



## Maternal Variables Related to High Risk Prenatal

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### Abstract

**Objective:** To analyze maternal variables linked to high-risk prenatal care for hypertension and diabetes. This is a Case-control study with 180 pregnant women, seeking care in a high risk prenatal clinic, in the municipality of Três Lagoas, Brazil. Eighty-two pregnant women (cases) with high-risk pregnancies marked by hypertension and/or diabetes and 98 pregnant women without said chronic diseases (controls) participated in the study. The data was collected by a questionnaire. For statistic, parametric analyses were performed, with a significance level of 5%.

**Results:** Among the variables that characterize the high-risk pregnancies are obesity ( $p < 0.001$ ) and complications in pregnancy ( $p < 0.002$ -Odds ratio 95% CI 3.16/1.56-6.39). The gestational risk was associated with biological factors and cesarean section. Application: health education during prenatal care is essential for the stimulation to change unhealthy habits and a multidisciplinary performance is essential to fight against maternal mortality.

### Keywords

Women's health; Prenatal care; Risk factors; High-risk

### Introduction

The reduction of maternal mortality is a major public health challenge, especially in developing countries [1]. According to the World Health Organization [2], developing countries account for 99% of maternal deaths worldwide. Maternal death is defined as the death of a woman during pregnancy or puerperium, regardless of duration or location of pregnancy and due to any cause related to or aggravated by pregnancy, excluding accidental causes or incidents [3]. Improving health of pregnant women is one of the eight Millennium Development Goals (MDGs) proposed by the United Nations to Governments and civil society. One of the goals among in the MDG was the reduction of 75% in maternal mortality between 1990 and 2015 [1].

The Inter-agency group by United Nations estimate the world maternal mortality ratio (MMR) in 2015 the 216 maternal deaths per 100 000 live births. Although the estimated MMR declined across all

MDG regions between 1990 and 2015, the magnitude of the reduction differed substantially between regions [2].

Thus, Brazil made a progress, but in order to achieve the goal, the RMM should be less than 35 maternal deaths per 100,000 live births among others, the main causes of maternal death are hemorrhage and arterial hypertension [4], both causes which are preventable through prenatal care, childbirth, and qualified puerperal [5].

Studies [6,7] show that hypertension is considered the principal direct maternal death to be the main cause of maternal mortality in developing countries. Another important risk factor for pregnant women is diabetes mellitus [8], the most prevalent metabolic change in pregnancy and a risk factor for arterial hypertension [9].

Considering the epidemiological transition, hypertension and diabetes have both become the most common non-communicable chronic diseases. They are highly related to lifestyle choices and modifiable risk factors such as high body mass index, obesity, physical inactivity, insufficient consumption of fruits and vegetables, smoking, and dyslipidemia [10].

It should be noted that pregnant women with complications of hypertension and/or diabetes should be monitored by both, prenatal clinics of habitual risks and by specialized services for prenatal high-risks, since the access to quality prenatal care services contributes to the reduction of maternal mortality.

The involvement of prenatal teams allows the development of maternal health promoting actions, including the (re) evaluation of risk factors which facilitates prenatal professionals a discussion about actions that should be carried out in order to address the risk factors [11]. Thus, the monitoring of pregnant women in prenatal care should be carried out by a multidisciplinary team, with a view to comprehensive care and adoption based on scientific evidence.

Considering the relevance of the theme and the importance of a (re) organization of the nursing care of pregnant women with gestational risks, we assumed that the present study to examine maternal variables related to hypertension and diabetes will contribute to the prenatal qualification, the purpose of this study was to analyze maternal variables related to prenatal high risk of hypertension and diabetes.

### Materials and Methods

This study is part of the research titled integral attention to the health of people with chronic disease: Diabetes and Hypertension, approved by the Ethics Committee for research involving human subjects at the Federal University of Mato Grosso do Sul, Protocol number 497.420.

We conducted a case-control study in the period from February to August 2015, in the clinic of prenatal high risk called Women's Clinic, in the city of Três Lagoas, Mato Grosso do Sul state, located in the central region western Brazil. The clinic is a reference for another ten municipalities that make up one of the four state health macro-regions. The clinic is part of the Unified Health System (UHS) and has the necessary infrastructure for the realization of high-risk prenatal care.

