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Social and geographical inequalities in the performance of prenatal care in a metropolitan area of Brazil

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Abstract *This study analyzed the social and geographical inequalities in the performance of prenatal medical care in the Unified Health System (SUS) in the Metropolitan Region of Grande Vitória, Espírito Santo, Brazil. A cross-sectional study was carried out with 1,209 puerperae living in this region, admitted for childbirth from 2010 to 2011. Data about prenatal care and contextual, enabling, and social characteristics were collected, following the Andersen's Behavioral Model. The performance of prenatal care was classified into five levels, including information on the number of prenatal visits, initial and repetitive examinations, tetanus vaccination, gestational risk management, and participation in educational activities. The likelihood of different levels of prenatal care performance was analyzed using a multivariate multinomial model, according to maternal social variables. High prenatal coverage (98%) and 4.4% care adequacy were identified. The likelihood of access to prenatal care was increased by enabling, contextual, and social factors. The relationship between prenatal care quality and pregnant women's social and geographical conditions must be considered in the organization of services to achieve equity and reduce maternal and perinatal morbimortality.*

Key words *Equity in access, Quality of health care, Unified Health System, Prenatal care*

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Introduction

The performance of services is an essential indicator of a health system structure, which must be organized to favor the use of those in need. In Brazil, prenatal care has been the focus of public policies for several decades, and it is crucial to analyze its performance from the viewpoint of equity.

The definition of equity in health, in general, is close to the idea of social justice, in ethical terms, and of human rights[1-4]. In this sense, the way society is organized and developed can reduce the opportunity for some people to achieve a good level of health, which would characterize an unfair situation[3]. The World Health Organization (WHO) recognizes that social, economic, and political mechanisms stratify and hierarchize individuals into social groups that are configured as structural determinants of health inequities. The underlying intermediate determinants include living conditions, the psychosocial aspects, the biological/genetic, and behavioral factors of the individuals and the health system. The configuration of the latter is what defines the pattern of access to health care for different social groups and, when it incorporates the differences in exposure, disease, and social vulnerability of the population, also through intersectoral actions, it can minimize such differences in people's lives[5].

Social determinants interfere with the individual's likelihood to obtain access (use) and the benefits resulting from health care. In this sense, the fifth and current phase of Andersen's[6] "Behavioral Model of Health Services Use", developed to assess the use of health services, highlights the importance of analyzing the contextual and individual determinants in the study of the use of health services. The model includes enabling contextual characteristics, such as organization and other factors related to the provision of services, and predisposing factors, such as demographic characteristics, community values, and beliefs about health, measured in aggregate. Furthermore, it highlights individual factors and behavioral health factors, which include those related to individuals, such as personal health practices, which interact with the use and care processes and affect health outcomes and user satisfaction.

Concerning Brazilian health services, it is highlighted that their performance must be evaluated, not only concerning access but also to the adequacy of the health care process. Elements related to maternal and child health are used among the indicators, as follows: the proportion of children born alive whose mothers attended more than six prenatal visits; the proportion of cesarean deliveries against total deliveries; and the proportion of pregnant women vaccinated against tetanus[7].

Equity in the performance of the prenatal care service is a cross-cutting dimension that will be present when individuals and communities have equal access to health services appropriate to health needs, since, according to Mooney[8], equity in access to services of health is related to the notion of justice. Social determinants also interfere with an individual's likelihood to gain access and benefits resulting from health care.

In the implementation of primary health care in the Unified Health System (SUS), the Family Health Program (ESF) aimed to ensure universal access, and has contributed to improving access to health services and also for the reduction of rates of important diseases, such as infant mortality[9]. It is the main level of care responsible for prenatal care in Brazil. However, as in other countries[10], although the number of prenatal care visits has increased and its coverage is practically universal (98%)[11,12], adequate care[13] records low rates. Analyses reveal that the quality of care does not accompany the coverage of the prenatal care service, and less qualified care is associated with social factors, and its coverage is lower in the North, for indigenous women, women without a partner, and those with a higher number of previous pregnancies[12]. Characteristics such as low income/education, lower age, and lack of a partner are associated with inadequate prenatal care[12,14-17], besides geographic inequalities[12,18]. This is a reality of concern since the quality of prenatal care is associated with more favorable perinatal outcomes[19-23].

Since 2000, the Humanization of Childbirth and Birth Program has been guiding the actions of prenatal care[24]. However, as highlighted by Victora et al.[25], improving the quality of care is usually a slower process than expanding coverage. Thus, in Brazil, access to and the adequacy of prenatal care are still significant challenges more than two decades later. We understand that the analysis of social inequalities in access to quality prenatal care is relevant to the area of public health since it can identify the social determinants that interfere with access to quality health services. On the other hand, the diagnosis of geographical inequalities provides indications on contextual aspects that can facilitate or hinder access, enabling an expanded understanding of

public health measures to be taken by the managers responsible for health policies. Thus, the evaluation of the performance of the prenatal care service (access and adequacy), also based on contextual, predisposing and enabling factors such as those presented in Andersen's Behavioral model[6], becomes essential for the planning of services.

Given these considerations, this study aims to analyze the social and geographical inequalities in the performance (use and adequacy) of prenatal care in the Unified Health System of a Metropolitan Region in the Southeast Region of Brazil.

Methods

The State of Espírito Santo (ES) is located in the Southeast Region of Brazil and has 3,972,388 inhabitants, approximately 4.9% of the total population of the region. Its Metropolitan Region of Grande Vitória (ES) (RMGV-ES) is formed by seven municipalities (Cariacica, Fundão, Guarapari, Serra, Viana, Vila Velha, and Vitória), which together house almost half of the total population of the state (49.1%)[26], produce approximately 57.7% of the state's Gross Domestic Product (GDP) and have an urbanization rate of 98.2%[27].

Cross-sectional studies were carried out in this region from April 2010 to February 2011 to assess SUS prenatal care. Detailed descriptions of the sample designs have been published[28,29]. The population universe consisted of women who were admitted to one of the nine health establishments of RMGV-ES who performed deliveries to the SUS during the study period. The sample totaled 1,209 women. Women who were not carrying the pregnant woman's card, who underwent prenatal care (all or part) in the private subsystem, were followed up in municipalities outside the RMGV-ES and puerperae who had recently given birth less than 12 hours' cesarean delivery were excluded.

The pilot study was carried out between March and April 2010, with a sample of 67 parturients (not included in the study), in one of the establishments where the main study was conducted. The study variables were built from information about prenatal medical care, copied from the pregnant woman's card or self-reported by them, on the maternal variables contained in the interview questionnaires and social indicators, and on the local organization of the health services of the municipalities of residence, published by IBGE[26], ONU/PNUD[30] and DATASUS (SUS Informatics Department. http://www2.datasus.gov.br/SIAB/index.php, accessed on Sep 02, 2008).

