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Non-performance of serological tests for syphilis during prenatal care: prevalence and associated factors

Não realização de teste sorológico para sífilis durante o pré-natal: prevalência e fatores associados

Juraci Almeida Cesar[I] ID, Adriana Vieira Camerini[I] ID, Renata Gomes Paulitsch[I] ID, Rodrigo Jacobi Terlan[I] ID

ABSTRACT: *Introduction:* Syphilis is a sexually transmitted disease, easy to diagnose and treat, but whose incidence is increasing in Brazil. This study estimated the prevalence of the non-performance of serological tests for syphilis during prenatal care, in addition to evaluating its trend and identifying its associated factors in the municipality of Rio Grande, Rio Grande do Sul, Southern Brazil. *Methods:* This is a cross-sectional survey that included all pregnant women living in this municipality who gave birth between January 1 and December 31, 2007, 2010, and 2013. A single standardized questionnaire was administered to the mothers within 48 hours of delivery, while they were still in the maternity ward. We used the χ^2 test for proportions and linear trend, and Poisson regression with robust adjustment in the multivariate analysis. The effect measure adopted was prevalence ratio (PR). *Results:* Among the 7,351 mothers who had at least one prenatal visit, the prevalence of non-performance of serological tests for syphilis in the three years studied was 2.9% (95% confidence interval – 95%CI 2.56 – 3.33), with 3.3% (95%CI 2.56 – 3.97) in 2007, 2.8% (95%CI 2.20 – 3.52) in 2010, and 2.7% (95%CI 2.12 – 3.38) in 2013. Black mothers, those with low household income and schooling, and who had few prenatal visits showed higher PR of non-performance of this test. *Discussion:* The prevalence of non-performance has virtually not changed in the period, and women with high-risk pregnancy showed a greater probability of not undergoing the test. *Conclusions:* This municipality needs to reach mothers with lower socioeconomic status, restructure the local health services, and enhance their operationalization to improve the quality of prenatal care.

Keywords: Prenatal care. Pregnant women. Serology. Syphilis.

[I]Postgraduate Program in Public Health, Faculty of Medicine, Universidade Federal do Rio Grande – Rio Grande (RS), Brazil.

Corresponding author: Juraci Almeida Cesar. Programa de Pós-graduação em Saúde Pública, Faculdade de Medicina, Universidade Federal do Rio Grande. Rua General Osório s/n, 4º andar, Centro, CEP: 96203-900, Rio Grande, RS, Brasil. E-mail: juraci.a.cesar@gmail.com

RESUMO: *Introdução:* A sífilis é uma doença de transmissão sexual de diagnóstico e tratamento fáceis, mas de incidência crescente no Brasil. Este estudo mediu prevalência, avaliou tendência e identificou fatores associados à não realização de exame sorológico para sífilis no pré-natal em Rio Grande, RS. *Metodologia:* Trata-se de inquérito transversal que incluiu todas as gestantes residentes nesse município que tiveram filho entre 1º de janeiro e 31 de dezembro nos anos de 2007, 2010 e 2013. Aplicou-se à mãe questionário único, padronizado em até 48 horas após o parto, quando ainda na maternidade. Utilizaram-se teste χ^2 para proporções e para tendência linear e regressão de Poisson com ajuste robusto na análise multivariável. A medida de efeito usada foi razão de prevalências (RP). *Resultados:* Entre as 7.351 mães que passaram por pelo menos uma consulta, a prevalência de não realização de sorologia para sífilis nos três anos foi de 2,9% (intervalo de confiança de 95% — IC95% 2,56 – 3,33), sendo de 3,3% (IC95% 2,56 – 3,97) em 2007, 2,8% (IC95% 2,20 – 3,52) em 2010 e 2,7% (IC95% 2,12 – 3,38) em 2013. Mães de cor da pele preta, de baixa renda familiar e escolaridade e que passam por poucas consultas apresentaram maior RP à não realização desse exame. *Discussão:* A prevalência de não realização praticamente não se modificou no período, com maior probabilidade de não realização entre aquelas de maior risco gestacional. *Conclusões:* Alcançar mães de pior nível socioeconômico, reestruturar os serviços locais de saúde, aperfeiçoar sua operacionalização a fim de melhorar a qualidade da assistência pré-natal parecem mandatórios nesse município.

