ORIGINAL ARTICLE

Prenatal care provided by nurses to pregnant women with syphilis: potential and challenges for preventing congenital syphilis

Assistência pré-natal do enfermeiro às gestantes com sífilis: potencialidades e desafios para prevenção da sífilis congênita

Atención prenatal del enfermero a gestantes con sífilis: potencialidades y desafíos para la prevención de la sífilis congénita

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ABSTRACT

Objectives: to analyze prenatal care provided by nurses to pregnant women diagnosed with syphilis in Primary Health Care. **Methods:** a cross-sectional study conducted with nurses from the Family Health Strategy of a Regional Health Department in São Paulo. Online data collection was performed using a questionnaire based on ministerial protocols for care for syphilis during pregnancy. Fisher's exact test and the chi-square test ($p < 0.05$) were used for analysis. **Results:** a total of 89 nurses participated, all of whom were providing their first prenatal care. However, 29.2% reported not providing subsequent prenatal consultations. Among the nurses who provided subsequent consultations, 81.2% based their care on a municipal protocol ($p = 0.000$); 32.2% did not prescribe benzathine benzylpenicillin to pregnant women who tested positive for syphilis; and 22.7% did not administer the drug without a physician present at the unit. It was also observed that a single treatment protocol was prescribed to pregnant women, regardless of the stage of syphilis they were in. **Conclusion:** there are gaps and non-conformities in relation to the protocols in the care provided by nurses to pregnant women diagnosed with syphilis, highlighting the need for actions to improve Primary Health Care nurses' practice and monitor compliance with established protocols.

Descriptors: Primary Health Care; Nursing Care; Prenatal Care; Nursing; Syphilis.

RESUMO

Objetivos: *analisar a assistência pré-natal do enfermeiro às gestantes com diagnóstico de sífilis na atenção primária à saúde.* ***Métodos:*** *estudo transversal, realizado com enfermeiros da Estratégia Saúde da Família de uma regional de saúde, em São Paulo. A coleta de dados online foi realizada a partir de questionário baseado nos protocolos ministeriais de assistência à sífilis na gestação. Para análise aplicou-se o teste Exato de Fisher e o Teste Qui-quadrado ($p < 0,05$).* ***Resultados:*** *participaram 89 enfermeiros, todos realizavam o primeiro atendimento pré-natal, contudo 29,2% referiram não realizar consultas pré-natais subsequentes. Entre os enfermeiros que realizavam as consultas subsequentes, 81,2% baseavam sua assistência em protocolo municipal ($p = 0,000$); 32,2% não realizavam a prescrição de Benzilpenicilina benzatina para as gestantes reagentes para sífilis e 22,7% não administravam o fármaco sem a presença do médico na unidade. Observou-se ainda a prescrição de protocolo único de tratamento para as gestantes independentemente do estágio da sífilis que se encontravam.* ***Conclusão:*** *há lacunas e não conformidades em relação aos protocolos na assistência prestada pelos enfermeiros às gestantes com diagnóstico de sífilis, evidenciando a necessidade*

de ações para melhorias na prática dos enfermeiros da atenção primária à saúde e monitoramento da conformidade com os protocolos instituídos.

Descritores: *Atenção Primária à Saúde; Cuidados de Enfermagem; Cuidado Pré-Natal; Enfermagem; Sífilis.*

RESUMEN

Objetivos: *analizar la atención prenatal de enfermeros a mujeres embarazadas diagnosticadas con sífilis en la Atención Primaria de Salud.* ***Métodos:*** *estudio transversal, realizado con enfermeros de la Estrategia de Salud de la Familia de un centro regional de salud de São Paulo. La recolección de datos en línea se realizó mediante un cuestionario basado en protocolos ministeriales para la asistencia a la sífilis durante el embarazo. Para el análisis se aplicó la prueba exacta de Fisher y la prueba de chi cuadrado (p < 0,05).* ***Resultados:*** *participaron un total de 89 enfermeros, todos ellos brindando su primera atención prenatal. Sin embargo, el 29,2% refirió no haber tenido consultas prenatales posteriores. Entre los enfermeros que realizaron consultas posteriores, el 81,2% basó su asistencia en el protocolo municipal (p = 0,000); el 32,2% no prescribió bencilpenicilina benzatínica a gestantes positivas a sífilis; y el 22,7% no administró el fármaco sin la presencia de un médico en la unidad. También se observó que se prescribía un único protocolo de tratamiento para las mujeres embarazadas, independientemente del estadio de la sífilis en el que se encontraran.* ***Conclusión:*** *existen vacíos e inconformidades en relación a los protocolos en la atención brindada por enfermeros a las gestantes diagnosticadas con sífilis, destacando la necesidad de acciones para mejorar la práctica de los enfermeros en la Atención Primaria de Salud y monitorear el cumplimiento de los protocolos establecidos.*