The following were checked on the pregnant woman's card to assess the performance of prenatal care, as per PHPN principles, activities and procedures[24]: number of visits; onset of prenatal care; laboratory tests (ABO-Rh, VDRL, routine urine (EAS), fasting blood glucose, hemoglobin, hematocrit, HIV/AIDS testing); receiving at least one dose of tetanus vaccine; and repetition of VDRL, EAS and fasting glucose tests.

Information was collected from the pregnant women on risk management (classification and referral for risk pregnancy monitoring) and their participation in educational activities (declaration of receipt of the information on the benefits of exclusive breastfeeding up to six months of life) and on the importance of breastfeeding up to two years of age or older (as per the WHO recommendations[31]) and having been encouraged to breastfeed in some educational activity in a group of pregnant women or home visits[28].

The findings were interpreted from the construction of thematic categories of Andersen's Behavioral Model[6]. The independent variables were grouped into contextual, predisposing, and enabling (social) factors. Regarding the context, variables related to the provision of services were used (coverage of primary care services by type of health facility, as per information provided by the Municipal Health Secretariats); municipality of residence, informed by the puerperae during the interview (Vitória or another municipality of the RMGV-ES); and the Municipal Human Development Index (MHDI)[30], attributed to the level of women. The predisposing variables were women's age (in full years) and number of previous births. The enabling (social) variables investigated were maternal schooling (full years of study); female head of household; ownership of consumer goods, adapted from the Household Assets Index of Szwarcwald et al.[32], calculated by (equation 1):

$$\text{IB} - \sum_{i} (1 - f_i) b_i \quad \text{, (eq. 1)}$$

in which "i" ranged from 1 to 8 items (TV, refrigerator, stereo, landline, washing machine, motor vehicle, microwave, and microcomputer); "f_i" was the relative frequency of each good; "b_i" was equal to 1 or zero, respectively, in the presence or absence of the asset; and housing conditions (adequate – as being the existence of adequate internal and external housing conditions; inadequate – inadequate internal or external housing

conditions, and highly inadequate – inadequate internal and external housing conditions). The internal housing conditions were classified as inadequate when the human household clustering was considered excessive (overcrowding, cases in which the ratio between the number of residents per room in the household, excluding bathrooms and kitchen, was higher than 2); absence of floor covering; walls made of clay, straw, wood, plastic or metal, and no flush in the bathroom. Poor external housing conditions were classified as the absence of a sewage system or the presence of an open wall ditch on the street of the home[33]. Maternal variables were obtained from interview data.

All data were entered into SPSS software version 17.0 (SPSS Inc. Chicago, United States), with exhaustive quality control and review. The dependent variable "prenatal care performance" was analyzed with five categories: 1-5 prenatal care visits; ≥ 6 prenatal care visits; first level of performance as a synonym for access, classified from the first visit to the 16th gestational week, and the minimum of six visits (number of visits adjusted by gestational age); and adequacy of care, analyzed as the second level of performance, for those who, besides access, also underwent initial tests and tetanus vaccination; and as the third level of performance for those who, besides access, performed all the procedures analyzed.

The statistical analysis of the bivariate association between prenatal care performance and maternal characteristics (contextual, predisposing, and enabling) was carried out by applying the Chi-square or Fisher's Exact tests when there were less than five observations in the cells for categorical variables. The Mann-Whitney and Kruskal-Wallis tests were used for the asset ownership variable. The geographical inequalities were analyzed by comparing women living in Vitória with those living in other municipalities in the region, to represent the differences between these groups, concerning the organization of health services and the travel required to receive health care, for example.

The likelihood of performing as per prenatal care was estimated. The multivariate multinomial analysis was performed to estimate the associations of independent variables with each outcome category, without establishing assumptions about the structure of their coefficients. A multivariate model was developed, including the variables that showed statistical significance $\alpha < 0.20$ in the bivariate analysis. In the final model, only significant variables remained at a significance level of $\alpha = 0.05$. The confidence interval was 95%. Only pregnant women with answers to all variables were included in this analysis.

The research project was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Espírito Santo, on 04/11/2009, and by the Research Ethics Committee of the National School of Public Health/Oswaldo Cruz Foundation, on 08/11/2013, thus complying with the recommendations of Resolution N° 466/2012, of the National Health Council. Formal authorizations for the implementation of research in health establishments (maternity wards, hospitals, municipal, and state health departments) were obtained. All puerperae signed the Informed Consent Form (ICF). Statistical analyses were performed using SPSS version 17.0 (SPSS Inc. Chicago, United States) and Stata12.

Results

Data from 1,209 puerperae were analyzed, of which 360 (29.8%) lived in the capital (Vitória) (Table 1). These women did not differ concerning the predisposing characteristics "age" and "number of previous births", nor the social characteristics "schooling" and "pregnant woman is the head of the family". They differed regarding "ownership of assets", with residents in Vitória having a higher mean ownership of assets (means of 1.40 and 1.22 for Vitória and RMGV-ES, respectively, $p = 0.009$) and "housing conditions" (75.1% adequacy in Vitória and 66.2% in other municipalities in the region, $p = 0.007$). The contexts differed. The Vitória MHDI was the only one classified as very high. The difference in service coverage was also statistically significant: 86.3% of the postpartum women in Vitória lived in areas covered by ESF and PACS and 98.3% by dental services, while these coverages were only 43.7% and 66.4% in other municipalities in the region, respectively ($p < 0.001$ for both).

The prevalence of each initial test was higher than 61% in both regions but was higher in the municipality of Vitória (Table 2), statistically higher for blood typing tests (ABO-Rh) and the first VDRL. It is noteworthy that the prevalence of compliance with at least one dose of the tetanus vaccine was less than 37% in both regions of the study, with no statistical significance for the difference.

The prevalence of repetition tests was less than 43% and was statistically higher for residents in the city of Vitória. The management of

Table 1. Maternal and regional characteristics. RMGV-ES, 2010-2011.

