidelines with the baby during prenatal visits. In addition, low schooling is associated with low birth weight, multiple births, and fewer prenatal consultations¹⁹.

In this study, black pregnant women prevailed among those with low schooling (illiterate, literate, elementary school). The main determinant of access to education and of progression within adequacy

patterns (age/schoolar year) is family income, with influence on all income ranges of the race/color variable²⁰.

In Brazil, the black population has the lowest wages in the labor market, lower schooling and more restrictions on access to health services. Even when it presents the same level of education as the white population, it does not have similar levels of income¹⁶.

The income variable is not included in the database used. However, data from the municipality show that the black population living in poverty or extreme poverty is twice as large as the white population, which reinforces the synergy between the determinants of access and adequate progression to education²⁰.

There is a need for affirmative public policies aimed at reducing successive losses throughout the educational system, especially, low-income families, in which mostly black children and young people.

Combating inequalities becomes more difficult in the development of public policies, especially when the origin of such inequalities is not only related to social differences but also to racial discrimination¹⁶.

The fertility rate in Brazil is 1.7 children per woman in fertile age. Most of the participants had less than three live children (88%) and less than two dead children (97%); however, black women were significantly concentrated among those with more than three children²¹.

Brazilian family arrangements, in 2012, presented almost 38% of households with women as the reference person. Among the families with a female reference person, 42.7% were women without partners and with children. Black women were at the head of 52.6% of families with a female reference person²².

This family organization makes black women need to ensure the livelihood of their children. Although there are more black women with occupations, they occur predominantly in precarious conditions, which hampers economic autonomy²³.

Occupation is a marker of the social

position of individuals. In this study, black women prevailed among those with occupation. However, the wage distribution of the population of the city of Joinville accompanies the national distribution, with a higher prevalence of the black population among those living with gains between 1/8 of minimum wage and 1 salary, with a reversal of prevalence from 1 minimum wage to more than 10 wages^{18,20}.

The average wage according to race/color and gender, in the municipality, also reflects this income asymmetry; black women present a mean wage 25% lower than that of white women²⁰.

Social policies as direct income transfer programs have already shown that they contribute to the reduction of poverty and inequality, especially for the black population, who live this condition more intensely²⁴.

As for the odds ratio in the unfavorable obstetric and neonatal outcomes according to race/color, no significant differences were shown by race/color, unlike other findings in 14 american states, in which black pregnant women had the worst outcomes⁶.

Hypertensive changes in pregnancy are associated with severe, fetal and maternal complications, and an increased risk of maternal and perinatal mortality. In developing countries, gestational hypertension is the leading cause of maternal mortality, accounting for a large number of hospitalizations in intensive care centers. Black pregnant women have an increased risk of pre-eclampsia, independently of the risk factors for age, pre-eclampsia, obesity and parity²⁵.

Although chronic hypertension was found to be significantly higher among black women, gestational hypertension did not have the same behavior (OR=1.18, 95%CI 0.72-1.94), and may have been corrected by the adequate number of prenatal visits.

Gestational diabetes, estimated nationally in 7.6% of the population, also appears in other studies with higher risk among black women in this one, presented 6.6%,

without significant differences by race/color (OR=1.06, 95%CI 0.70- 1.60) (26) (27) (10).

Cesarean delivery can cause significant and sometimes permanent complications, as well as sequelae or death, especially in cases of emergency cesarean sections for black pregnant women. According to the World Health Organization (WHO), cesarean delivery is linked to a risk of death 3.5 times greater than the risk involved in normal delivery; of puerperal infection five times higher; and with preterm infants, then, it presents rates between 5% and 15% greater. Racial disparities were identified in international studies, such as higher cesarean rates among black women. The Southern region presents the highest percentage of cesarean deliveries, 60.1%, in relation to the normal birth in the Country. In this study, the percentage was 62%, suggesting risks due to the medicalization of delivery, regardless of race/color (OR=1.10, 95%IC 0.87-1.37)^{28,29}.