Descriptores: *Atención Primaria de Salud; Atención de Enfermería; Atención Prenatal; Enfermería; Sífilis.*

INTRODUCTION

Syphilis is a disease caused by *Treponema pallidum*, and its transmission occurs predominantly through sexual and vertical transmission[1,2]. According to the World Health Organization (WHO), it is estimated that 357 million new cases of curable Sexually Transmitted Infections (STIs) occur annually among people aged 15-49, and among these is syphilis, responsible for 6 million new cases per year. During pregnancy, underreported or incorrectly treated syphilis leads to vertical transmission and consequently to congenital syphilis (CS), responsible for more than 300,000 fetal and neonatal deaths each year and also puts more than 215,000 newborns at risk of premature death[3,4].

A study carried out in the United States recorded, between 2013 and 2017, an increase in the number of cases of CS and that 50% to 80% of cases of gestational syphilis presented adverse outcomes, including stillbirth or spontaneous abortion[5].

In Brazil, analyzing the data from 2020, there was an increase in cases of gestational syphilis and deaths from CS; these data may be even higher due to the possibility of underreporting due to the coronavirus disease 2019 (COVID-19) pandemic. There were 61,441 reported cases of gestational syphilis (21.6 cases per thousand live births), 22,065 cases of CS (7.7 cases per thousand live births), and 186 deaths from CS (6.5 cases per 100 thousand live births). Despite a possible decrease in CS rates, Brazil is still far from the target established by the WHO of up to 0.5 cases per thousand live births by 2030[3,6,7].

The Federal Nursing Council (In Portuguese, *Conselho Federal de Enfermagem* - COFEN) issued a Technical Note explaining the importance of nursing professionals in STI management in public services. It defended benzathine benzylpenicillin administration in all Basic Health Units (BHU) upon prescription by a medical or nursing professional, in specific cases, in view of municipal, state, or federal protocols[8].

Medication prescription by nurses provided that they are previously established in public health programs and a routine approved by the health institution, is provided for in the Professional Practice Law. In southern Brazil, after implementing a municipal care protocol associated with the training of nurses, there was a significant increase in diagnoses and treatments of syphilis in Primary Health Care (PHC)[8,9].

It is important to highlight that this is a treatable disease with low-cost and easily available resources, and despite this, it still has a high incidence and low treatment effectiveness due to incorrect dispensing, which leads to CS rates continuing to grow and falling far short of the recommended target. Therefore, it is necessary to contribute to implementing quality prenatal care, ensuring safety and health for the pregnant woman, the fetus and the partner[10].

A study carried out in Pará demonstrated an increasing trend in the incidence of CS in the state between 2007 and 2017, caused mainly by inefficient prenatal care for pregnant women, inadequate treatment of pregnant women, and ineffective treatment of their partners, i.e., gaps in direct care from nurses[11], among other professionals involved in care.

It should be noted that the Nursing Consultation is an independent activity carried out privately by nurses and is regulated by the Professional Practice Law. In the context of prenatal care, it aims to provide conditions for health promotion with a participatory approach. Thus, it should include the approach to STI prevention and treatment, including gestational syphilis.

Considering the above, this study aimed to analyze prenatal care provided by nurses to pregnant women diagnosed with syphilis in PHC.

METHODS

Study design

This is a descriptive-analytical study with a cross-sectional design. The STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist was used to guide the report of this study[12].

Site

The study was carried out in PHC services, classified as Family Health Strategy (FHS) in the municipalities that make up a Brazilian health region located in the countryside of the state of São Paulo, called Regional Health Department XIV, made up of 20 municipalities.

Population and selection criteria

The study population consisted of all nurses who worked in all Family Health teams in the municipalities that make up the XIV Regional Health Department and who were responsible for prenatal care for pregnant women in PHC.

Nurses who worked in FHS, who provided prenatal consultations to pregnant women, and who had at least six months of experience in FHS (based on their experience in prenatal care) were included.