	Variables	Region of residence						p-value*
		Total (n=1209)		RMGV-ES (n = 849)		Vitória (n = 360)		
		n	%	n	%	N	%	
Predisposing	Age (n = 1,209)							0.242
	≤ 19 years	275	22.7	185	21.8	90	25.0	
	20-34 years	837	69.2	600	70.7	237	65.8	
	≥ 35 years	97	8.1	64	7.5	33	9.2	
	Number of previous deliveries (n = 1,209)							0.229
	0-2	10000000	82.7	695	81.9	305	84.7	
	≥3	209	17.3	154	18.1	55	15.3	
Enabling	Schooling (n = 1,199)							0.434
	≤ 7 years	367	30.6	266	31.7	101	28.1	
	8-10 years	426	35.5	291	34.6	135	31.7	
	≥11 years	406	33.9	283	33.7	123	34.3	
	Household head (n = 1,201)							0.893
	Pregnant woman herself	126	10.5	88	10.4	38	10.7	
	Other	1075	89.5	757	89.6	318	89.3	
	General housing conditions (n = 1,161)							0.007
	Highly inadequate	56	4.8	46	5.6	10	2.9	
	Inadequate	306	26.4	231	28.2	75	22.0	
	Adequate	799	68.8	543	66.2	256	75.1	
Contextual	PHC coverage (n = 1,205)							< 0.001
	UBS	525	43.6	476	56.3	49	13.6	
	ESF	531	44.1	238	28.1	293	81.6	
	PACS	149	12.4	132	15.6	17	4.7	
	Oral health coverage (n = 1,205)							< 0.001
	No	290	24.1	284	33.6	06	1.7	
	Yes	915	75.9	562	66.4	353	98.3	
	MHDI (n = 1,209)							< 0.001
	Medium	38	3.2	38	4.5	-	-	
	High	583	48.2	583	68.7	-	-	
	Very high	588	48.6	228	26.9	360	100.0	

*Chi-square ($\chi 2$).

gestational risk occurred for 93.3% of pregnant women in this study, while educational activities were carried out by less than 20% of them, and both procedures with no statistically significant differences between regions (Table 2).

Also according to information in Table 2, considering the 1,072 women with data for analyzing the performance of prenatal care, and based on total compliance with procedures recommended by the PHPN, we can observe that, in general, Vitória showed a pattern statistically higher than the set of other municipalities in the region ($p < 0.001$). Even so, of the pregnant women living in Vitória, only 62 (20.3%) had six or more prenatal visits, and only 152 (49.7%) had adequate access to prenatal care (first level). Of the residents in the other municipalities of RMGV-ES, 323 (42.2%) had one to five visits, and only 259 (33.8%) had adequate access to prenatal care (first level). The analysis of the second

Table 2. Distribution of prenatal care procedures, by region of residence. RMGV-ES, 2010-2011. Tabela 2. Distribuição dos procedimentos da assistência pré-natal, segundo região de moradia. RMGV-ES, 2010-2011.

PHPN activities	Total		RMGV-ES		Vitória		p-value*
	n† * n	%	n	%	n	%	
PHPN procedures	1,183	100.0	830	100.0	353	100.0	
Onset of prenatal care up to the 4th month	600	55.7	404	52.6	196	63.4	**0.001**
Prenatal care visits							< **0.001**
1-5	425	35.9	349	42.0	76	21.5	
6+	758	64.1	481	58.0	277	78.5	
Blood typing (ABO-Rh)	762	64.4	511	61.6	251	71.1	**0.002**
First VDRL	864	73.0	590	71,1	274	77.6	**0.020**
First EAS	795	67.2	558	67,2	237	67.1	0.976
First blood glucose	861	72.8	596	71.8	265	75.1	0.249
Hemoglobin	844	71.3	585	70.5	259	73.4	0.315
Hematocrit	770	65.1	534	64.3	236	66.9	0.406
Anti-HIV	776	64.8	545	65.7	221	62.6	0.314
Tetanus immunization	427	36.1	304	36.6	123	34.8	0.559
Repetition VDRL	397	33.6	263	31.7	134	38.0	**0.037**
Repetition EAS	403	34.1	264	31.8	139	39.4	**0.012**
Repetition blood glucose	427	36.1	278	33.5	149	42.2	**0.004**
Gestational risk management	1099	93.3	769	92.9	330	94.3	0.376
Educational activities	215	18.2	145	17.5	70	19.9	0.325
Performance levels (n =1072)	1072	100.0	766	100.0	306	100.0	< **0.001**
1-5 visits	389	36.3	323	42.2	66	21.6	
≥ 6 visits	173	16.1	111	14.5	62	20.3	
first level	411	38.3	259	33.8	152	49.7	
second level	46	4.3	35	4.6	11	3.6	
third level	53	4.9	38	5.0	15	4.9	

* Chi-square ($\chi 2$) test.

† In the descriptive analysis, all women with information were included in each of the variables, while only those with information available for the set of variables were included in the regression.

and third performance levels, which include procedures in the prenatal care process, showed a decreased prevalence of adequacy with an increased number of recommended procedures, with 4.3% of pregnant women receiving all care included in the second level of adequacy, while 4.9% received all procedures provided for in the PHPN, respectively, for the group of women studied. Compliance with total PHPN recommended procedures was similar in both regions (5%).

The bivariate analysis shown in Table 3 revealed marked inequalities in prenatal care performance. The level of performance was associated with older age (p = 0.040), fewer births (p = 0.001), higher schooling (p = 0.002), pregnant women being the head of the household (p = 0004), primary care coverage by UBS (p = 0.005) and residing in the other municipalities of RMGV-ES (p < 0.001).

In the multivariate analysis, the likelihood of complying with each performance level was different between the variables analyzed (Table 4). Regarding the predisposing variables, the older the age, the higher the likelihood of puerperae fulfilling the first (access) and third level of performance, concerning the likelihood to have less than six visits. The higher number of previous deliveries was related to a lower likelihood of adequacy: 55% less for the likelihood to meet the first level and 73% less to achieve the third level.

Social inequality was observed in access to prenatal care (first level), compared to having less than six visits, and the difference found for the fulfillment of the second and third levels was not statistically significant (Table 4). The likelihood of puerperae starting prenatal care until the fourth month and having six or more visits (first level of performance), compared to the likelihood to have one to five visits was 68% higher for those with 11 or more years of schooling, and 92% higher if they were the head of the household. Puerperae not being the head of the household was associated with the best level of performance.

Contextual inequalities in access and the care process were also observed: living in an area with

Table 3. Performance of prenatal care, by characteristics of the context, predisposition, and enablement. RMGV-ES, 2010-2011.