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A total of 180 pregnant women participated in the present study. Patients were allocated to a group of women with hypertension and / or diabetes (case) and a group of women free of the chronic diseases (control). General inclusion criteria were compliance of 18 years; being pregnant and in any trimester of pregnancy, being assisted by a nursing team and attending a medical examination in the clinic of women. Additionally, participants who were in the case group had to be at high risk of hypertension and / or diabetes mellitus. Further, participants with any kind of physiological impairment that could have prevented them from data collection were excluded. In case of the control group hypertension and/ or diabetes were exclusion criteria. Further, exclusion criteria in both groups were age under 18 years and a missing agreement of participation in the study. After identifying the participants checklist with the inclusion and exclusion criteria was applied in order to confirm the group participations where allocated to. Further, research objectives were presented and participants were asked to participate in the study by signing an agreement of participation. Our study consisted of 180 pregnant women, who performed prenatal care in the primary care network of the city of Três Lagoas, which 82 were assigned on the case group and 98 were allocated on the control group.

The participants answered a questionnaire prepared by the authors with the following variables: biological characteristics (age, self-declared color and body mass index), personal habits (drinking and smoking), demographic (education, marital status, occupation, conditions housing and access to health insurance), health status (health problems in the current and comorbidities gestation), obstetric history (number of pregnancies, complications in a previous pregnancy, complications in childbirth and type of previous births) and related health services (professional accompanying prenatal). The questionnaire was answered individually. Students of undergraduate nursing were responsible for getting the questionnaires. There was training the students to obtain the data, even being answered by the participant. The questionnaire response time was less than 20 minutes. All participants signed the consent form for voluntary participation in research. The research was approved to the Ethics Committee on Human Research from Federal University of Mato Grosso do Sul, Brazil. The study followed the national and international standards of ethics in research involving human subjects.

Data were compiled in Microsoft Excel 2010, with subsequent migration to the Statistical Package for Social Sciences (SPSS) version 21. We calculated the mean and standard deviation (mean  $\pm$  SD) for numerical variables and the distribution of frequency for categorical variables. We conducted univariate analysis between the variables, using the chi-square test of Pearson Association ( $\chi^2$ ) and Fisher's exact test, with the 5% significance level. To determine the strength of association, we calculated the odds ratio (OR) with 95% confidence interval. The Odds Ratio (OR) is a measure of association between an exposure and an outcome. The 95% confidence interval (CI) is used to estimate the precision of the OR. A large CI indicates a low level of precision of the OR, whereas a small CI indicates a higher precision of the OR.

## Results

The characterization of participants showed that in both groups, most of the women belonged to the age group of 24-29 years, although, compared to the control group, the average age of the risk group is slightly:  $29 \pm 27$  and  $6,164 \pm 6.162$  years, respectively.

In terms of education, the average number of years studied by pregnant women was  $9 \pm 2.6$  years. There was a predominance of

mixed color of pregnant women (48.9%), married or living with a partner (68.9%) and dwelling in rented housing (48.9%).

Regarding the classification of body mass index (BMI), BMI of less than 18.5 considered as underweight; a BMI from 18.5 to 24.9 is considered as normal weight; a BMI from 25.0 to 29.9 as pre-obesity; obesity I a BMI from 30.0 to 34.9 as obesity I class; obesity II class refers to a BMI from 35.0 to 39.9 and obesity III class refers to a BMI above 40.0. The average BMI of the risk group was  $32.5 \pm 10.74$ , while in the control group the average BMI was  $28.59 \pm 6.44$ .

As shown in Table 1, a correlation analysis of socio demographic characteristics such as care, habits and health status, was performed and two variables, the body mass index and health problems, showed significance level ( $p < 0.001$ ).

The majority of our participants depend on the National Health System, as this is their only way to access health services. In terms of reported nutritional status and health problems the most frequent in the risk group were: hypertension and diabetes mellitus, and in terms of comorbidities respiratory diseases (bronchitis, sinusitis and rhinitis), obesity and infection urinary were common. In the control group, most frequent health problems were: urinary tract infection, respiratory diseases and obesity.