Sample definition

The Arango formula[13] was used to calculate the sample, in which there is a correction for when the population size is known, i.e. 156 nurses in total. Therefore, a design effect size of 0.5 with a power of 80.0% was used. Respecting the eligibility criteria, the sample of this study consisted of 89 nurses from 18 of the 20 municipalities that make up the region studied since nurses from two municipalities did not participate in the research.

Data collection

Data collection took place from November 8, 2021, to January 20, 2022. A semi-structured self-report data collection instrument with closed-ended questions was developed by the researchers in an electronic form (2020, Google, United States) based on readings of care protocols for pregnant women diagnosed with syphilis published by the Brazilian Ministry of Health (MoH)[1] and based on the objectives of the proposed study. The final instrument consisted of 48 questions, structured in three parts: I – Nurse Characterization; II - Prenatal Care for Pregnant Women Diagnosed with Syphilis; and III - Opinion on Facilitators and Barriers in Nursing Care for Pregnant Women Diagnosed with Syphilis for CS Prevention. The data related to parts I and II will be presented in this study, as they are related to the objectives of this section.

Questionnaires via virtual media favor the scope of the research; they offer possibilities of anonymity and remarkable privacy, which can be positive regarding information on unconventional behaviors[14].

It is worth noting that this instrument was subjected to a consensus analysis regarding its content after approval of the present study by a Research Ethics Committee, according to the Delphi technique, by seven expert judges in nursing in women's health and FHS, four of whom were clinical nurses and three were nursing professors. To conclude the refinement process, after the judges' assessment, the instrument was also subjected to a pre-test with PHC nurses who were not part of the study sample.

Nurses were contacted via email and WhatsApp, a multiplatform instant messaging and voice-calling application for smartphones (Version 2.20.206.24, 2020, Meta, Inc., United States). An invitation was sent to participants through both platforms, which included a text explaining the research, its objectives, a summary of the data collection instrument content (topics covered), expected time for participation (maximum 40 minutes), ethical aspects, and a link containing the Informed Consent Form (ICF), in which consent to participate in the research would be given by selecting the option "( ) I AGREE". Only after consent was given did the nurses access the questionnaire to participate in the research.

Data analysis and treatment

Data analysis was performed in descriptive and inferential form[15]. Descriptive analysis included calculations of frequencies, percentages, means, and standard deviations to characterize the sample and the variables studied. The data were entered into an Excel spreadsheet (version 16.0, 2020, Microsoft Corporation, United States) using the double entry technique, and then the data were coded and analyzed using a statistical analysis software, Statistical Analysis System (SAS) (version

9.4, 2013, SAS Institute, United States). Fisher's exact and chi-square tests were used to verify the association between the variables characterizing nurses (sex, age, nursing course completion year, time working in the Family Health Team, specialization and/or master's and/or doctoral degrees, updating or improvement on syphilis less than five years ago, qualification/training to perform rapid syphilis testing) and prenatal care for pregnant women diagnosed with syphilis (existence of a municipal care protocol, basis of care in the absence of a municipal protocol, performance of subsequent prenatal consultations, times of performance of rapid syphilis test during prenatal care, responsible for compulsory notification of confirmed cases of syphilis, testing and treatment of partners concomitantly with pregnant women, performance of prenatal care for partners, benzathine benzylpenicillin administration without the presence of a physician, treatment protocol recommended for pregnant women diagnosed with syphilis, active search for pregnant women absences for continuity of treatment, request for Venereal Disease Research Laboratory (VDRL) examination monthly after treatment, discussion of cases of CS in investigation committees, monitoring of reagent pregnant women and outcomes of CS and monitoring of children exposed to syphilis with a specific protocol).

The following relationships were tested to analyze the associations between variables: characteristics of nurses X characteristics of prenatal care for pregnant women diagnosed with syphilis, protocol referred to as the basis by nurses for prenatal care for pregnant women diagnosed with syphilis X characteristics of prenatal care for pregnant women diagnosed with syphilis. A 95% confidence level and a 5% margin of error were adopted.

Some questions could not be analyzed due to low frequency, so they were excluded from inferential analysis, which justifies the difference in the number of participants in some analyses, i.e., questions in which only one or two answers were obtained and which could not be regrouped[16].