Palavras-chave: Cuidado pré-natal. Gestantes. Sorologia. Sífilis.

INTRODUCTION

Gestational syphilis is an infectious disease of vertical transmission – from mother to fetus –, which affects at least three-fourths of newborns if not treated[1]. This condition can lead to congenital syphilis, fetal loss, miscarriage, stillbirth, low birth weight, prematurity, and early neonatal mortality[1,2].

Despite its significant harmful potential, both diagnosis and treatment, management, or control are easy to implement[3]. Detection involves serological screening of pregnant women with non-treponemal tests, usually the venereal disease research laboratory (VDRL) and the rapid test (rapid plasma reagin)[3,4]. The treatment, benzathine penicillin-based, is highly effective and low-cost. The control must be done at the beginning of prenatal care and near the 30th week of pregnancy[3,5].

Despite almost all Brazilian pregnant women (98%) starting prenatal care, estimates indicate that at least 10% of them do not undergo a single serological test for syphilis[3,5]. Between 2003 and 2015, the rate of congenital syphilis in the country increased from 1.7 to 6.5 cases per one thousand live births, that is, from 5,172 to 19,228 cases. This increase represents a frequency 3.8 times higher[6]. Another aspect to consider is the high incidence and underreporting of this disease among indigenous peoples[7]. In Rio Grande do Sul, the rate jumped from 1.2 to 11.5/1,000 live births in the same period, or from 186 to 1,642 cases, a frequency nearly nine times higher. The national rate of 6.5/1,000 live births is 13 times greater than that recommended by the Pan American Health Organization for Latin America and the Caribbean – 0.5/1,000 live births[8].

The resurgence of congenital syphilis is worrying due to the high number of cases, its rapid growth, and for being the primary cause of 5.4% of all stillbirths[6,9]. Thus, identifying pregnant women with a higher probability of not undergoing the serological test for this disease, as well as creating mechanisms that allow health professionals and services to reach these women, can increase the coverage of this test and, consequently, reduce the incidence of congenital syphilis.

This study aimed to estimate the prevalence of non-performance of serological tests for syphilis, in addition to evaluating its trend and identifying its associated factors among all puerperal women living in the municipality of Rio Grande, Rio Grande do Sul, who gave birth in one of the two local maternity hospitals, in 2007, 2010, and 2013.

METHODS

Rio Grande has around 210 thousand inhabitants and is located in the so-called Southern Half of the state of Rio Grande do Sul, at 300 km from the capital Porto Alegre. Its economy is based on farming, fishing, trade, port activity, and, more recently, the construction of ship platforms. The gross domestic product (GDP) per capita in 2012 was R$ 45 thousand per year, while the child mortality coefficient was 13.5/1,000 live births[10].

The data presented in this study originated from cross-sectional surveys conducted periodically in the municipality to evaluate the pregnancy and childbirth care provided. The first one was carried out in 2007, the second in 2010, and the last in 2013. They covered all births that occurred in the municipality between January 1 and December 31 of these years and included only newborns with at least 20 weeks of gestational age, weighing 500 grams or more, and whose mother lived in Rio Grande, both in urban and rural areas. This article included only mothers who had at least one prenatal visit. These women were interviewed only once in the maternity ward within 48 hours of delivery.

A single standardized and pre-coded questionnaire was used, consisting almost entirely of closed questions. The information collected included demographic and socioeconomic characteristics, housing and sanitation conditions, reproductive history, lifestyle habits, morbidity pattern in the gestational period, and care received during pregnancy and childbirth. The outcome was the non-performance of serological tests for syphilis (VDRL) during prenatal visits.

