

Gestational syphilis: association between prenatal guidance, maternal serological evolution and vertical transmission

Sífilis gestacional: associação entre orientações no pré-natal, evolução sorológica materna e transmissão vertical

Sífilis gestacional: asociación entre orientación prenatal, evolución serológica materna y transmisión vertical

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ABSTRACT

Objective: To verify the association between prenatal guidance and serological progression in postpartum women with gestational syphilis and syphilis test reactivity in newborns.

Method: A cross-sectional study conducted at a university hospital from November 2023 to August 2024. The sample consisted of 119 postpartum women diagnosed with syphilis during prenatal care, and who received adequate treatment or not. Data were collected using a questionnaire administered to postpartum women and medical records and analyzed using Pearson's chi-square test.

Results: Postpartum women had adequate responses to the guidance received during prenatal care: definition of syphilis (59.7%), transmission (84.9%), treatment (94.1%), maternal/fetal consequences (59.7%), prevention (74.8%), vertical transmission (31.1%), congenital syphilis (53.8%), and diagnostic tests (63.9%). A positive association was found between adequate responses to diagnostic tests and proper treatment ($p=0.035$). Between adequate responses regarding treatment and maintenance or increase in Venereal Disease Research Laboratory (VDRL) titers ($p=0.030$), and between adequate responses regarding vertical transmission ($p=0.034$) and diagnostic tests ($p=0.039$) with VDRL-reactive newborns at birth. Regarding sexual partners, 52.1% had no record of treatment.

Conclusion: Despite the adequate responses of most postpartum women to prenatal guidance, maintenance, or an increase in maternal VDRL titers and neonatal reactivity, these findings suggest gaps in educational actions and failure in the treatment of sexual partners.

Descriptors: Syphilis; Prenatal Care; Health Education; Public Health Surveillance; Nursing.

RESUMO

Objetivo: Verificar a associação entre as orientações recebidas no pré-natal com evolução sorológica de puérperas com sífilis gestacional e reatividade de exame para sífilis em neonatos.

Método: Estudo transversal, realizado em hospital universitário entre novembro/2023 a agosto/2024. Amostra com 119 puérperas diagnosticadas com sífilis durante o pré-natal e com tratamento adequado ou não. Dados coletados por instrumento aplicado em puérperas e em prontuário, analisados por Teste de Pearson.

Resultados: Puérperas tiveram respostas adequadas para orientações recebidas no pré-natal: definição de sífilis (59,7%), transmissão (84,9%), tratamento (94,1%), consequências maternas/fetais (59,7%), prevenção (74,8%), transmissão vertical (31,1%), sífilis congênita (53,8%) e exames diagnósticos (63,9%). Houve associação positiva entre respostas adequadas sobre exames diagnósticos e tratamento adequado ($p=0,035$), entre respostas adequadas para tratamento e manutenção ou aumento da titulação do *Venereal Disease Research Laboratory* (VDRL) ($p=0,030$), e entre respostas adequadas referentes à transmissão vertical ($p=0,034$) e exames diagnósticos ($p=0,039$) com VDRL reagente de neonatos ao nascimento. Quanto às parcerias sexuais, 52,1% não possuíam registro de tratamento.

Conclusão: Apesar das respostas adequadas da maioria das puérperas às orientações do pré-natal, a manutenção ou aumento das titulações de VDRL maternas e reatividade neonatal sugerem lacunas nas ações educativas e falha no tratamento das parcerias sexuais.

Descritores: Sífilis; Assistência pré-natal; Educação em saúde; Vigilância em Saúde pública; Enfermagem.

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RESUMEN

Objetivo: Verificar la asociación entre la orientación recibida durante el control prenatal con la evolución serológica de las puérperas con sífilis gestacional y la reactividad de las pruebas de sífilis en los recién nacidos.

Método: Estudio transversal realizado en un hospital universitario entre noviembre/2023 y agosto/2024. Muestra de 119 puérperas diagnosticadas de sífilis durante el control prenatal y con tratamiento adecuado o no. Datos recogidos mediante instrumento aplicado a puérperas e historias clínicas, analizados mediante test de Pearson.

Resultados: Las puérperas respondieron adecuadamente a las orientaciones recibidas durante el control prenatal: definición de sífilis (59,7%), transmisión (84,9%), tratamiento (94,1%), consecuencias materno/fetales (59,7%), prevención (74,8%), transmisión vertical (31,1%), sífilis congénita (53,8%) y pruebas diagnósticas (63,9%). Hubo una asociación positiva entre las respuestas adecuadas a las pruebas diagnósticas y el tratamiento adecuado ($p=0,035$), entre las respuestas adecuadas al tratamiento y el mantenimiento o aumento del título del Laboratorio de Investigación de Enfermedades Venéreas (VDRL) ($p=0,030$), entre las respuestas adecuadas respecto a la transmisión vertical ($p=0,034$) y las pruebas diagnósticas ($p=0,039$) con el VDRL reactivo en neonatos al nacer. En cuanto a las parejas sexuales, el 52,1% no tenía registro de tratamiento.