Ethical aspects

All ethical precepts were followed, such as obtaining co-participating institution consent and declaration from the XIV Regional Health Department director, as well as the Data Use Commitment Term. Subsequently, the research project was approved by the *Universidade Federal de Alfenas* Research Ethics Committee, in compliance with the Brazilian National Health Council Resolution 466/2012 and Certificate of Presentation of Ethical Consideration (In Portuguese, *Certificado de Apresentação de Apreciação* Ética - CAAE) 48576021.4.0000.5142.

RESULTS

A total of 89 nurses participated; the majority (95.5%) were female. Concerning age, the mean was 37.6 years (SD = 7.7), with the youngest age reported being 23 and the oldest being 61 years.

The mean time since graduation in nursing was 11.5 years (SD = 6.2), with the shortest time being one and the longest being 36 years. As for job tenure in FHS, the mean was 5.6 years (SD = 5.5), with the shortest reported time being 6 months and the longest being 21 years.

Concerning training, 73.0% of nurses had specialization. Among the areas reported, most of them (32.3%) reported specialization in public health and women's health. Almost all of the nurses had undergone updating/improvement training on syphilis less than five years ago (92.1%), and 95.5% were trained to perform rapid tests (Table 1).

Table 2 presents descriptive analyses of the care provided by nurses to pregnant women with syphilis. It is noteworthy that 77.5% of nurses followed a municipal protocol, while the others followed the Brazilian MoH and the São Paulo Health Department (In Portuguese, *Secretaria de Saúde de São Paulo* - SES/SP) guidelines. All nurses provided the first care to pregnant women, but 29.2% did not provide subsequent prenatal consultations. Rapid syphilis tests were performed at the first consultation by 96.6% of nurses, and 64.0% repeated the testing in the second and third trimesters. Compulsory notification was performed by 93.3% of nurses.

When caring for partners, 82.0% performed prenatal consultations, and 48.3% treated partners simultaneously with pregnant women. Regarding treatment, 40.5% of nurses prescribed the maximum dose of benzathine benzylpenicillin for recent syphilis, while 31.5% did not prescribe treatment. Benzathine benzylpenicillin administration without the presence of a physician was performed by 64.0% of nurses.

In relation to syphilis follow-up, 96.6% actively sought out pregnant women who missed appointments, and 59.5% monitored cure with monthly VDRL. Case discussions in the Mortality Committee were conducted by 57.3% of nurses. During the study, 30.4% monitored between one and five pregnant women with syphilis, 28% reported negative outcomes, and 71.9% monitored children exposed to or diagnosed with syphilis for two years according to the protocol.

Table 1 - Descriptive analysis of nurse characterization variables (n = 89) - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

Variables	n	%	Mean ±SD[a]
Sex			-
Female	85	95.5	
Male	4	4.5	
Age			37.6 ±7.7
20-30 years	15	16.8	
31-40 years	45	50.6	
41 years or more	29		
Time since graduation			11.5 ±6.2
≤10 years	36	40.5	
11-20 years	47	52.8	
21 years or more	6	6.7	
Job tenure in FHS[b]			5.6±5.5
≤ 5 years	57	64.0	
6-10 years	17	19.1	
11 years or more	15	16.9	
Has specialization			-
Yes, in public health and women's health	35	39.3	
Yes, in other areas	30	33.7	
No	24	27.0	
Has completed an updating/improvement course on syphilis less than five years ago			-
Yes	82	92.1	
No	7	7.9	
Has completed training/education to perform a rapid test for syphilis			-
Yes	85	95.5	
No	4	4.5	

Note: [a] Standard Deviation; [b] Family Health Strategy.

Table 2 - Descriptive analysis of variables of care for pregnant women diagnosed with syphilis (n = 89) by nurses at PHC - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

Continue...

Variables	n	%
Protocol for care for pregnant women diagnosed with syphilis		
Bases care for pregnant women diagnosed with syphilis on municipal protocol.		
Yes	69	77.5
No	20	22.5
Nurses' prenatal care for pregnant women		
Performs the first consultation for pregnant women		
Yes	89	100.0
No	0	0.0
Performs subsequent prenatal consultations		
Yes	63	70.8
No	26	29.2

Table 2 - Descriptive analysis of variables of care for pregnant women diagnosed with syphilis (n = 89) by nurses at PHC - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