Table 2 shows data for the obstetric history of the groups studied. The data shows that in pregnant women with chronic diseases the chance of developing of some complications during pregnancy are three times higher (OR = 3.16, 95% CI (1.56 to 6.39)) and the risk of complications during childbirth (cesarean) is also almost three times higher (OR = 2.61, 95% CI (1.12 to 6.08)) compared to pregnant women without chronic diseases.

Most frequently reported complications in previous pregnancies among the risk group were abortions, urinary tract infections and bleeding. In the case group, the most frequent were abortion, hypertensive disease specific of pregnancy (HDP) or preeclampsia and urinary infections. In both groups swelling and bleeding were reported as frequent complication in previous births.

Table 3 shows the data on the relationship with healthcare professionals. Health professionals were reported to be mostly involved in prenatal care of the participants.

In the category other dentists and psychologists were mentioned, both with low frequency.

## Discussion

The description of the participants shows that young women are suffering from chronic diseases. The situation is exacerbated by nutritional status, especially when it comes to obesity, by itself constitute a risk factor for hypertension both as for diabetes and related complications, including pre-eclampsia [12].

On the classification of BMI, data shows that most of the participants in the control group were classified as pre-obese, while in the case group classification [13] corresponds to obesity II. Noteworthy is that obesity is associated with dystocia and increases the chances of birth cesariana [14]. It is recommended to evaluate nutritional status, preferably before pregnancy, with advice on the adoption of habits that can reduce the risk of complications during pregnancy, childbirth and postpartum.

The control group had a higher rate of smoking and drinking during pregnancy, both factors that contribute to the development of

**Table 1:** Habits and health conditions of the groups, Três Lagoas, Brazil, 2015.

Variables	Cases n (%)	Controls n (%)	p value
<b>Private health access</b>			
Yes	21 (11.7%)	19 (10.6%)	0.317
No	61 (33.9%)	79 (43.9%)	
<b>Smoker</b>			
Yes	13 (7.2%)	9 (5.0%)	0.174
No	69 (38.3%)	89 (49.4%)	
<b>Alcohol use</b>			
Yes	15 (8.3%)	13 (7.2%)	0.354
No	67 (37.2%)	85 (47.2%)	
<b>Body mass index</b>			
< 18.5	04 (2.2%)	02 (1.1%)	<0.001
18.5 – 24.9	13 (7.2%)	28 (15.6%)	
25.0 – 29.9	10 (5.6%)	29 (16.1%)	
30.0 – 34.9	18 (10.0%)	25 (13.9%)	
35.0 -39.9	20 (11.1%)	09 (5.0%)	
≥ 40.0	17 (9.4%)	05 (2.8%)	
<b>Illness (Presence of Comorbidity)</b>			
Yes	72 (40.0%)	26 (14.4%)	<0.001
No	10 (5.6%)	72 (40.0%)	

**Table 2:** Distribution of pregnant women interviewed, according to obstetric history, Três Lagoas, Brazil, 2015.

Variables	Cases n (%)	Controls n (%)	Odd Ratio (OR)	(IC95%)	p value
<b>Births</b>					
<b>Normal</b>	22 (12.2%)	32 (17.8%)	2.33	(1.07 – 5.07)	0.010
<b>Cesarean</b>	32 (17.8%)	20 (11.1%)			
<b>Normal and cesarean</b>	15 (8.3%)	14 (7.8%)			
<b>None</b>	13 (7.2%)	32 (17.8%)			
<b>Complications in pregnancy previously</b>					
Yes	51 (28.3%)	35 (19.4%)	3.16	(1.56 – 6.39)	0.002
No	18 (10.0%)	39 (21.7%)	1.00		
<b>Primigravidae</b>	13 (7.2%)	24 (13.3%)			
<b>Complications in previous birth</b>					
Yes	20 (11.1%)	10 (5.6%)	2.61	(1.12 - 6.08)	0.046
No	49 (27.2%)	64 (35.6%)	1.00		
<b>Primigravidae</b>	13 (7.2%)	24 (13.3%)			

chronic diseases. Healthy eating, controlled sodium intake, potassium intake, combating physical inactivity and tobacco and alcohol, are the main non-pharmacological recommendations for early prevention of high blood pressure (hypertension) and reduce mortality due to cardiovascular diseases [15].