	Variables	Total (n = 1013)		1-5 visits (n = 365)		≥ 6 visits (n = 165)		first level (n = 390)		second level (n = 42)		third level (n = 51)		p-value*
		n	%	n	%	n	%	n	%	n	%	n	%	
Predisposing	Age													**0.040**
	≤ 19 years	224	22.1	94	42.0	41	18.3	76	33.9	08	3.6	05	2.2	
	20-34 years	706	69.7	245	34.7	108	15.3	280	39.7	34	4.8	39	5.5	
	≥ 35 years	83	8.2	26	31.3	16	19.3	34	41.0	00	0.0	07	8.4	
	Number of previous deliveries													**0.001**
	0-2	843	83.2	282	33.5	135	16.0	343	40.7	38	4.5	45	5.3	
	≥ 3	170	16.8	83	48.8	30	17.6	47	12.1	04	2.4	06	3.5	
Enabling	Schooling													**0.002**
	≤ 7 years	302	29.8	128	42.4	54	17.9	98	32.5	08	2.6	14	4.6	
	8-10 years	352	34.7	139	39.5	47	13.4	132	37.5	17	4.8	17	4.8	
	≥ 11 years	359	35.4	98	27.3	64	17.8	160	44.6	17	4.7	20	5.6	
	Household head													**0.004**
	Pregnant woman herself	112	11.1	50	44.6	20	17.9	29	25.9	02	1.8	11	9.8	
	Other	901	88.9	315	35.0	145	16.1	361	40.1	40	4.4	40	4.4	
	General housing conditions													0.060
	Highly inadequate	48	4.7	23	47.9	07	14.6	12	25.0	03	6.3	03	6.3	
	Inadequate	253	25.0	99	39.1	52	20.6	81	32.0	10	4.0	11	4.3	
	Adequate	712	70.3	243	34.1	106	14.9	297	41.7	29	4.1	37	5.2	
Contextual	PHC coverage													**0.005**
	UBS	452	44.6	184	40.7	58	12.8	160	35.4	24	5.3	26	5.8	
	ESF	446	44.0	135	30.3	89	20.0	185	41.5	17	3.8	20	4.5	
	PACS	115	11.4	46	40.0	18	15.7	45	39.1	01	0.9	05	4.3	
	Municipality of residence													< **0.001**
	RMGV-ES	729	72.0	302	41.5	105	14.4	251	34.4	33	4.5	38	5.2	
	Vitória	284	28.0	63	22.2	60	21.1	139	48.9	09	3.2	13	4.6	
	MHDI													0.127
	Medium	29	2.9	11	37.9	03	10.3	13	44.8	02	6.9	00	0.0	
	High	493	48.7	197	40.0	75	15.2	171	34.7	22	4.5	28	5.7	
	Very high	491	48.5	157	32.0	87	17.7	206	42.0	18	3.7	23	4.7	

Table 4. Final model of the odds ratio (CI) of the performance levels of prenatal care. RMGV-ES, 2010-2011.

	Variables	≥ 6 or more visits		first level		second level		third level	
		Odds Ratio	95%CI	Odds Ratio	95%CI	Odds Ratio	95%CI	Odds Ratio	95%CI
Predisposing	Age								
	≤ 19 years	1.00	-	1.00	-	1.00	-	1.00	-
	20-34 years	1.00	0.62-1.60	1.53*	1.05-2.24	1.71	0.73-4.01	2.71*	1.15-6.41
	≥ 35 years**	1.61	0.71-3.63	2.56*	1.29-5.06	-	-	7.72*	2.38-25.1
	Number of previous deliveries								
	0-2	1.00	-	1.00	-	1.00	-	1.00	-
	≥ 3	0.73	0.43-1.26	0.45*	0.29-0.71	0.51	0.17-1.58	0.27*	0.11-0.67
Enabling	Schooling								
	≤ 7 years	1.00	-	1.00	-	1.00	-	1.00	-
	8-10 years	0.74	0.46-1.19	1.04	0.71-1.51	1.59	0.65-3.90	1.02	0.50-2.11
	≥11 years	1.52	0.94-2.47	1.68*	1.13-2.50	1.99	0.78-5.06	1.52	0.74-3.11
	Household head								
	Other	1.00	-	1.00	-	1.00	-	1.00	-
	Pregnant woman herself	1.23	0.69-2.19	1.92*	1.15-3.22	2.72	0.62-11.8	0.66	0.32-1.37
Contextual	PHC Coverage								
	UBS	1.00	-	1.00	-	1.00	-	1.00	-
	ESF	1.59*	1.01-2.48	1.17	0.82-1.67	0.99	0.47-2.09	0.84	0.43-1.60
	PACS	1.30	0.70-2.44	1.20	0.74-1.94	0.17	0.22-1.27	0.86	0.33-2.20
	Municipality of residence								
	RMGV-ES	1.00	-	1.00	-	1.00	-	1.00	-
	Vitória	2.28*	1.43-3.64	2.52*	1.70-3.73	1.23	0.51-2.98	2.27*	1.13-4.55

* p-value < 0.05. ** there were no observations for age ≥ 35 years in the group that met the second level of performance. Thus, the Odds Ratio and the confidence interval could not be estimated.

ESF coverage was associated with a 59% higher likelihood of puerperae having six or more visits, compared to the likelihood to have less than six visits; however, it was not related to the likelihood to receive quality prenatal care (first to third performance levels). Living in Vitória has increased around twofold the likelihood of the pregnant woman having six or more visits, have adequate access (first performance level) or quality prenatal care first performance level), compared to the likelihood to have one to five prenatal visits.

Discussion

This study showed that, in the municipalities of RMGV-ES, although prenatal care coverage reached 98%, only five out of every 100 puerperae attended at the SUS performed fully adequate prenatal care. The care process had low adequacy, with a small proportion of pregnant women who performed all the procedures provided for in the PHPN (third performance level) (5%). It also showed that there are social and geographical inequalities in access to this service, with a significant difference in the performance levels achieved. From the viewpoint of comprehensive maternal and child health care, prenatal care should be organized to ensure adequate care for pregnant women, regardless of their social and geographical characteristics[34].

This result was similar to that observed in other studies, which showed prenatal care coverage of approximately 99% for Brazil[11,12] and low percentages of the adequacy of care, regardless of the source of the information and the classification criteria[13,35]. When interpreting the results, it is necessary to consider that the more demanding the criterion, the higher the prevalence of inadequacy[35]. It is noteworthy that the criterion

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used in this study aimed to consider the procedures indicated in the PHPN in its breadth and the low percentage at the third level of performance, which represents the completion of all the procedures analyzed, provided for in prenatal care[24]. Differently from the one proposed here, most studies on the theme focus only on access (measured by the number of visits and the time of the onset of prenatal care) or a smaller list of procedures[13-17,35].

It is necessary to discuss and show that the process of implementing a policy depends on several factors, such as the existence of sufficient financial resources and the quantity and quality of human resources to meet universality, for example. Therefore, it is necessary to evaluate not only the coverage of the programs but also the quality of the services provided. It is understood, however, that an expanded coverage can be achieved in a shorter period than the improvement in the quality of care, which is usually a slower and more complex process[25]. Moreover, prenatal care assessment studies, in general, focus on the proportion of pregnant women who have performed at least six visits recommended by the Ministry of Health. Not even the PHPN has been used, except by the Ministry[35].

The performance of prenatal care was not the same concerning the two regions studied, and the factors analyzed, organized according to contextual, predisposing and enabling factors, which, according to Andersen[6], affect the use of health services. Brazilian studies have analyzed the relationship between prenatal care and unfavorable social characteristics of pregnant women[12,14,16,17,36,37]. So also several countries around the world[10].