Four trained interviewers – who conducted the pilot study in the month prior to data collection in these same maternity hospitals – administered the questionnaires.

The search for parturients occurred daily by consulting the birth records and visiting the two maternity wards. After finding a puerperal woman, the interviewers confirmed her place of residence, and, if it corresponded to the municipality of Rio Grande, the informed consent form (ICF) was read. If the mother agreed, she signed two copies of the form, keeping one of them, and returning the other to the interviewer for later archiving. Only after this

procedure, the interviewer administered the questionnaire. In the case of underage mothers, a parent or guardian signed the ICF.

At the end of each working day, the interviewers coded the questionnaires and handed them us at the headquarters of the project so we could code the open questions. At this point, the questionnaires were also thoroughly reviewed for subsequent typing. Different professionals recorded the data with double entry and in reverse order to the first typist. At the end of each batch of 100 questionnaires, the entries were compared and any possible errors, corrected. Next, a consistency analysis was performed. Both the typing and the comparison of the data recorded were carried out using the free software EpiData 3.1[11]. At the end of this stage, the data was stored, and derived variables created. These stages were performed using the statistical software Stata 12[12].

The descriptive analysis consisted of obtaining prevalence measures of both exposures and the outcome. The effect measure used was prevalence ratio (PR), calculated by Poisson regression with robust variance adjustment[13]. We reported the p-value of the linear trend test for ordinal categorical variables, while other variables used the Wald test for heterogeneity.

In the adjusted analysis of factors associated with the non-performance of serological tests for syphilis, we adopted a previously established hierarchical model with three levels to adjust for potential confounding factors[14]. The first level involved demographic (age, skin color, living with a partner) and socioeconomic variables (schooling, household income, and paid work during pregnancy); the second level included environmental (household crowding) and reproductive characteristics (parity, previous stillbirth, and whether the pregnancy was planned); and the third level comprised pregnancy care variables (number of prenatal visits, trimester of the first prenatal visit, place where the pregnant woman had the prenatal visits, type of health service used, and if the mother received ferrous sulfate supplementation). In the regression model, variables were controlled for those of the same or previous levels, establishing a p≤0.20 to maintain the variables in the analysis model proposed. The significance level adopted for two-tailed tests was 95%[15].

Quality control consisted of re-administering at least 7% of the questionnaires through telephone or home visits systematically chosen. The Kappa coefficient of agreement ranged from 0.63 to 0.89. This stage aimed to check the performance of the interviews and compare the answers received on both occasions.

The Health Research Ethics Committee (HREC) of the Universidade Federal do Rio Grande approved each research protocol, under the following process numbers: 23116.5369/6.58-12/2007; 23116.6258/9.64-117/2009; and 23116.2623/2012.67-007-2012.

RESULTS

In 2007, 2010, and 2013, the number of births from mothers who lived in the municipality of Rio Grande was 7,818. Out of this total, we could gather information about 7,637 births, which represents a respondents rate of 97.7% (or loss of 2.3%). The losses corresponded to

1.2% in 2007, 2.7% in 2010, and 2.8% in 2013. The sample of the present study consisted of 7,351 births from mothers who had at least one prenatal visit.

Table 1 shows that 18.6% of them were adolescents, 69.1% were white, 84.9% lived with a partner, 57.3% had at least completed high school, 21.3% had a monthly household income greater than four minimum wages (MW), 41.9% had paid work outside the

Table 1. Characteristics of pregnant women who had at least one prenatal visit in Rio Grande, Rio Grande do Sul, Brazil, in 2007, 2010, and 2013.