It is estimated that prematurity, in Brazil, is up to 11.3% of the cases of births, with records of race/color influence when associated with maternal schooling. In international studies, preterm birth remains a risk for black women, although sociodemographic variables are isolated. In this study, the index was 8%, without differences by race/color (OR=1.29, 95%CI 0.83-2.01)^{6,7,10,30,31}.

The WHO estimates that the prevalence of low birth weight is less than 10% in births worldwide. In the United States, in the year of 2013, the percentage was 8%, but among those born to black mothers, it reached 13%. In Brazil, in 2010, the percentage was 8.4%, and black mothers were more likely to have children with low birth weight in all regions and at all levels of schooling. In the South, the percentage of underweight in the same period was 8.7%, and among black women, it reached 10.6%. Low birth weight in this study was 7%, with no differences by race/color (OR=0.72, 95%CI 0.38-1.37)^{32,33}.

The racial differences found in the literature, concerning malformations are not

clear as to their relations with genetic susceptibilities and cultural and/or social differences, and with what could influence this association. In the present study, in relation to malformations, these differences were not found (OR=1.98, 95%CI 0.50-7.81)³⁴.

Thus, the association of race/color with a higher risk of unfavorable outcome, both obstetrical and neonatal, was not revealed when the effects of the confounding variables were isolated. Although there is evidence of the genetic predisposition of the black population for some diseases, the phenotypic classification does not represent a biological homogeneity, since, among individuals with the same phenotypic characteristics, there may be greater genetic variation. In addition, it is difficult to measure the impact of colonization and consequent miscegenation on the genetic component³⁵.

Therefore, for an analysis of the racial cut, it is necessary to consider more than the numerical differences with statistical significance. Historical, socio-political and economic issues contribute to the existence and maintenance or expansion of differentials within groups or intergroups. In addition, racism is not always present, in an explicit and measurable way, in the interactions³⁵.

The results of the research suggest racial, socioeconomic, demographic and health inequalities among black women. In this way, it is possible to infer that the use of the race/color variable in health studies needs to consider it as a social construct, even when used in the analysis of conditions with proven genetic component associated with race/color. The improvement in the living conditions of black women, especially in terms of income and access to the education system with adequate progression, are essential for the health indicators of this population. For this confrontation, affirmative action policies for the black population are necessary as complements of the universal policies, to ensure that the better social insertion

of the black population also results in the reduction of inequalities.

Conclusions

After adjustment to confounding factors, no race/color influences were found in the endpoints studied, even in those with proven genetic interference in other studies, such as gestational hypertension and *diabetes mellitus*.

Considering the different genetic compositions between individuals of the same phenotype and the genetic homogeneity between geographically close individuals, it is possible that diseases with a strong genetic determination manifest themselves with their own characteristics in the Brazilian population, and between the different regions of Brazil, what does not happen in other places in the Americas and even in Africa^{11,36}.

Influences of miscegenation and colonization cannot be measured, but may have an important role in the genetic component in the region studied, reinforcing race/color as a social determinant and not a biological entity.

Diseases linked to poverty may be more incidental than those of genetic origin, due to the situation of inequality experienced by blacks in the Country, and still perceived in indicators of access, including health. The absence of income variable, a marker of social insertion, was a limitation in this study.

Thus, it is important that studies in the health area evaluate race/color as a social construct, considering the effect of socioeconomic condition, access to health service and schooling of the black population in the analysis of the variable as risk to outcomes, once that racial discrimination is not always explicitly and measurably present in social relations³⁷.

Collaborators

Vanessa Cardoso Pacheco: participated in the design of the research and data collection, bibliographical survey, methodology, data analysis and interpretation, article writing and final review.

Jean Carl Silva: participated in the design of research, methodology, data analysis and interpretation, critical review and final review.

Ana Paula Mariussi, Monica Roeder Lima and Thiago Ribeiro e Silva: participated in the methodological design and processing and handling of data. ■

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