Barriers to geographic and organizational access, unavailability of material and human resources, direct and indirect costs for obtaining care, unmet expectations about procedures, and subjective aspects of care are presented to pregnant women and require a coping capacity on their part[38]. Other studies have also revealed aspects involved in access, mainly related to acceptability and its relationship with adherence to care, the role of users in the construction of therapeutic paths, and the perceived supply of material and human resources[37,39-42].

Although Vitória had a better performance in access to prenatal care, the prevalence of adequacy to the stages of the care process was similar to the set of other municipalities in the RMGV-ES. There was a drop in prevalence in the comparison between the first (access) and the third (total adequacy) levels of performance. The low adequacy of care verified may be related to problems in the care process, such as being unaware of or non-adhering to protocols, and the lack of registration of information on the pregnant woman's card (used as a source of data for childbirth and also in scientific research). Moreover, other factors may be related, such as problems in the organization of services, which end up creating hurdles to perform the procedures recommended by the PHPN easily and conveniently: deficient marking systems; long distance from the places where the exams are performed; delay in releasing results; and barriers related to the availability of clinical analysis laboratories, as mentioned by Thiede et al.[34].

These results followed, however, national rates, as the low adequacy of the care process was also observed in several Brazilian regions[13,14,28,35,43-50] and abroad[10]. All of this involves, however, the need for the reallocation and, in many cases, of more considerable financial resources for these health services, as well as the necessary managerial capacity for planning and evaluating the actions, training, and adherence of the health team. The implementation of the PHPN is more complicated than it appears at first glance and depends on the efforts of the various social actors and factors (resource-dependent) involved.

Another significant result that deserves to be highlighted was the low prevalence of receiving important information by pregnant women. Despite the recognized importance of health education for this group[50], there seems to be a gap regarding educational activities related to prenatal care in primary health care[51]. Educational activities should receive more considerable attention when planning and implementing the prenatal care process, as they could reduce the asymmetry between the knowledge of pregnant women and the service prescriptions[52,53]. Information is a necessary factor so that individuals can make choices regarding the use of health service and for the care process and, thus, it is an essential determinant of the quality of the health system and affects access to care significantly[34].

Considering the Andersen Behavioral Model of Health Services Use[6], regarding social inequalities in the performance of prenatal care, we observed that the various enabling factors analyzed did not behave uniformly for each of the levels of prenatal care performance. The higher level of schooling of women, and the fact that they are the head of the household increased the likeli-

hood of access to prenatal care (first level), but no social factor had an influence on the care process (second and third levels of performance).

Social inequalities in access to quality prenatal care are discussed in the literature. In general, studies have shown that characteristics such as low income, low schooling, younger age, and lack of a partner are associated with receiving inadequate prenatal care in Brazil[12,14-17,36] and other developing countries[10,54].

Also considering the same model[6] concerning predisposing factors, in this study, the higher number of previous births decreased the likelihood to access prenatal care (first level) and receive quality care (third level), which may be related to the influence of a negative experience of prenatal care or that has given pregnant women the feeling of already having the necessary knowledge and greater autonomy in the decision to perform or not a specific care procedure. According to a study by Figueroa et al.[53], pregnant women who had a bad experience of prenatal care, better knowledge about prenatal care and the symptoms of pregnancy imply a positive attitude towards the search for prenatal care, despite recognizing the complicated relationship between knowledge, support received from social security systems and attitudes. The study by Viellas et al.[12] showed that, in Brazil, pregnant women with a higher number of births alleged that one of the reasons for the later start of prenatal care was situations of unwanted pregnancies, which also influenced the non-performance of prenatal care for pregnant women without a partner. Moreover, as caregivers, women with a higher number of previous births also share time with their children, devoting less time to themselves.

On the other hand, older age and an understanding of the need for prenatal care and the risk of not receiving this follow-up can explain the occurrence of higher likelihood to access prenatal care (first level) or to perform all stages of care (third level), regardless of the highest parity. Studies show the association between lower maternal age and late onset of prenatal care[12,55], lower prevalence of six or more visits[12,55,56], and a higher likelihood of inadequate prenatal care[35,57,58].

As for the enabling (social) inequalities, higher schooling, adjusted for the other variables in the model, was associated with a higher likelihood of access (first level of performance) but did not change the likelihood to comply with the highest level of prenatal care performance (third level), which shows that this social factor did not influence the fulfillment of prenatal care as a whole. Higher schooling is usually associated with the early start of prenatal care and compliance with a minimum of six visits[12,56]. However, differently from what was observed here, studies show that higher education also tends to show an association with the fulfillment of the tests indicated for each prenatal care period[56] and with the completion of all stages of the proposed care[56,58]. It is essential to point out that healthier living behaviors are associated with higher schooling levels[59].

Another enabling factor analyzed, the pregnant women being the head of the household, was positively related to access to prenatal care, not influencing the care process. Likewise, studies carried out with pregnant women using the SUS in the municipalities of Niterói-RJ, and Rio de Janeiro-RJ did not show an association between pregnant women being the head of the household and an adequate prenatal care[60]. However, this is a variable related to vulnerability and social exclusion, which places women in the face of social, economic, and violence difficulties, which is a situation of low self-esteem, frustrations, fears, and anxieties and, at the same time, of courage and struggle[61]. It can be inferred that the autonomy of these women enhances access to prenatal care, which has a high prevalence in the general population, while the qualification of the care process, which has a low frequency, was not influenced by social factors.

The results also showed that, as expected, more significant barriers to access occur in less developed contexts. This statement is reinforced by the identification that better results at almost all levels of performance were observed for residents in Vitória. It is crucial to analyze factors related to geographical inequalities. This municipality is the capital of the State, concentrates approximately 50% of the GDP of RMGV-ES, and receives 21.5% of the Tax on Operations related to the Circulation of Goods and Provision of Interstate and Intermunicipal Transport and Communication Services (ICMS). In 2011, the per capita expenditure on health in Vitória was twice the mean expenditure of other municipalities in the region[62] and, since this municipality has a better-organized health system than the others in the region[62,63], it is assumed, then, that it has fewer geographical and organizational hurdles to access services.

The higher likelihood to access prenatal care in Vitória (contextual factor) may be related to the uptake potential of the ESF, which has a high coverage in this municipality[63]. Moreover, it is necessary to reflect that Vitória has 100% ur-

ban population, a territorial extension of only 98 km², and well-organized health services. Although the other municipalities of the RMGV-ES do not have a high percentage of rural population, ranging from 0.2% to 15.6% of the resident population, the territorial extensions of these municipalities are more significant (ranging from 210 km² to 594 km²) (http: //cidades.ibge.gov.br/xtras/home.php) and their health services are poorly organized[63]. This reality can create geographical barriers to the continuity of the care process and influence its adequacy, due to the greater distances to be covered by pregnant women residing in other municipalities of the RMGV-ES, when compared to the distances traveled by pregnant women residing in Vitória.