Variable	Perinatal survey			p Trend	Total (2007–2013)
	2007	2010	2013		
Maternal age					
11 to 19 years	20.2% (494)	18.4% (422)	17.3% (452)		18.6% (1,368)
20 to 24 years	27.9% (683)	26.4% (604)	26.4% (690)	<0.001	26.9% (1,977)
25 years or older	51.9% (1,272)	55.2% (1,262)	56.3% (1,472)		54.5% (4,006)
Skin color					
White	70.2% (1,720)	70.3% (1,608)	66.8% (1,747)		69.1% (5,075)
Brown/Mixed	18.0% (441)	20.4% (468)	22.1% (578)	0.022	20.2% (1,487)
Black	11.8% (288)	9.3% (212)	11.1% (289)		10.7% (789)
Living with husband	83.4% (2,043)	84.8% (1,941)	86.2% (2,253)	0.003	84.8% (6,237)
Maternal schooling					
0 to 8 years	47.2% (1,157)	43.7% (1,001)	38.6% (1,008)		43.1% (3,166)
9 to 11 years	42.9% (1,051)	45.4% (1,040)	45.4% (1,188)	<0.001	44.6% (3,279)
12 years or more	9.8% (241)	10.8% (247)	16.0% (418)		12.3% (906)
Monthly household income in minimum wages+					
Up to 0.9	13.6% (332)	16.8% (384)	5.0% (130)		11.5% (846)
1 to 1.9	32.3% (792)	33.5% (767)	28.1% (734)	<0.001	31.2% (2,293)
2 to 3.9	34.4% (843)	31.5% (720)	39.7% (1,038)		35.4% (2,601)
4 or more	19.7% (482)	18.2% (417)	27.2% (712)		21.9% (1,611)
Had paid work during pregnancy	61.9% (1,516)	56.6% (1,296)	55.7% (1,457)	<0.001	41.9% (3,082)
Household residents: mean (SD)	3.6 (1.7) (2,449)	3.4 (1.8) (2,288)	3.3 (1.6) (2,614)	<0.001	3.5 (1.7) (7,351)
Number of children					
1	40.6% (995)	44.8% (1,024)	48.2% (1,261)		44.6% (3,280)
2	5.55% (134)	14.0% (320)	29.8% (1,261)	< 0.001	16.8% (1,234)
3	29.3% (717)	22.5% (515)	11.3% (304)		20.9% (1,536)
4 or more	24.6% (603)	18.7% (429)	10.3% (269)		17.7% (1,301)

Table 1. Continuation.

Variable	Perinatal survey			p Trend	Total (2007–2013)
	2007	2010	2013		
Had a previous stillbirth	3.3% (82)	3.4% (78)	1.6% (43)	<0.001	2.8% (203)
Number of prenatal visits					
1 to 5	24.3% (596)	19.7% (452)	14.2% (137)		19.3% (1,420)
6 to 11	61.6% (1,508)	67.1% (1,535)	70.6% (1,846)	<0.001	66.5% (4,889)
12 or more	14.1% (345)	13.2% (301)	15.1% (396)		14.2% (1,042)
Had their first visit during the first trimester	73.6% (1,794)	78.3% (1,765)	78.6% (2,054)	<0.001	76.8% (5,613)
Place where they had the prenatal visits					
Private or insurance physician	44.3% (1,085)	45.8% (1,048)	49.8% (1,302)	<0.001	45.2% (3,435)
Basic health unit	39.6% (969)	33.4% (765)	29.7% (777)		33.1% (2,513)
Outpatient clinic	16.3% (395)	20.8% (475)	20.5% (535)		21.8% (1,655)
Received ferrous sulfate supplementation	61.7% (1,510)	75.6% (1,729)	78.8% (2,059)	<0.001	78.8% (5,298)
Did not undergo serological tests for syphilis during prenatal care	3.3% (80)	2.8% (65)	2.7% (72)	0.291	2.9% (217)
Total	33.3% (2,449)	31.1% (2,288)	33.6% (2,614)		100% (7,351)

+Minimum wage in 2007: R$ 380; in 2010: R$ 510; in 2013: R$ 678; SD: standard deviation.

home during pregnancy, and lived, on average, with 3.5 people. About 45% of them were primiparas, 3% had at least one previous stillbirth, and 80.6% had at least six prenatal visits. Most of the visits (56.7%) occurred in the public service, 66.9% received ferrous sulfate supplementation, and 2.9% (95% confidence interval – 95%CI 2.6 – 3.3) did not undergo a serological test for syphilis.