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Variables	n	%
Performs rapid syphilis tests during the first prenatal consultation		
Yes	86	96.6
No	3	3.4
Performs rapid syphilis tests during the 2nd and 3rd trimesters of pregnancy		
Yes	57	64.0
No	18	20.2
Only in the 2nd trimester	4	4.5
Only in the 3rd trimester	10	11.2
Professional who carries out compulsory notification in confirmed cases of syphilis		
Nurse	83	93.3
Nursing technician	2	2.2
Any healthcare professional	4	4.5
Nurses' assistance for pregnant women's partners		
Partners' prenatal care is carried out by nurses in the unit where they work		
Yes	73	82.0
No	16	18.0
Partners are tested and treated at the same time as pregnant women.		
Yes, based on the reagent RT[a] result	27	30.4
Yes, after checking the reagent VDRL[b]	17	19.1
Yes, regardless of the RT[a] or VDRL[b] result	43	48.3
It depends on the partner's wishes	2	2.2
Nursing assistance related to syphilis treatment		
BB[c] is administered in the unit of action, even without the presence of a physician.		
Yes	57	64.0
No	32	36.0
Treatment protocol for pregnant women with primary lesions and rapid reagent test		
2,400,000 IU[d] of BB[c] in a single dose	14	15.7
4,800,000 IU[d] of BB[c] in two doses of 2,400,000 IU[d] seven days apart	9	10.1
7,200,000 IU[d] of BB[c] in three doses of 2,400,000 IU[d] at seven-day intervals	36	40.5
Depends on the symptoms presented	2	2.2
Does not prescribe treatment	28	31.5
Treatment protocol for pregnant women with secondary lesions and who have a rapid reagent test		
2,400,000 IU[d] of BB[c] in a single dose	3	3.4
4,800,000 IU[d] of BB[c] in two doses of 2,400,000 IU[d] seven days apart	22	24.7
7,200,000 IU[d] of BB[c] in three doses of 2,400,000 IU[d] at seven-day intervals	36	40.5
Depends on the symptoms presented	1	1.1
Does not prescribe treatment	27	30.4
Treatment protocol for asymptomatic pregnant women with a history of primary and/or secondary lesions for less than 1 year and rapid reagent test		
2,400,000 IU[d] of BB[c] in a single dose	8	9.0
4,800,000 IU[d] of BB[c] in two doses of 2,400,000 IU[d] seven days apart	11	12.4
7,200,000 IU[d] of BB[c] in three doses of 2,400,000 IU[d] at seven-day intervals	41	46.0

Table 2 - Descriptive analysis of variables of care for pregnant women diagnosed with syphilis (n = 89) by nurses at PHC - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

Conclusion.

Variables	n	%
Depends on the symptoms presented	2	2.2
Does not prescribe treatment	27	30.4
Treatment protocol for asymptomatic pregnant women with or without a history of primary and/or secondary lesions for more than 1 year and rapid reagent test		
2,400,000 IU[d] of BB[c] in a single dose	6	6.7
4,800,000 IU[d] of BB[c] in two doses of 2,400,000 IU[d] seven days apart	5	5.6
7,200,000 IU[d] of BB[c] in three doses of 2,400,000 IU[d] at seven-day intervals	49	55.0
Depends on the symptoms presented	2	2.2
Does not prescribe treatment	27	30.4
Treatment protocol for pregnant women with syphilitic lesions in organs and tissues and reagente RTa		
2,400,000 IU[d] of BB[c] in a single dose	12	13.5
4,800,000 IU[d] of BB[c] in two doses of 2,400,000 IU[d] seven days apart	6	6.7
7,200,000 IU[d] of BB[c] in three doses of 2,400,000 IU[d] at seven-day intervals	42	47.2
Depends on the symptoms presented	1	1.1
Does not prescribe treatment	28	31.5
Nursing assistance related to syphilis follow-up		
There is an active search for absent pregnant women diagnosed with syphilis so that treatment is not interrupted		
Yes	86	96.6
No	3	3.4
Pregnant women diagnosed with syphilis are requested to undergo monthly VDRL[b] to monitor cure and treatment effectiveness		
Yes, a nurse carries out this monitoring	17	19.1
Yes, monitoring is carried out by a physician	8	9.0
Yes, monitoring is carried out by a nurse and a physician	53	59.5
There is no monitoring protocol, or there is no knowledge of it; each case is handled individually	11	12.4
CS[f] cases are discussed at the MFIMIC[g] of the municipality where it operates.		
Yes	51	57.3
No	6	6.7
No knowledge	32	36.0
Are you currently monitoring any pregnant women who tested positive for syphilis?		
Yes, between one and five pregnant women	27	30.4
Yes, between six and ten pregnant women	1	1.1
No	61	68.5
During prenatal care, was there any outcome of CS[f]		
Yes	25	28.0
No	60	67.5
Not aware	4	4.5
There is monitoring with a specific protocol for two years of children carrying or exposed to syphilis in the unit where it operates.		
Yes	64	71.9
No	11	12.4
Not aware	14	15.7