Conclusión: A pesar de que la mayoría de las puérperas respondieron adecuadamente a las orientaciones de cuidados prenatales, el mantenimiento o el aumento de los títulos de VDRL maternos y de la reactividad neonatal sugieren lagunas en las acciones educativas y el fracaso en el tratamiento de las parejas sexuales.

Descriptores: Sífilis; Atención Prenatal; Educación en Salud; Vigilancia en Salud Pública; Enfermería.

INTRODUCTION

Syphilis is a sexually transmitted infection (STI) caused by the bacterium *Treponema pallidum*. It can be acquired through sexual contact, hematogenous transmission, or vertical transmission from mother to fetus. When transmitted during pregnancy, it can result in congenital syphilis (CS), a condition associated with serious complications such as miscarriage, premature birth, fetal death, congenital malformations, neurological sequelae, and neonatal death. The prevention of CS depends essentially on early diagnosis and timely treatment of the pregnant woman and her sexual partner^(1–2).

The diagnosis of syphilis requires a correlation between clinical data, laboratory test results: treponemal (Rapid Test-RT) and non-treponemal (Venereal Disease Research Laboratory-VDRL), history of past infections, and investigation of recent exposure. Therefore, it is recommended that pregnant women undergo RT for syphilis at least three times: at the first prenatal visit, at the beginning of the third trimester, and at the time of delivery⁽³⁾. In the event of a reactive result, it is essential to initiate treatment with Benzathine Penicillin G as soon as possible, ideally within 30 days before delivery. This is the only drug proven to be safe and effective for the treatment of syphilis in pregnant women, due to its ability to cross the placental barrier and prevent intrauterine bacterial proliferation⁽⁴⁾.

Maternal treatment is considered adequate after completion of the prescribed treatment regimen and a decrease in VDRL titers by two dilutions within three months and four dilutions within six months until seroconversion (non-reactive VDRL), with monthly serological monitoring recommended until delivery. In addition, treatment of the pregnant woman's sexual partner should also be considered essential to interrupt the chain of disease transmission and prevent maternal reinfection and CS. To this end, the Brazilian Ministry

of Health (MS, in Portuguese) recommends TR and the offer of presumptive treatment to all sexual partners⁽³⁾.

Newborns exposed to syphilis undergo serological monitoring at birth, and, in the case of VDRL reactivity, hospitalization is indicated for treatment of CS with intravenous penicillin over a period of 10 days. In addition, during hospitalization, the newborn undergoes laboratory and imaging tests to detect possible early changes resulting from the infection, with subsequent outpatient follow-up to monitor for potential late complications⁽⁵⁾.

Despite the availability of RT and free treatment in the Brazilian Unified Health System (SUS), the indicators for Gestational Syphilis (GS) and CS remain high in Brazil, pointing to failures in the coverage and quality of prenatal care. Data from the Ministry of Health indicate that, in 2023, more than 86,000 cases of GS and over 25,000 cases of CS were reported in the country. Rio Grande do Sul stands out, with rates above the national average, being the fourth Brazilian state with the highest number of cases of GS and CS⁽⁶⁾. In Brazil, mandatory reporting of syphilis is an essential strategy for situational diagnosis and disease control⁽³⁾.

The above data reinforce the need to prioritize prenatal care as a public health strategy to enhance health surveillance processes, disease monitoring, and educational actions during prenatal care. Syphilis, being a traceable, treatable, and preventable condition, is indicative of the effectiveness of epidemiological surveillance and the response capacity of Primary Health Care (PHC). In the context of the SUS, strengthening disease prevention and control actions, such as care management mechanisms, is crucial to ensure the right to health is equitably and effectively implemented⁽⁷⁾.

The quality of prenatal care is an essential factor in helping to eradicate syphilis, providing access to healthcare for pregnant women and their sexual partners^(8–9). In this sense, comprehensive and accessible prenatal guidance centered on women and involving their sexual partners can improve

understanding of the disease, promote treatment adherence, reduce reinfections, and generate better outcomes for pregnant women and newborns. Thus, prenatal health education must be developed comprehensively, focusing on the care of women and children⁽¹⁰⁾.

Within the scope of nurses' work in prenatal care, health education emerges as a care tool with the potential to positively influence the success of treatment for pregnant women with syphilis. Through the bond established, nurses provide personalized and specialized information on the diagnosis, treatment, and prevention of syphilis⁽¹¹⁾.