Table 2 reveals that the prevalence of non-performance of serological tests for syphilis ranged from 15.7 to 0.6% among pregnant women who had 1–3 prenatal visits and 12 or more, respectively. In the adjusted analysis, the variables significantly associated with the non-performance of serological tests for syphilis were skin color, maternal schooling, household income, number of prenatal visits, and ferrous sulfate supplementation.

The same table indicates that the PR of non-performance of serological tests for syphilis during prenatal care was 1.57 (1.10–2.25) among black mothers compared to white ones, and 2.40 (1.34–4.29) in mothers who belonged to families with a monthly income

Table 2. Prevalence of exposure variables per category and crude and adjusted analysis for the non-performance of serological tests for syphilis during prenatal care. Rio Grande, Rio Grande do Sul, Brazil, in 2007, 2010, and 2013 (n=7,351).

Level	Variable	Prevalence of non-performance of serological tests for syphilis	Analysis (PR and 95%CI)	
			Crude	Adjusted
I	Maternal age (years)		p<0.001	p=0.235**
	13 to 19	4.4%	1.00	1.00
	20 to 24	3.3%	1.43 (1.04 – 1.95)	1.25 (0.91 – 1.71)
	25 or older	2.3%	1.90 (1.38 – 2.62)	1.29 (0.91 – 1.82)
	Skin color		p<0.001	p=0.043*
	White	2.5%	1.00	1.00
	Brown/Mixed	3.4%	1.34 (0.98 – 1.85)	1.17 (0.84 – 1.61)
	Black	4.7%	1.84 (1.29 – 2.63)	1.57 (1.10 – 2.25)
	Living with husband/partner		p=0.171	p=0.791
	Yes	3.6%	1.00	1.00
	No	2.8%	1.26 (0.90 – 1.77)	0.95 (0.66 – 1.36)
	Maternal schooling in years		p<0.001	p<0.001**
	0 to 8	4.5%	4.51 (2.31 – 8.82)	2.57 (1.21 – 5.44)
	9 to 11	2.0%	2.02 (1.01 – 4.05)	1.42 (0.67 – 3.00)
	12 or more	1.0%	1.00	1.00
	Household income in minimum wages+		p<0.001	p=0.016**
	Up to 0.9	5.3%	4.28 (2.54 – 7.20)	2.40 (1.34 – 4.29)
	1 to 1.9	3.7%	2.98 (1.84 – 4.83)	1.75 (1.01 – 3.01)
	2 to 3.9	2.6%	2.07 (1.26 – 3.40)	1.50 (0.88 – 2.54)
	4 or more	1.2%	1.00	1.00
	Had paid work during pregnancy		p<0.001	p=0.573
	No	3.6%	1.68 (1.26 – 2.24)	1.09 (0.79 – 1.50)
	Yes	2.1%	1.00	1.00
II	Number of household residents		p<0.001	p=0.075**
	1 or 2	1.6%	1.00	1.00
	3	2.9%	1.77 (1.19 – 2.63)	1.29 (0.80 – 2.07)
	4 or more	4.2%	2.60 (1.82 – 3.71)	1.62 (1.05 – 2.51)

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Table 2. Continuation.