Note: [a] rapid test; [b] Venereal Disease Research Laboratory; [c] Benzathine benzylpenicillin; [d] International Units; [e] n = 88 considering that one participant did not respond regarding the treatment protocol for pregnant women with syphilitic lesions in organs and tissues and rapid reagent test; [f] congenital syphilis; [g] Maternal, Fetal and Infant Mortality Investigation Committee.

Characteristics of nurses X prenatal care for pregnant women diagnosed with syphilis

Professionals who were trained on syphilis less than five years ago presented more assertive care behaviors in relation to those who did not update their training in this period. Among these behaviors are the use of municipal protocols to base their care (p = 0.009), carrying out subsequent prenatal consultations (p = 0.024), testing for syphilis in the first consultation, in the second and third trimesters of pregnancy (p = 0.000), carrying out prenatal care for partners (p = 0.014), monthly monitoring with VDRL after treatment for cure efficacy (p = 0.035), participation in discussions of CS cases in municipal committees (p = 0.000) and access to specific protocols for monitoring children exposed and diagnosed with syphilis for two years (p = 0.012) (Table 3).

Table 3 - Inferential analysis of the relationship between updating or improvement on syphilis less than five years ago with the variables of prenatal care provided by nurses (n = 89) to pregnant women diagnosed with syphilis - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

Variables	Have you completed an updating or improvement course on syphilis less than five years ago?		Total n (%)	*p*-value
	Yes n (%)	Non(%)		
Protocol in which service is provided				
Municipal	54 (85.7)	15 (57.7)	69 (77.5)	0.009[a]
Other documents	9 (14.3)	11 (42.3)	20 (22.5)	
Performed subsequent prenatal consultations				
Yes	49 (77.8)	14 (53.8)	63 (70.8)	0.024[b]
No	14 (22.2)	12 (46.2)	26 (29.2)	
When RTc for syphilis was performed during prenatal care				
1st consultation	6 (9.5)	9 (34.6)	15 (16.8)	0.000[a]
1st consultation and 2nd trimester	3 (4.8)	1 (3.8)	4 (4.5)	
1st consultation and 3rd trimester	6 (9.5)	4 (15.4)	10 (11.2)	
1st consultation, 2nd and 3rd trimesters	48 (76.2)	9 (34.6)	57 (64.0)	
Did not perform RT[c]	0 (0.0)	3 (11.5)	3 (3.4)	
Did you provide prenatal care for the partner at the service where you work?				
Yes	56 (88.9)	17 (65.4)	73 (82.0)	0.014[a]
No	7 (11.1)	9 (34.6)	16 (18.0)	
Did you request for pregnant women diagnosed with syphilis to undergo a monthly VDRLd test to monitor the cure and effectiveness of the treatment?				
Yes, by a nurse	15 (23.8)	2 (7.7)	17 (19.1)	0.035[a]
Yes, by a physician	5 (7.9)	3 (11.5)	8 (9.0)	
Yes, by a nurse and a physician	37 (58.7)	16 (61.5)	53 (56.6)	
There was no monitoring protocol, each case was handled individually	4 (6.4)	0 (0.0)	4 (4.5)	
I am not aware	2 (3.2)	5 (19.3)	7 (7.9)	
Were CSe cases discussed in the MFIMICf in the municipality where you work?				
Yes	44 (69.8)	7 (26.9)	51 (57.3)	0.000[a]
No	2 (3.2)	4 (15.4)	6 (6.7)	
I have no knowledge	17 (27.0)	15 (57.7)	32 (36.0)	
Were children carrying or exposed to syphilis monitored using a specific protocol for two years in the unit where you work?				
Yes	51 (81.0)	13(50.0)	64(71.9)	0.012[a]
No	5 (7.9)	6(23.1)	11(12.3)	
I have no knowledge	7 (11.1)	7(26.9)	14(15.7)	

Note: [a] Fisher's exact test; [b] chi-square test; [c] rapid test; [d] Venereal Disease Research Laboratory; [e] Congenital Syphilis; [f] Maternal, Fetal and Infant Mortality Investigation Committee.