Given the epidemiological scenario of syphilis and the current health context, health education must be seen as a care tool with the potential to empower pregnant women, enabling them to make safe and assertive decisions about their diagnosis and treatment based on the guidance provided by health professionals during prenatal consultations. Thus, the knowledge of pregnant women and postpartum women about the prevention of GS and CS can contribute to prevention, early diagnosis, and effective treatment. Therefore, this study aimed to verify the association between the guidance received during prenatal care and the serological evolution of postpartum women with gestational syphilis and syphilis test reactivity in newborns.

■ METHOD

This is a cross-sectional, retrospective, analytical study, part of a matrix project authored by the researchers involved in the present study, entitled "Risk factors for congenital syphilis: prenatal, hospital, and outpatient follow-up of women and their children from birth to 18 months of age." The research followed the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline⁽¹²⁾.

The sample was convenience-based, consisting of postpartum women with a diagnosis and adequate or inadequate treatment for syphilis in the current pregnancy. They also had a record of prenatal care in electronic medical records or pregnancy cards, were over 18 years of age, and had a single newborn. The exclusion criteria were postpartum women diagnosed with syphilis exclusively at the time of delivery, treatment for syphilis performed only before the current pregnancy, history of mental and/or neurological disorders (recorded in medical records), and those who had neonatal death during the current hospitalization.

For the sample calculation, a study was considered that evaluated the barriers to prenatal care for the control

of vertical transmission of syphilis in pregnant women, according to the sociodemographic, reproductive, and care profile in a metropolis in northeastern Brazil⁽¹³⁾. Considering a 95% confidence level, an expected correlation of 0.5, and a desired confidence interval range of 0.3, a sample size of 99 postpartum women and their newborns was calculated; however, the final sample consisted of 119 participants and their newborns.

The data were collected between November 1, 2023, and August 31, 2024, by a group of researchers who had been trained beforehand to ensure standardization of data collection and double data entry into the database. Postpartum women were selected through daily searches for cases of syphilis in pregnant women identified at the time of admission to the hospital's Obstetric Center (OC) at the time of delivery.

Data collection took place in two stages. The first consisted of an in-person interview with postpartum women, conducted in a private room in the obstetric unit at any time during hospitalization after 24 hours of delivery, lasting approximately 30 minutes. The second stage involved extracting information from the electronic medical records of the postpartum woman and her newborn, as well as from the handbook for the pregnant woman.

An instrument developed by the researchers was used, based on a review of the literature on the subject. The instrument contained open and closed questions, which were later categorized in a database, and was structured around seven thematic axes: (1) sociodemographic information (age, race/color, years of schooling, stable sexual partnership during pregnancy, and monthly family income); (2) obstetric history (number of pregnancies and abortions, and type of delivery in the current pregnancy); (3) quality of prenatal care according to the postpartum woman's perception (organization and benefits of prenatal care); (4) screening and treatment of maternal syphilis during prenatal care (diagnostic tests, treatment of the pregnant woman, guidance provided on syphilis by health professionals during prenatal care, and responses from postpartum women about the guidance received, educational activities on syphilis during prenatal care); (5) screening and treatment of syphilis in sexual partners during prenatal care (attendance at consultations, diagnostic tests, and treatment of sexual partners); (6) hospitalization of women for delivery (VDRL at the time of delivery); and (7) hospitalization of newborns (VDRL results at birth and indication of hospitalization for treatment of CS).

Regarding prenatal care organization, aspects related to follow-up, reception at the Health Unit (HU), scheduling, and waiting time for appointments were considered, based on the individual perceptions of postpartum women. To collect

this data, response options were categorized as “excellent/good,” “fair,” “poor/very poor,” and “did not know.”

Concerning the guidance provided on syphilis during prenatal care and the responses of postpartum women to this guidance, an “appropriate response” was considered one in which postpartum women, when responding freely, mentioned the content established in the Ministry of Health Protocol⁽³⁾, even if expressed in lay terms, as presented in Chart 1.

Regarding maternal outcome, a decrease in VDRL titration by at least two dilutions was considered “positive,” and maintenance or elevation of VDRL titration was considered “negative.” For this purpose, a comparison was made between tests collected during prenatal care and at hospital admission for delivery.

For the neonatal outcome, information related to VDRL testing/results at birth was collected. A “positive” outcome was considered when the newborn presented a “non-reactive” VDRL, and a “negative” outcome when the newborn presented a “reactive” VDRL.

The data were analyzed using descriptive statistics, including the mean and standard deviation, as well as absolute and relative frequencies. The normality of continuous variables was assessed using the Shapiro-Wilk test, and the association between categorical variables was examined using Pearson’s Chi-square test. A $p < 0.05$ was considered statistically significant. The Statistical Package for the Social Sciences (SPSS) 29.0 program was used for the analyses.