These factors are related to the concept of service availability[34]. When the geographical distribution of health services is not based on the health needs of residents of a region, geographical inequalities in access to quality health services occur[64]. As Mooney[8] states, equity in access can also be understood as the application of resources in proportion to the needs of the population.

The prenatal care process was not influenced by the contextual factor type of the primary health care model (UBS, PACS, and ESF). Adequacy involves factors that transcend the availability of the service. It can be influenced by the behavior and knowledge of health professionals, efficient scheduling systems, the availability and accessibility (geographic access) to services for carrying out complementary exams, and adherence of pregnant women to the prescribed procedures, among others. When some of the required procedures are performed in different health establishments, there is a need for more significant user travel, greater availability of time, and cost of transportation when not guaranteed by the public authorities.

Different realities about the influence of the type of service on the quality of prenatal care are described in scientific research. A study carried out in a municipality in the southern region of Brazil showed that the ESF has better care in the set of actions related to prenatal care; however, the prevalence of performing some of the recommended procedures is below the levels recommended by the policies[65]. Another study carried out in the same region showed that access to prenatal care is satisfactory in the ESF, as well as a high prevalence of performing the clinical and obstetric procedures indicated for prenatal care and also increased guidance received by pregnant women. However, it is highlighted that the relationship between clinical-obstetric procedures and exams must be improved, providing continuity of care[47]. The importance of Community Health Workers (ACS) and nurses for adherence and the quality of prenatal care provided in the ESF is recognized[66] also by pregnant women, who relate the performance of the various health professional categories and ACS to access and continuity of prenatal care[38]. Thus, the ESF has managed to promote contact with health services, regardless of the gestational period, but it is still unable to perform early uptake and the qualified continuity of the care process.

One of the limitations of this study refers to the fact that the sample included did not allow the comparison between each of the municipalities of RMGV-ES. We tried to circumvent this limitation, including, in the methodological design, other variables that complemented the characterization of the social context of the women studied. Furthermore, the exclusion of women who underwent prenatal care, in whole or in part, in the private subsystem, on the one hand, allowed moving forward in the analysis of the prenatal care public policy in Brazil. On the other hand, it did not allow building an analysis of the reality of all women experiencing the pregnancy period.

Conclusions

In this study, we observed that the high coverage of prenatal care does not necessarily translate into an improved quality of care. Moreover, social inequalities in access to prenatal care and geographical inequalities in access and performance persist. The quality of care is a more complicated process, which requires more time to be achieved within a universal health system under construction, such as the SUS. It also depends on elements other than those necessary to ensure access, besides the provision of prenatal care services.

The *Rede Cegonha* ("Stork Network"), since 2011, has been added to the PHPN guidelines to stimulate improved access, coverage and quality of prenatal care, childbirth, and postpartum and child care[67]. Furthermore, to implement the maternal and child care policy, it is recommended that managers include the analysis of the social determination of performance in the planning and evaluation of prenatal care services, and adjust the allocation of resources to the areas with the most significant health needs, allowing the

provision of necessary care to pregnant women, from the viewpoint of comprehensive care.

Given the limitation of health services in reducing health inequalities, intersectoral partnerships should be established, promoting better living and working conditions for women and their communities so that they exercise freedom in the use of health services. It is also necessary to qualify professionals for the technical implementation of prenatal care in the ESF and interdisciplinary work. This is essential for the construction of an equitable health system, as SUS proposes to be.

This study has high applicability for the SUS concerning the implementation of policies that aim to reduce inequalities within prenatal care since it shows a new way of analyzing the situation, based on the Andersen Behavioral Model of Health Services Use[6].

Collaborations

CDD Esposti, C Travassos, and RS Pinheiro participated in all stages of the research, including the design, analysis, and interpretation of data, drafting and review of the paper, and approval of the version to be published. ET Santos Neto participated in the design, analysis, and interpretation of results, critical review, and approval of the version to be published. AE Oliveira collaborated in the interpretation of the data, critical review of the paper, and approval of the version to be published.

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References

1. Rawls J. Justiça como equidade: uma concepção política, não metafísica. *Lua Nova* 1992; (25):28-59.
2. Rawls J. *Uma teoria da Justiça*. São Paulo: Martins Fontes; 1997.
3. Sen A. Why equity health? *Health Econ*. 2002; 11:659-666.
4. Sen A. Why and how is health a human right? *Lancet* 2008; 372(9655):2010.
5. Organização Mundial da Saúde (OMS). *A conceptual framework for action on the social determinants of health*: *Social Determinants of Health Discussion*. Geneve: OMS; 2010. Paper 2 (Policy and Practice).
6. Andersen RM. National Health Surveys and the Behavioral Model of Health Services Use. *Med. Care* 2008; 46(7):647-653.
7. Viacava F, Viacava F, Ugá MAD, Porto S, Laguardia J, Moreira RS. Avaliação de Desempenho de Sistemas de Saúde: um modelo de análise. *Cien Saude Colet* 2012; 17(4):921-934.
8. Mooney GH. Equity in health care: confronting the confusion. *Eff. Health Care* 1983; 1(4):179-185.
9. Paim J, Travassos C, Almeida C, Bahia L, Macinko J. The Brazilian health system: history, advances, and challenges. *Lancet* 2011; 377(9779):1778-1797.
10. Arsenault C, Jordan K, Lee D, Dinsa G, Manzi F, Marchant T, Kruk ME. Equity in antenatal care quality: an analysis of 91 national household surveys. *Lancet Glob Health* 2018; 6(11):e1186-e1195.
11. Victora CG, Aquino EML, Leal MC, Monteiro CA, Barros FC, Szwarcwald CL. Saúde de mães e crianças no Brasil: progressos e desafios. *Lancet* 2011 [acessado 2019 maio 30]; 32-46. Disponível em: http://bvsms.saude.gov.br/bvs/artigos/artigo_saude_brasil_2.pdf.
12. Viellas EF, Domingues RMSM, Dias MAB, Gama SGN, Theme Filha MM, Costa JV, Bastos HM, Leal MC. Assistência pré-natal no Brasil. *Cad Saude Publica* [Internet]. 2014 [cited 2019 May 30]; 30(Supl. 1):S85-S100. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2014001300016&lng=en
13. Andreucci CB, Cecatti JG. Desempenho de indicadores de processo do Programa de Humanização do Pré-natal e Nascimento no Brasil: uma revisão sistemática. *Cad Saude Publica* 2011; 27(6):1053-1064.
14. Gonçalves CV, Cesar JA, Mendonza-Sassi RAM. Qualidade e equidade na assistência à gestante: um estudo de base populacional no Sul do Brasil. *Cad Saude Publica* 2009; 25(11)2507:2516.
15. Ribeiro ERO, Guimarães AMDN, Bettiol H, Lima DDF, Almeida MLD, Souza L, Silva AAM, Gurgel RQ. Risk factors for inadequate prenatal care use in the metropolitan area of Aracaju, Northeast Brazil. *BMC Pregnancy and Childbirth* 2009; 9:31.
16. Almeida SDM, Barros MBA. Equidade e atenção à saúde da gestante em Campinas (SP), Brasil. *Rev. Panam. Salud Pública* 2005; 17(1):15-25.
17. Coimbra LC, Silva AAM, Mochel EG, Alves MTSSB, Ribeiro VS, Aragão VMF, Bettiol H. Fatores associados à inadequação do uso da assistência pré-natal. *Rev Saude Publica* 2003; 37(4):456-462.