The literature states that smokers have higher blood sugar levels and people who have diabetes and use tobacco are at increased risk for neuropathy and kidney disease [16]. Therefore, pregnant women in similar situations should be encouraged to suspend or abandon the vices.

Health education should facilitate the contact between pregnant women and health professionals, at which risk factors for prenatal care

should be problematized, in order to raise awareness among pregnant women and change their unhealthy lifestyle habits, especially of the consumption of tobacco, alcohol, drugs, and other substances and other unfavorable situations in health [15].

Another finding refers to the number of pregnant women with health insurance. Companies are the major employers in the town and many offer benefits that include access to private health systems. Further, 100% of the participants are assisted by the UHS, which guarantees them among other benefits, the access to immunization services, medicines distributed within the UHS. This finding reinforces the importance and responsibility of the public health sector to the population.

The obstetric history showed that in both groups there were complications in previous pregnancies, cesarean delivery being the most common type. Thus, more detailed studies of the situation and implementation of qualified prenatal services. The cesarean birth has a high risk of maternal deaths associated with hemorrhage, infection, pulmonary embolism and anesthetic accidents and therefore should only be done in the case of physiological impossibility of a natural delivery [17]. It is a responsibility to guide the pregnant women and their families about the risks of cesarean delivery.

Thus, the findings of the case group justify the importance of prenatal high risk care services. The multidisciplinary attention must be attentive to pre-eclampsia, eclampsia, HELLP syndrome, premature labor and depression. Furthermore, these health problems can be cesarean delivery indications which may increase maternal morbidity and mortality [18].

The Family Health Strategy team provides health services to the community and mainly consists of a doctor, a nurse, a dentist, communities health workers and a nurse aid. Thus, at a minimum those professionals should be mentioned by the pregnant women. In the present study it is worrying, that only on a low frequency participants were able to report about the professionals who are involved in their prenatal care. This finding points out the need for discussion and change of the current health care model, because despite the prenatal services at a high-risk clinic, there is also a strong need of improving the health care services of the family health strategy team.

**Table 3:** Distribution of pregnant women interviewed, according to the relationship with healthcare professionals, Três Lagoas, Brazil, 2015.

Variables	Cases n (%)	Controls n (%)	p value
<b>Nurse</b>			
Yes	67 (37.2%)	90 (50.0%)	0.043
No	15 (8.3%)	08 (4.4%)	
<b>Doctor</b>			
Yes	82 (45.6%)	98 (54.4%)	1.000
No	00 (0.0%)	00 (0.0%)	
<b>Nurse assistant</b>			
Yes	04 (2.2%)	01 (0.6%)	0.117
No	78 (43.3%)	97 (53.9%)	
<b>CHW*</b>			
Yes	06 (3.3%)	10 (5.6%)	0.498
No	76 (42.2%)	88 (48.9%)	
<b>Others professionals</b>			
Yes	02 (1.1%)	04 (2.3%)	0.216
No	80 (44.4%)	94 (52.2%)	

\*Community Health Workers

Moreover, our result show, that in both groups' nurses were significantly more often involved in prenatal care services than any other health professional. It was observed, that also participant from the control group were provided with care in the institution. This result point out the need of a reorganization of the current prenatal care services in the institution, as only women at prenatal high risk should be assisted.

The Ministry of Health [18] recommends that prenatal care should be started as early as possible and one of the first professional that should be contacted are community health workers as they are closer to the families and represent the link between community and other health professionals.

Regarding the multidisciplinary approach in prenatal health care, the first consultation with a prenatal nurse should be concentrating, among other procedures required of an integral care in pregnancy on the diagnosis of pregnancy, the assessment of general conditional and the classification of gestational risk [19]. A dental evaluation is critical to the healthy outcome of prenatal care. The medical supervision contributes to the monitoring of maternal and fetal health.

Other health professionals, such as psychologists, nutritionists, physical therapists and physical educators also qualify as prenatal professionals.