This research was approved by the Research Ethics Committee of the institution’s headquarters, under the Certificate of Submission for Ethical Appraisal (CAAE) number 53415321.1.0000.5327 and opinion number 5,336,347. Ethical principles in research, as outlined in Resolution No. 466 of December 12, 2012, of the National Health Council, and the General Data Protection Law, were respected.

The participants were clearly informed about the study’s purpose, potential risks, and benefits. After reading and signing the Free Informed Consent Form (FICF), data collection began.

■ RESULTS

The study included 119 postpartum women and their respective newborns.

The mean age of the postpartum women was 26.2 years ($SD = 5.2$), with the majority self-identifying as white (49.6%), followed by Black (33.6%) and brown (16.8%). Regarding education, 109 postpartum women (91.6%) had up to 11 years of schooling, while 10 (8.4%) had more than 11 years of

education. Considering the national minimum wage (BR) of R\$1,412.00 in 2024, 75 (62.9%) postpartum women reported a monthly income of up to 2 minimum wages, 41 (34.4%) reported 2 to 4 minimum wages, and 3 (2.5%) reported more than 4 minimum wages. Regarding obstetric data, 49 (41.2%) postpartum women were primiparous, 96 (80.7%) had no history of abortion, and 68 (57.1%) had a vaginal delivery in their current pregnancy.

Concerning sexual partners, 96 (80.7%) postpartum women reported having had a single partner during their current pregnancy, with 75 (63.0%) reporting that their partners attended prenatal appointments, of whom 38 (50.7%) attended six or more sessions. In addition, 71 (59.7%) postpartum women reported receiving guidance from health professionals regarding their partners’ participation in prenatal appointments.

Data regarding prenatal care, the organization of care as perceived by postpartum women, and guidance related to syphilis provided during consultations are summarized in Table 1.

For 100 (84.0%) postpartum women, there was no difficulty in attending consultations, and they stated that, in relation to syphilis, prenatal consultations brought benefits, highlighting the opportunity to treat the disease (70; 58.8%).

Considering the educational activities regarding syphilis, in addition to prenatal consultations, 13 (10.9%) postpartum women stated that they had participated, with 7 (53.8%) in groups for pregnant women, 4 (30.8%) in lectures, and 2 (15.4%) receiving informational leaflets.

The postpartum women answered questions related to syphilis regarding the guidance they received, each of which was analyzed as “adequate” or “inadequate.” In this context, the postpartum women responded appropriately to the following questions: definition of syphilis (71; 59.7%), transmission (101; 84.9%), treatment (112; 94.1%), maternal and fetal consequences (71; 59.7%), prevention (89; 74.8%), vertical transmission (37; 31.1%); congenital syphilis (64; 53.8%) and diagnostic tests (76; 63.9%).

Regarding the responses considered adequate about the consequences of syphilis, both maternal and fetal, 67 (94.4%) postpartum women mentioned only fetal consequences, 2 (2.8%) referred only to maternal outcomes, and 2 (2.8%) addressed both maternal and fetal outcomes.

The appropriate treatment regimen until delivery was followed by 102 (85.7%) postpartum women. In the association between adequate responses and treatment, a significant correlation was found for postpartum women who responded adequately to diagnostic tests ($p = 0.035$), with the majority of these (65; 85.5%) receiving adequate treatment, as shown in Table 2.

Chart 1. Questions on syphilis asked to puerperal women and classification of the types of answers considered appropriate. Porto Alegre, Rio Grande do Sul, Brazil, 2024

Questions about syphilis	Responses considered adequate
What is syphilis?	- Sexually Transmitted Infection (STI) - A bacterium
How is syphilis transmitted?	- Sexual transmission. - Vertical transmission
How is syphilis treated?	- Penicillin. - Injectable medication
What are the consequences of syphilis for the pregnant woman and her baby?	- Abortion. - Baby acquires syphilis. - Lesions or spots on the skin
How can syphilis be prevented?	- Female/male condom
How can syphilis be passed on to the baby (vertical transmission)?	- Placental route. - Via childbirth. - By blood.
What are the consequences of syphilis for the baby after birth?	- Malformations. - Blindness. - Neurological problems. - Bone problem. - Skin lesions. - Deafness. - Prematurity. - Miscarriage
What tests are used to diagnose syphilis?	- VDRL. - Rapid test

Source: Research data, 2023-2024

Table 1. Adherence to prenatal care, organization of prenatal care, and guidance received by postpartum women diagnosed with syphilis during pregnancy (n=119). Porto Alegre, Rio Grande do Sul, Brazil, 2024

Variables	n*	%
Number of prenatal visits		
< 6 consultations	15	12.6
≥ 6 consultations	104	87.4
Prenatal start		
1 st trimester	97	81.5
2 nd trimester	20	16.8
3 rd trimester	02	1.7
Location of prenatal care		
Primary Health Care	92	77.3
Hospital and Primary Health Care	19	16.0
Private Practice	05	4.2
Hospital	03	2.5
The puerperal woman's perception of the organization of prenatal care		
- prenatal care		
Great/Good	89	74.8
Fair	21	17.6
Poor/Terrible	08	6.7
Did not know	01	0.8
- reception at the Health Unit		
Good	93	78.2
Fair	15	12.6

Table 1. Cont.