18. Brasil. Ministério da Saúde (MS). Departamento de Ciência e Tecnologia, Secretaria de Ciência, Tecnologia e Insumos Estratégicos. Avaliação Nacional do Programa de Humanização do Pré-natal e Nascimento. *Rev Saude Publica* 2008; 42(2):383-387.
19. Fonseca1 CRB, Strufaldi MWL, Carvalho LR, Puccini RF. Adequacy of antenatal care and its relashionship with low birth weight in Botucatu, São Paulo, Brazil: a case control study. *BMC Pregnancy and Childbirth* 2014; 14:255-267.
20. Lansky S, Friche AAL, Silva AAM, Campos D, Bittencourt DAS, Carvalho ML, Frias PG, Cavalcante RS, Cunha AJLA. Pesquisa Nascer no Brasil: perfil de mortalidade neonatal e avaliação da assistência à gestante e ao recém-nascido. *Cad Saude Publica* 2014; 30(Supl.)S192:S207.
21. Barros FC, Bhutta ZA, Batra M, Hansen TN, Victora CG, Rubens CE. Global report on preterm birth and stillbirth (3 of 7): evidence for effectiveness of interventions. *BMC Pregnancy and Childbirth* 2010; 10(Supl. 1):S3-39.
22. Barros FC, Matijasevich A, Requejo JH, Giugliani E, Maranhão AG, Monteiro CA, Barros AJD, Bustreo F, Merialdi M, Victora CG. Recent trends in maternal, newborn, and child health in Brazil: progress toward Millennium Development Goals 4 and 5. *Am J Public Health* 2010; 100(10):1877-1889.
23. Silveira MF, Victora CG, Barros AJD, Santos IS, Matijasevich A, Barros FC. Determinants of preterm birth: Pelotas, Rio Grande do Sul State, Brazil, 2004 birth cohort. *Cad Saude Publica* 2010; 26(1):185-194.
24. Brasil. Ministério da Saúde (MS). Portaria GM/MS nº 569, de 1 junho de 2000. *Diário Oficial da União* 2000; 1 jun.
25. Victora CG, Hanson K, Bryce J, Vaughan PJ. Achieving universal coverage with health interventions. *Lancet* 2004; 364(9444):1541-1548.
26. Instituto Brasileiro de Geografia e Estatística (IBGE). *Conheça cidades e estados do Brasil*. [acessado 2019 Fev 05]. Disponível em: https://cidades.ibge.gov.br/
27. Instituto Jones Dos Santos Neves (IJSN). *Produto Interno Bruto dos Municípios – 2016*. Vitória: IJSN; 2018.
28. Santos-Neto ET, Oliveira, AE, Zandonade E, Gama SGN, Leal MC. O que os cartões de pré-natal das gestantes revelam sobre a assistência nos serviços do SUS da Região Metropolitana da Grande Vitória, Espírito Santo, Brasil? *Cad Saude Publica* 2012; 28(11):1650-1662.
29. Polgliane RBS, Leal MC, Amorim MHC, Zandonade E, Santos Neto ET. Adequação do processo de assistência pré-natal segundo critérios do Programa de Humanização do Pré-natal e Nascimento e da Organização Mundial de Saúde. *Cien Saude Colet* 2014; 19(7):1999-2010.
30. Atlas Brasil. *Atlas Brasil 2013*. [acessado 2014 Jun 18]. Disponível em: http://www.atlasbrasil.org.br/2013/
31. World Health Organization (WHO). The World Health Organization's infant-feeding recommendation. *Bull. World Health Organization* 1995; 73:165-174.
32. Swarcwald CL, Leal MC, Gouveia GC, Souza WV. Desigualdades socioeconômicas em saúde no Brasil: resultados da Pesquisa Mundial de Saúde, 2003. *Rev. Bras. Saúde Matern. Infant.* 2005; 5(Supl. 1):S11-S22.
33. Vettore MV, Gama SGN, Lamarca GA, Schilithz AOC, Leal MC. Housing conditions as a social determinant of low birthweight and preterm low birthweight. *Rev Saude Publica* 2010; 44(6):1021-1031.
34. Thiede M, Akewengo P, Mc'Intyre D. Explorando as dimensões do acesso. In: Mc'Intyre D, Mooney G. *Aspectos econômicos da equidade em saúde.* Rio de Janeiro: Editora Fiocruz; 2014. p. 137-161.
35. Saavedra JS, Cesar, JA. Uso de diferentes critérios para avaliação da inadequação do pré-natal: um estudo de base populacional no extremo Sul do Brasil. *Cad Saude Publica* 2015; 31(5):1003-1014.
36. Mallmann MB, Boing AF, Tomasi YT, Anjos JC, Boing AC. Evolução das desigualdades socioeconômicas na realização de consultas de pré-natal entre parturientes brasileiras: análise do período 2000-2015. *Epidemiol. Serv. Saude* 2018; 27(4):7-11.
37. Ribeiro JM, Costa NR, Pinto LFS, Silva PLB. Atenção ao pré-natal na percepção das usuárias do SUS. *Cad Saude Publica* 2004; 20(2):534-545.
38. Esposti CDD, Oliveira AE, Santos-Neto ET, Travassos CMR. Representações sociais sobre o acesso e o cuidado pré-natal no Sistema Único de Saúde da Região Metropolitana da Grande Vitória, Espírito Santo. *Saúde Soc*. 2015; 24(3):765-779.
39. Figueiredo PP, Rossoni E. O acesso à assistência pré-natal na Atenção Básica à Saúde sob a ótica das gestantes. *Rev. Gaúcha Enferm.* 2008; 29(2):238-245.
40. Almeida CAL, Tanaka OY. Perspectiva das mulheres na avaliação do Programa de Humanização do Pré-Natal e Nascimento. *Rev Saude Publica* 2009; 43(1):98-104.
41. Albuquerque RA, Jorge MSB, Franco TB, Quinderé PHD. Produção do cuidado integral no pré-natal: itinerário de uma gestante em uma unidade básica de saúde da família. *Interface (Botucatu)* 2011; 15(38):677-686.
42. Vieira SM, Bock LF, Zocche DA, Pessota CU. Percepção das puérperas sobre a assistência prestada pela equipe de saúde no pré-natal. *Texto & Contexto Enferm*. 2011; 20(n. esp.):255-262.
43. Coutinho T, Teixeira MTB, Dain S, Sayd JD, Coutinho LM. Adequação do processo de assistência pré-natal entre as usuárias do Sistema Único de Saúde em Juiz de Fora-MG. *Rev. Bras. Ginecol. Obstet.* 2003; 25(10):717-724.
44. Coutinho T, Monteiro MFG, Sayd JD, Teixeira MTB, Coutinho CM, Coutinho LM. Monitoramento do processo de assistência pré-natal entre as usuárias do Sistema Único de Saúde em município do Sudeste brasileiro. *Rev. Bras. Ginecol. Obstet*. 2010; 32(11):563-569.
45. Moraes MS, Kujumjian FG, Chiaravalloti Neto F, Lopes JCC. Avaliação da assistência às gestantes: o caso do município de São José do Rio Preto, São Paulo, Brasil. *Rev. Bras. Saúde Mater. Infant*. 2004; 4(4):375-384.