Level	Variable	Prevalence of non-performance of serological tests for syphilis	Analysis (PR and 95%CI)	
			Crude	Adjusted
II	Number of children		p<0.001	p=0.211**
	1	1.9%	1.00	1.00
	2	2.9%	1.56 (1.04 – 2.35)	1.47 (0.93 – 2.34)
	3	3.6%	1.92 (1.34 – 2.75)	1.49 (0.98 – 2.25)
	4 or more	5.0%	2.68 (1.90 – 3.78)	1.43 (0.93 – 2.19)
	Had a previous stillbirth		p=0.038	p=0.489
	No	2.9%	1.00	1.00
	Yes	5.4%	1.87 (1.03 – 3.37)	1.24 (0.67 – 2.29)
III	Current pregnancy was planned		p<0.001	p=0.078
	Yes	2.0%	1.00	1.00
	No	3.5%	1.74 (1.29 – 2.35)	1.31 (0.96 – 1.78)
	Number of prenatal visits		p<0.001	p<0.001**
	1 to 3	15.7%	27.31 (11.98 – 62.22)	13.23 (5.19 – 33.71)
	4 to 5	4.5%	7.89 (3.37 – 18.48)	4.50 (1.76 – 11.49)
	6 to 11	1.9%	3.23 (1.41 – 7.36)	2.42 (1.01 – 5.74)
	12 or more	0.6%	1.00	1.00
	Month of the first prenatal visit		p<0.001	p=0.908*
	First	1.3%	1.00	1.00
	Second and third	2.3%	1.82 (1.14 – 2.92)	1.11 (0.67 – 1.83)
	Fourth or later	6.0%	4.71 (2.96 – 7.50)	1.09 (0.62 – 1.90)
	Type of health service used for prenatal care		p<0.001	p=0.079
	Private	1.5%	1.00	1.00
	Public	4.1%	2.76 (2.00 – 3.80)	1.41 (0.96 – 2.08)
	Ferrous sulfate supplementation		p<0.001	p<0.001
	No	4.2%	1.79 (1.38 – 2.33)	1.82 (1.39 – 2.37)
	Yes	2.3%	1.00	1.00

Adjustment equations: level I – maternal age, living with partner, skin color, maternal schooling, household income, and paid work during pregnancy; level II – skin color, maternal schooling, household income, household crowding, and planned pregnancy; level III – skin color, maternal schooling, household income, household crowding, planned pregnancy, number of prenatal visits, month of the first prenatal visit, type of health service used for prenatal care, and ferrous sulfate supplementation; *Wald test for heterogeneity; **Wald test for linear trend; +minimum wage in 2007: R$ 380; in 2010: R$ 510; in 2013: R$ 678; PR: prevalence ratio; 95%CI: 95% confidence interval.

lower than one MW in contrast with those with household income ≥ 4 MW. The PR for mothers with up to eight years of schooling was 2.57 (95%CI 1.21 – 5.44) when compared to those with 12 or more years of schooling. Lastly, the PR of non-performance of serological tests for syphilis among mothers who had 1–3 prenatal visits was 13.23 (95%CI 11.98 – 62.22) compared to those with 12 or more visits, and 1.82 (95%CI 1.39 – 2.37) in mothers not supplemented with ferrous sulfate during pregnancy in contrast with those who received supplementation.

DISCUSSION

The prevalence of non-performance of serological tests for syphilis in this study was 2.9%, with a slight decline from 3.2% in 2007 to 2.7% in 2013. The PRs of non-performance of this test were significantly higher among black mothers, those with up to eight years of schooling, monthly household income lower than one MW, who had one to three prenatal visits, and the ones not supplemented with ferrous sulfate.

A recent hospital-based study that included all Brazilian states found a national prevalence of non-performance of 11%, ranging from 5% in the South Region to 21% in the North Region[16]. This difference might be attributed primarily to the greater availability and ease of access to public health services in each of these regions. In this study, black mothers presented PR of 1.57 (1.10 – 2.25) for non-performance of serological tests for syphilis when compared to white ones. In general, black women had fewer prenatal visits and started them later. These women also lived farther from health services and faced other socioeconomic barriers, such as lack of resources to pay for transport and loss of working hours, in addition to educational and cultural factors that hindered the search for prenatal care of better quality, which includes serological tests for syphilis[17].