Variables	n*	%
Bad/Poor	10	8.4
Did not know	01	0.8
- scheduling appointments		
Great/Good	90	75.6
Fair	15	12.6
Poor/Terrible	13	10.9
Did not know	01	0.8
- waiting time for appointments		
Good	68	57.1
Fair	26	21.8
Bad/Poor	23	19.3
Did not know	02	1.7
Guidance received during prenatal care†		
What is syphilis	79	66.4
Transmission	102	85.7
Treatment	112	94.1
Maternal/fetal consequences	71	59.7
Prevention	92	77.3
Vertical transmission	38	31.9
Congenital syphilis	64	53.8
Diagnostic tests	94	79.0

Source: Research data, 2023-2024

*n=Number

†Multiple choice questions.

Table 2. Adequate responses of postpartum women diagnosed with syphilis during pregnancy in relation to prenatal treatment (n=119). Porto Alegre, Rio Grande do Sul, Brazil, 2024

Variables	n (%) [*]			
	Prenatal treatment			p [†]
	Appropriate answers 119 (100.0)	Proper treatment 102(85.7)	Inadequate treatment 17(14.3)	
What is syphilis	71 (59.7)	65 (91.5)	06 (8.5)	0.472
Transmission	101 (84.9)	93 (92.1)	08 (7.9)	0.063
Treatment	112 (94.1)	100 (89.3)	12 (10.7)	0.361
Maternal/fetal consequences	71 (59.7)	64 (90.1)	07 (9.9)	0.921
Prevention	89 (74.8)	78 (87.6)	11 (12.4)	0.156
Vertical transmission	37 (31.1)	33 (89.2)	04 (10.8)	0.860
Congenital syphilis	64 (53.8)	59 (92.2)	05 (7.8)	0.375
Diagnostic tests	76 (63.9)	65 (85.5)	11 (14.5)	0.035[‡]

Source: Research data, 2023-2024

*n=Number

†p=Significance level.

‡Pearson's Chi-square test.

Of the total sample, only 113 postpartum women underwent VDRL testing during prenatal care, which allowed comparison with the VDRL collected at the time of hospital admission. In this regard, a positive outcome was identified in 45 (39.8%) postpartum women, characterized by a decrease in titration in at least two dilutions of the VDRL test. An unfavorable outcome was identified in 68 (60.2%) postpartum women, characterized by maintenance or an increase in VDRL titration. Considering the serological evolution and responses to the guidance received during prenatal care, among the postpartum women who responded adequately to treatment (106; 93.8%), 60 (56.6%) maintained or increased their VDRL titers (p=0.030), as shown in Table 3.

Regarding newborns, all 119 underwent VDRL testing at birth, of which 84 (70.6%) were reactive. Regarding the associations between the responses of postpartum women about the guidance received about syphilis and neonatal outcome, for mothers who responded appropriately about

vertical transmission and diagnostic tests, the VDRL test of newborns was reactive in 83.8% (p=0.034) and 77.6% (p=0.039), respectively. Hospitalization was indicated for the treatment of CS. Comparative data between adequate responses from postpartum women regarding guidance on syphilis and neonatal outcomes are shown in Table 4.

Regarding the treatment regimen during pregnancy, for 102 (85.7%) postpartum women, treatment was initiated and completed before delivery. In comparison, for 17 (14.3%), it was instituted before delivery and either completed after delivery or not completed at all.

Diagnostic testing of sexual partners during pregnancy was also analyzed, with 84 (70.6%) undergoing at least one TR during prenatal care; of these, 29 (34.5%) were reactive. Of the partners who did not undergo TR (35; 29.4%), 12 (34.3%) gave the following reasons: unsolicited test, refusal/lack of interest, and lack of knowledge of the diagnosis of the parturient, as reported by the postpartum women.