46. Koffman MD, Bonadio IC. Avaliação da atenção pré-natal em uma instituição filantrópica da cidade de São Paulo. *Rev. Bras. Saúde Mater. Infant.* 2005; 5(Supl. 1):s23-32.
47. Anversa ETR, Bastos GAN, Nunes LN, Dal Pizzol TS. Qualidade do processo da assistência pré-natal: unidades básicas de saúde e unidades de Estratégia Saúde da Família em município no Sul do Brasil. *Cad Saude Publica* 2012; 28(4):789-800.
48. Domingues RMSM, Hartz ZMA, Dias MAB, Leal MC. Avaliação da adequação da assistência pré-natal na rede SUS do Município do Rio de Janeiro, Brasil. *Cad Saude Publica* 2012; 28(3):425-437.
49. Martinelli KG, Santos Neto ET, Gama SGN, Oliveira AE. Adequação do processo da assistência pré-natal segundo os critérios do Programa de Humanização do Pré-natal e Nascimento (PHPN) e Rede Cegonha. *Rev. Bras. Ginecol. Obstet.* 2014; 36(2):56-64.
50. Silva EP, Lima RT, Osório MM. Impacto de estratégias educacionais no pré-natal de baixo risco: revisão sistemática de ensaios clínicos randomizados. *Cien Saude Colet* 2016; 21(9):2935-2948.
51. Souza VB, Roecker S, Marcon SS. Ações educativas durante a assistência pré-natal: percepção de gestantes atendidas na rede básica de Maringá-PR. *Rev. Eletr. Enf. [Internet]*, 2011 [acessado 2015 Mar 17]; 13(2):199-210. Disponível em: http://www.fen.ufg.br/revista/v13/n2/v13n2a06.htm.
52. Mendoza-Sassi RA, Cesar JA, Ulmi EF, Mano PS, Dall'Agnol MM, Neumann NA. Avaliando o conhecimento sobre pré-natal e situações de risco à gravidez entre gestantes residentes na periferia da cidade de Rio Grande, Rio Grande do Sul, Brasil. *Cad Saude Publica* 2007; 23(9):2157-2166.
53. Figueroa V, Alfaro NA, Rosa AC. Predictores de utilización de la atención prenatal. *Aten. Prim*. 2005; 35(4):185-191.
54. Say L, Raine R. A systematic review of inequalities in the use of maternal health care in developing countries: examining the scale of the problem and the importance of context. *Bulletin of the World Health Organization* 2007; 85(10):812-819.
55. Puccini RF. Eqüidade na atenção pré-natal e ao parto em área da Região Metropolitana de São Paulo, 1996. *Cad Saude Publica* 2003; 19(1):35-45.
56. Domingues RMSM, Leal MC, Hartz ZMA, Dias MAB, Vettore MV. Acesso e utilização de serviços de pré-natal na rede SUS do município do Rio de Janeiro, Brasil. *Rev Bras Epidemiol* 2013; 16(4):953-965.
57. Rasia ICRB, Albernaz E. Atenção pré-natal na cidade de Pelotas, Rio Grande do Sul, Brasil. *Rev. Bras. Saúde Matern. Infant.* 2008; 8(4):401-410.
58. Jong EIF. Determinants of late and/or inadequate use of prenatal healthcare in high-income countries: a systematic review. *Eur J Public Health* 2015; 22(6):904-913.
59. Barreto SM, Passos VMA, Giatti L. Comportamento saudável entre adultos jovens no Brasil. *Rev Saude Publica* 2009; 43(Supl. 2):9-17.
60. Fonseca SC, Kale PL, Silva KS. Pré-natal em mulheres usuárias do Sistema Único de Saúde em duas maternidades no Estado do Rio de Janeiro, Brasil: a cor importa? *Rev. Bras. Saúde Matern. Infant*. 2015; 15(2):209-217.
61. Barreira TMHM, Makhoul AF, Cohn A. Condição feminina de mulheres chefes de família em situação de vulnerabilidade social. *Serv. Soc. Soc*. 2011; (105):167-179.
62. Espírito Santo. *Ficha de informações municipais de 2013*. [acessado 2015 Fev 26]. Disponível em: http://www.saude.es.gov.br/default.asp
63. Brasil. Ministério da saúde (MS). *Índice de Desempenho do Sistema Único de Saúde*: *Resultados*. Brasília; 2011. [acessado 2015 Mar 01]. Disponível em: http://idsus.saude.gov.br/mapas.html
64. Porto SM. *Equidade na distribuição geográfica dos recursos em saúde: uma contribuição para o caso brasileiro* [tese]. Fundação Oswaldo Cruz: Rio de Janeiro; 1997.
65. Mendoza-Sassi RAM. Diferenças no processo de atenção ao pré-natal entre unidades da Estratégia Saúde da Família e unidades tradicionais em um município da Região Sul do Brasil. *Cad Saude Publica* 2011; 27(4):787-796.
66. Duarte SJH, Andrade SM. O significado do pré-natal para mulheres grávidas: Uma experiência no município de Campo Grande, Brasil. *Saúde Soc* 2008; 17(2):132-139.
67. Brasil. Ministério da Saúde (MS). Portaria GM/GM nº 2.351, de 5 de outubro de 2011. Institui, no âmbito do Sistema Único de Saúde - SUS - a Rede Cegonha. *Diário Oficial da União* 2011; 5 out.

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