## Conclusion

The analysis of maternal variables that result in prenatal high-risk, shows that many of these variables are often the result of lifestyle habits which are preventable and can be changed by health education and prenatal care. This leads to a major challenge for prenatal health professionals that aim to promote maternal health. The study points out the importance of prenatal care led by multidisciplinary teams, in order to promote the health of pregnant women by integrating knowledge and skills from different areas. It is recommended that women of childbearing age are included in health education activities that aim to improve their condition and quality of life before pregnancy. Further, it is recommended to invest in a continuing education for health professionals who work with pregnant women, to be able to ensure high quality assistance and prenatal care.

## References

1. Lozano R, Gómez-Dantés H, Castro MV, Franco-Marina F, Santos-Preciado JI (2011) Progress on the millenium development goals 4 and 5 in mesoamerica. *Salud Publica Mex* 53: 295-302.
2. World Health Organization (WHO) (2015) Trends in maternal mortality: 1990 to 2015.
3. World Health Organization (WHO) (2008) International statistical classification of diseases and related health problems.
4. Henrique AJ, Borrozzino NF, Gabrielloni MC, Barbieri M, Schirmer J (2012) Perinatal outcome in women with chronic hypertension: an integrative literature review. *Rev bras Enferm* 65: 1000-1010.
5. Duarte SJH, Mamede MV (2012) Study of basic skills in antenatal care: nursing team's actions in Cuiaba, MT. *Enferm Foco* 3: 75-80.
6. Gadelha PS, Gadelha-Costa A, Mauad Son F (2006) Maternal mortality in the hospital of the Ribeirão Preto medical school, University of Sao Paulo. *Revista da AMRIGS* 50: 135-138.
7. Soares VMN, Souza KV, Freygang TC, Correa V, Saito MR (2009) Maternal mortality due to preeclampsia /eclampsia in a state in southern Brazil. *Rev Bras Ginecol Obstet* 31: 566-573.
8. Ribeiro MC, Nakamura MU, CHN Abdo, Torloni MR, Scanavino MT, et al. (2011) Pregnancy and gestational diabetes: a prejudicial combination to female sexual function? *Rev Bras Ginecol Obstet* 33: 219-224.

9. Thornton J, Duley L (2015) Gestational hypertension before term: observe or deliver? *Lancet* 385: 2441-2443.
10. Chaves G, N Brites, Munzinger J, Uhlmann L, Gonzalez G, et al. (2015) Education to a healthy lifestyle improves symptoms and cardiovascular risk factors - Asuriesgo study. *Arq bras cardiol* 104: 347-355.
11. Xavier RB, CB Janotti, AC Martins, Silva KS (2013) Reproductive risks and comprehensive care of pregnant women with hypertensive syndromes: a transversal study. *Online Braz J Nurs* 12: 823-833.
12. Mol BW, Roberts CT, Thangaratinam S, Magee LA, de Groot CJ, et al. (2015) Pre-eclampsia. *Lancet* 387: 999-1011.
13. Brazilian Association for the Study of Obesity and Metabolic Syndrome (2009) Brazilian obesity guidelines 2009/2010. *AC Pharmaceuticals* 1-83.
14. Ministry of Health, Brazil (2012) Secretary of health care. Department of Strategic Programmatic Actions. High-risk pregnancy: technical manual.
15. Brazil Ministry of Health (2014) Secretary of health care. Department of Primary Care. Strategies for the care of people with chronic disease.
16. Brazilian Society of Cardiology, Brazilian Society of Hypertension, Brazilian Society of Nephrology (2010) VI Brazilian guidelines on hypertension. *Arq Bras Cardiol* 95: 1-51.
17. Domingues RMSM, Viellas EF, Dias MAB, Torres JA, Theme-Filha MM, et al. (2015) Prenatal care adequacy according to maternal characteristics in Brazil. *Rev Panam Salud Publica* 37: 140-147.
18. Brazil Ministry of Health (2013) Secretary of health care. Department of Primary Care. Strategies for the care of the person with chronic disease: hypertension.
19. Assis LS, Stipp MAC, Leite JL, Cunha NM (2009) The nurse care of cardiovascular health in hypertense women. *Esc Anna Nery Rev Enferm* 13: 265-270.

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