Table 3. Relationship between maternal outcome and adequate responses of postpartum women diagnosed with syphilis during pregnancy (n=113). Porto Alegre, Rio Grande do Sul, Brazil, 2024

Variables	n (%) [*]			
	Appropriate answers	Maternal waste		
		113 (100)	Positive [†] 45 (39.8)	Negative [‡] 68 (60.2)
What is syphilis	67(59.3)	34(50.7)	33(49.3)	0.405
Transmission	96(85.0)	46(47.9)	50(52.1)	0.336
Treatment	106(93.8)	46(43.4)	60(56.6)	0.030^{**}
Maternal/fetal consequences	69(61.1)	37(53.6)	32(46.4)	0.924
Prevention	86(76.1)	43(50.0)	43(50.0)	0.130
Vertical transmission	35(31.0)	16(45.7)	19(54.3)	0.238
Congenital syphilis	63(55.8)	31(49.2)	32(50.8)	0.253
Diagnostic tests	72(63.7)	39(54.2)	33(45.8)	0.958

Source: Research data, 2023-2024

^{*}n=Number[†]Positive maternal outcome corresponds to a drop in the titrations in at least two dilutions in the VDRL test.[‡]Negative maternal outcome corresponds to maintenance or increase in VDRL titration.[§]p=Significance level.^{**}Pearson's Chi-square test.**Table 4.** Relationship between neonatal outcome and adequate responses of puerperal women diagnosed with syphilis during pregnancy (n=119). Porto Alegre, Rio Grande do Sul, Brazil, 2024

Variables	n (%) [*]			
	Appropriate answers	Neonatal outcome		
		119(100)	Positive [†] 35(29.4)	Negative [‡] 84(70.6)
What is syphilis	71(59.7)	21(29.6)	50(70.4)	0.467
Transmission	101(84.9)	26(25.7)	75(74.3)	0.094
Treatment	112(94.1)	34(30.4)	78(69.6)	0.085

Table 4. Cont.

Variables	n (%)*			
	Appropriate answers	Neonatal outcome		
		119(100)	Positive† 35(29.4)	Negative‡ 84(70.6)
Maternal/fetal consequences	71(59.7)	20(28.2)	51(71.8)	0.533
Prevention	89(74.8)	23(25.8)	66(74.2)	0.183
Vertical transmission	37(31.1)	06(16.2)	31(83.8)	0.034**
Congenital syphilis	64(53.8)	19(29.7)	45(70.3)	0.466
Diagnostic tests	76(63.9)	17(22.4)	59(77.6)	0.039**

Source: Research data, 2023-2024

*n = Number

†Positive neonatal outcome corresponds to a non-reactive VDRL test result.

‡Newborn negative outcome corresponds to a reactive VDRL test result.

§p = Significance level.

**Pearson's Chi-square test.

Of the total sample, 62 (52.1%) sexual partners did not undergo treatment for syphilis or did not have a record of such treatment in the postpartum woman's prenatal care record. Of these, 34 (54.8%) reported not receiving treatment, as indicated by the postpartum women.

DISCUSSION

The study indicated that most postpartum women rated the organization of prenatal care as "excellent/good," with adherence to a minimum of six consultations, and responded appropriately to various aspects related to syphilis. There was a lower percentage of appropriate responses regarding vertical transmission. Regarding the guidance received by postpartum women during prenatal care, an association was observed between adequate responses about diagnostic tests and treatment for syphilis, with a higher percentage for adequate treatment. Similarly, an association was found between adequate responses regarding treatment and maintenance or elevation of VDRL titers at the time of hospital admission for delivery. In addition, associations were observed between adequate responses regarding vertical transmission and diagnostic tests with VDRL-reactive neonates at birth.

Regarding sexual partners, most participated in prenatal consultations but did not undergo treatment or did not have a record of it in the postpartum woman's prenatal card.

The sociodemographic profile of the postpartum women evaluated revealed a predominance of young women who self-identified as white, with up to eleven years of schooling and a monthly family income of up to two minimum wages. However, when grouping the data from Black and Brown postpartum women for statistical purposes, greater vulnerability to GS was identified. This finding is consistent with other studies that also relate GS to lower income and education⁽¹⁴⁻¹⁵⁾, factors that influence access to health services and understanding of information, making it challenging to adhere to preventive and therapeutic practices. This scenario highlights the importance of targeted approaches that consider the socioeconomic conditions and social realities of pregnant women to mitigate risk situations and promote improved health outcomes⁽¹⁶⁾.

Adherence to prenatal care was satisfactory, with most postpartum women starting follow-up in the first trimester of pregnancy and attending at least six consultations, as recommended by the Ministry of Health⁽¹⁷⁾. Postpartum women reported no difficulties in attending appointments.

They stated that, in relation to syphilis, prenatal care brought benefits, highlighting the opportunity to treat the disease, with most receiving adequate treatment. Furthermore, the organization of prenatal care was considered “excellent/good” in aspects such as follow-up, reception, scheduling, and waiting time for appointments. A cross-sectional study conducted in a municipal hospital in Curitiba/Paraná, with 307 postpartum women, indicated that a more positive perception of the service was associated with greater adherence to prenatal care. According to the authors, high levels of satisfaction among postpartum women were associated with factors such as rapport with the healthcare team, easy access to information, and the establishment of a relationship of trust between users and professionals ⁽¹⁸⁾.