Household income and maternal schooling are the main determinants of adequate prenatal care[18-21]. A study conducted in Pelotas, Rio Grande do Sul, showed that the coverage for almost all prenatal procedures and tests was higher among pregnant women belonging to the highest quintile of income compared to the lowest[18].

We have found no studies reporting the probability of (non-) performance of serological tests for syphilis according to the number of prenatal visits. Only one work evaluated a similar association: urinalysis during prenatal care. In this study, Silveira et al. showed that, even after adjustment for several confounding factors, the odds ratio of non-performance of urinalysis during the prenatal period was 24.5 (10.5 – 57.4) among pregnant women who had only one prenatal visit in comparison with those who had seven or more visits[21]. That is, the provision of health care depends on the pregnant woman going to prenatal visits. The higher the number of visits to health services, the greater the probability of receiving care.

The non-supplementation with ferrous sulfate, used here as a proxy of the outcome, reinforces the idea that the non-performance of serological tests for syphilis is not selective.

Namely, pregnant women who do not undergo a particular test have a high probability of not undergoing other procedures[18,22].

The study *Nascer no Brasil* (Being Born in Brazil) revealed a significantly higher risk of congenital syphilis among newborns whose mothers had less than eight years of schooling (3.2: 41.47 – 7.12), were black (3.17: 1.78 – 5.65), did not go to a single prenatal visit (6.07: 2.34 – 15.75), or received prenatal care in public health services (4.24: 2.07 – 8.69)[16].

As expected, the results obtained from perinatal studies in Rio Grande showed, quite clearly, that pregnant women with a higher probability of not undergoing serological tests for syphilis had the same characteristics of puerperal women identified in the national study as those with greater risk of acquiring syphilis. This finding suggests that women who do not undergo this test during prenatal visits do not have it done in another location, which deepens the problem. In the case of Rio Grande, the total number of newborns exposed to congenital syphilis can reach 170 (6.5%), with 75 (2.9%) of them from mothers who went to at least one visit but did not have the test performed, and 90 (3.6%) whose mothers did not go to a single prenatal visit.

When interpreting these results, taking into account the type of study design adopted is essential, as it measures both exposures and the outcome at the same time. This scenario prevents the assessment of causality. Besides, it is important to consider that, in approximately half of the cases, the information about the performance of the serological test for syphilis was based only on the mother's answers, without confirming the data in her records, which can lead to underreporting due to forgetfulness or the participant not mentioning it. These limitations, however, do not invalidate the results presented here, since cohort studies, which allow evaluating temporality, have amply shown the effects of demographic, socioeconomic, and reproductive variables, as well as those related to health service use on the numerous outcomes in maternal and child health. The possible underestimation of the non-performance of VDRL by the mother makes even more evident the need to implement actions aiming at increasing the coverage of the serological test for syphilis.

CONCLUSION

The timely diagnosis of syphilis during pregnancy is the main challenge for the control of congenital syphilis. It depends on universalizing care provision and eliminating missed opportunities[23]. This study shows that this control is still not effective in the municipality of Rio Grande.

Our results indicate stagnation in the performance of serological tests for syphilis. They also reveal that women with lower socioeconomic status and a higher risk of complications during pregnancy and childbirth were more likely not to undergo this test. Efforts should be directed at reaching these pregnant women. In addition, we suggest the following measures to increase the coverage of the serological test for syphilis in this municipality:

- provide the rapid test (rapid plasma reagin) for syphilis in all local Basic Health Units, and if the diagnosis is confirmed, start the treatment for the mother and her partner;

- prioritize, together with health professionals, the performance of this test among pregnant women with lower socioeconomic status, of black skin color, and who go to few prenatal visits;
- elaborate campaigns informing pregnant women about the resurgence of this disease and the importance of undergoing this test for both the mother and the newborn, and encourage them to request the test during the prenatal visit.

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