In the present study, although postpartum women recognized the positive evaluation of prenatal care organization and the benefits of follow-up, an analysis of the guidance received revealed significant gaps. In this regard, 33.6% of postpartum women did not receive advice on the definition of their disease, 14.3% on forms of transmission, 22.7% on prevention, 68.1% regarding vertical transmission, 40.3% regarding maternal/fetal consequences, 46.2% regarding CS, and 21.0% regarding diagnostic tests. The absence of this guidance can compromise understanding of the disease, hinder adherence to treatment, and reduce the effectiveness of preventive actions, especially in interrupting vertical transmission, limiting women’s empowerment in self-care, and reinforcing the need for more comprehensive and precise counseling during prenatal care ⁽¹³⁾. Pregnant women diagnosed with syphilis must receive comprehensive guidance on all aspects of the disease, promoting critical awareness as a first step toward changing the way they deal with the disease ^(3,19).

Regarding guidance on syphilis, more than half of the postpartum women responded appropriately about the definition of the disease, transmission, treatment, maternal/fetal consequences, prevention, consequences of CS, and diagnostic tests. On the other hand, a lower percentage of adequate responses was observed in relation to vertical transmission, reflecting a limitation in knowledge about intrauterine transmission.

Furthermore, when analyzing the appropriate responses of postpartum women in relation to the treatment performed, the present study revealed a significant association between diagnostic tests and treatment, with a particular emphasis on the higher percentage of appropriate therapies administered. This association suggests that greater knowledge about diagnostic tests promotes treatment adherence, highlighting the importance of investing in educational strategies as a fundamental tool for controlling STIs. Corroborating the data

presented, a randomized clinical trial in the municipality of Goiânia/Goiás with 64 postpartum women diagnosed with syphilis demonstrated that structured educational interventions promoted a significant increase in knowledge about the disease, the forms of transmission, and the importance of complete treatment. In addition, these interventions promoted treatment adherence, reducing the risk of vertical transmission and contributing to improved maternal and neonatal outcomes ⁽²⁰⁾.

On the other hand, the data also show that, although postpartum women had a certain level of knowledge about syphilis—and most had undergone adequate treatment—this did not translate into positive outcomes. That is, a decrease in the VDRL titer of the postpartum woman and a non-reactive VDRL in the newborn. Regarding maternal outcomes, a positive association was found between adequate responses regarding treatment and an increase or maintenance of maternal VDRL titers at admission for delivery, suggesting reinfection or persistence of infection. A cohort study conducted in the municipality of Botucatu/São Paulo, with 158 pregnant women diagnosed with syphilis, showed that the absence of concomitant treatment of sexual partners contributes to maternal reinfection. This hinders the breaking of the chain of vertical transmission of syphilis. In addition, the lack of specific educational actions aimed at managing the infection, coupled with the non-involvement of sexual partners, aggravates this scenario, compromising the effectiveness of treatment and maternal and neonatal outcomes ⁽²¹⁾.

Regarding neonatal outcomes, the positive association between adequate responses to vertical transmission and VDRL-reactive diagnostic tests in newborns at birth suggests that, despite insufficient knowledge and treatment, other factors contribute to the maintenance of the infection. A cross-sectional study conducted in Rio Branco/Acre, with 92 postpartum women diagnosed with syphilis during pregnancy, pointed to an association between inadequate or non-treatment by the sexual partner and failure to treat the pregnant woman. This was correlated with the diagnosis of CS. In this same study, 58% of sexual partners did not adhere to treatment, which was associated with high VDRL titers in newborns, in addition to clinical and laboratory manifestations ⁽²²⁾.

The data from the present study also reveal failure in the treatment of sexual partners, representing a significant weakness in the control of syphilis. A cross-sectional survey conducted in Itapetinga/Bahia, with 46 pregnant women diagnosed with syphilis and their partners, identified several factors that contributed to the failure to treat sexual partners. These include lack of knowledge about the importance of

treatment, lack of time to undergo therapy, fear of injections, and incompatibility of schedules with health services⁽²³⁾. Similarly, a cross-sectional study conducted in the city of Modakeke, Nigeria, involving 414 male respondents, reinforces the need for strategies that promote the engagement and co-responsibility of sexual partners, encouraging their active participation. The involvement of sexual partners in prenatal care not only strengthens the support network for pregnant women but also increases the effectiveness of preventive actions and offers the partnership a valuable opportunity for inclusion and care in the health system⁽²⁴⁾.

The failure to treat both the pregnant woman and her sexual partner, coupled with a lack of specific educational measures, may increase the risk of maternal reinfection. This study also highlights a low percentage of academic activities related to syphilis in primary care units, such as lectures, groups for pregnant women, or informational materials. The absence of educational activities to complement consultations may compromise the effectiveness of follow-up, limiting pregnant women's access to essential information and hindering the adoption of effective preventive practices⁽¹⁰⁾. A qualitative study was conducted in Basic Health Units in the municipality of Mossoró/Rio Grande do Norte, to analyze Health Education actions aimed at pregnant women in the Family Health Strategy teams. It revealed that the implementation of this strategy contributes to changes in women's lifestyle habits and in how they approach the challenges of the gestational period⁽¹⁹⁾.

Furthermore, the findings reinforce the importance of health surveillance in the context of the SUS. This should go beyond case registration to include proactive actions such as the identification of risk profiles, the strengthening of continuing education for teams, and situational nursing intervention, especially in PHC. In this sense, the work of nursing is not limited to individual care. Still, it extends to the field of epidemiology, where it involves monitoring local patterns, conducting active searches, and promoting rapid responses to notifiable diseases, such as GS and CS⁽²⁵⁾. It is also essential to develop better strategies that encourage the participation of sexual partners in prenatal consultations⁽²⁶⁾.

Additionally, another factor that can be decisive in the control of syphilis is the social vulnerability of families, and PHC should be strengthened to adapt preventive strategies to the specific needs of each community^(16,27). In Brazil, the SUS plays a central role in this strengthening by ensuring universal access to primary care and promoting preventive and health education actions⁽²⁸⁾.

The findings of this study contribute to the understanding of the current complexities related to strategies for addressing syphilis during pregnancy and in the neonatal period. This suggests the need to highlight barriers to care,

vulnerability factors, and the effectiveness of interventions. Given these complexities and the need for concrete advances, the urgency of coordinated action at the national and international levels becomes even more evident.

In this scenario, the World Health Organization (WHO) has set targets for eliminating vertical transmission of syphilis. This includes expanding coverage of pregnant women to more than 95%, with at least one syphilis test during prenatal care, by 2025, and reducing the incidence of CS—including stillbirths—to less than 0.5 cases per 1,000 live births by 2025. 2030. Aligned with the Sustainable Development Goals (SDGs), these targets reinforce the need for integrated public policies that coordinate prevention, early diagnosis, and effective treatment⁽²⁸⁾.

Strengthening surveillance strategies and integrating PHC with referral services is essential to ensure continuity of care. Analyzing care flows and identifying gaps provides opportunities for innovation, while investing in continuing education for health teams ensures that protocols are updated and syphilis indicators are effectively monitored⁽²⁷⁾.

Considering these aspects, nursing should act as a link between points of care, promoting educational actions, efficient records, and clear and accessible guidance on syphilis. In addition, it should train professionals to communicate effectively with pregnant women and their sexual partners, using active methodologies, such as simulations and case discussions, to improve the prenatal approach⁽²⁵⁾.

In the context of prenatal care practices, nurses act from screening to prevention of vertical transmission, performing TR, requesting laboratory tests, and prescribing treatment for syphilis, according to the protocol defined by the Ministry of Health. They also promote relevant and individualized health education actions⁽²⁵⁾. Prenatal care requires professionals to be attentive and welcoming to pregnant women, as it involves not only medical and programmatic factors, but also socioeconomic, cultural, educational, and social support aspects⁽²⁹⁾. When prenatal care is conducted appropriately, with early diagnosis, effective treatment, health education, active search for pregnant women, and inclusion of sexual partners in consultations, an environment conducive to a significant reduction in the number of syphilis cases emerges⁽⁸⁻⁹⁾.

Finally, it is worth noting that the sample was convenience-based, which limits the generalizability of the results to the broader population and restricts the applicability of the findings to contexts or groups like the one studied. Additionally, data on prenatal care were collected from postpartum women 24 hours after delivery, which may introduce a memory bias, potentially affecting the accuracy of the information provided. On the other hand, it is worth noting that the data were collected by a properly trained team committed to information security.

Longitudinal studies are recommended for future research to investigate the factors that hinder the reduction of VDRL titers in postpartum women, which impact the need for therapeutic interventions in newborns. Also, to identify more effective strategies for communication and integration between SUS networks.

CONCLUSION

The study showed that, despite adherence to prenatal care and adequate treatment of syphilis by most postpartum women, there are still gaps in the guidance received, especially regarding vertical transmission, CS, and diagnostic tests. These gaps were evident in the maintenance or increase in VDRL titers in postpartum women and in reactivity in neonatal tests, indicating that the knowledge acquired during prenatal care does not always translate into favorable serological outcomes. Low adherence to treatment by sexual partners, coupled with socioeconomic vulnerability factors such as racial inequality, low educational attainment, and limited monthly family income, favors maternal reinfection and continued vertical transmission. More comprehensive educational strategies, engagement of sexual partners, and integration of PHC with referral services are essential to reduce vertical transmission and improve maternal and neonatal outcomes, contributing to the elimination of GS and CS.

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■ **Availability of data and material:**

Access to the dataset can be made upon request to the corresponding author.

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