Use of municipal protocol to support prenatal care for pregnant women diagnosed with syphilis X Prenatal care provided to pregnant women diagnosed with syphilis

Approximately 77.5% of nurses reported basing their care for pregnant women diagnosed with syphilis on the municipal protocol. The use of this reference showed an association with indicators such as subsequent prenatal consultations (p = 0.000); testing at the first consultation and in all subsequent trimesters was significantly more frequent (p = 0.008); and benzylpenicillin benzathine administration without the presence of a physician was more common (p = 0.019).

As for the treatment of pregnant women with syphilis, there was a higher prescription of 7,200,000 IU of benzathine benzylpenicillin in the recent stages of syphilis among nurses who followed municipal protocols compared to those who followed other documents. Proportionally, there was also a higher rate of nurses who did not prescribe syphilis treatment for pregnant women among nurses who based their care on other documents (Table 4).

There was an association between partners' prenatal care consultation and recommendation for treatment regardless of the result of the rapid test and/or VDRL (p = 0.018), as recommended by the MoH protocols and guidelines (Table 5).

Table 4 - Inferential analysis of the relationship between the guiding protocol for prenatal care for pregnant women diagnosed with syphilis and the variables of prenatal care provided by nurses (n = 89) to pregnant women diagnosed with syphilis - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

Continue...

Variables	They based their care for pregnant women diagnosed with syphilis on:		Total n (%)	*p*-value
	Municipal protocol n (%)	Other documents n (%)		
Underwent subsequent prenatal consultations				
Yes	56 (81.2)	7 (35.0)	63 (70.8)	0.000[a]
No	13 (18.8)	13 (65.0)	26 (29.2)	
In prenatal care, when you underwent RT[b] for syphilis				
Only in the 1st consultation	7 (10.1)	8 (40.0)	15 (16.9)	0.008[a]
In the 1st consultation, in the 2nd trimester	2 (2.9)	2 (10.0)	4 (4.5)	
In the 1st consultation, in the 3rd trimester	8 (11.6)	1 (5.0)	9 (10.1)	
In the 1st consultation, in the 2nd and 3rd trimesters	50 (72.5)	8 (40.0)	58 (65.2)	
Did not perform RT[b]	2 (2.9)	1 (5.0)	3 (3.3)	
Administered BB[c] in the unit where they work even without the presence of a physician				
Yes	49 (71.0)	7 (35.0)	56 (63.9)	0.019[a]
No	20 (29.0)	13 (65.0)	33 (37.1)	
Treatment protocol recommended for pregnant women with primary lesions and reagent[d] RT[b]				
2,400,000 IU[e] BB[c] in a single dose	12 (17.9)	2 (10.0)	14 (16.1)	0.001[a]
4,800,000 IU[e] BB[c] in 2 doses 7 days apart	8 (11.9)	1 (5.0)	9 (10.3)	
7,200,000 IU[e] BB[a] in 3 doses at 7-day intervals	33 (49.3)	3 (15.0)	36 (41.4)	
Did not prescribe treatment	14 (20.9)	14 (70.0)	28 (32.2)	
Treatment protocol recommended for pregnant women with secondary lesions and with reagent[d] RT[b]				
2,400,000 IU[e] BBc in a single dose	2 (2.9)	1 (5.0)	3 (3.4)	<0.000[a]
4,800,000 IU[e] BBc in 2 doses with 7-day intervals	18 (26.5)	4 (20.0)	22 (23.8)	
7,200,000 IU[e] BB[a] in 3 doses with 7-day intervals	35 (51.5)	1 (5.0)	36 (40.9)	
Did not prescribe treatment	13 (19.1)	14 (70.0)	27 (30.7)	

Table 4 - Inferential analysis of the relationship between the guiding protocol for prenatal care for pregnant women diagnosed with syphilis and the variables of prenatal care provided by nurses (n = 89) to pregnant women diagnosed with syphilis - Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021-2022

Conclusion.

Variables	They based their care for pregnant women diagnosed with syphilis on:		Total n (%)	*p*-value
	Municipal protocol n (%)	Other documents n (%)		
Treatment protocol recommended for asymptomatic pregnant women with a history of primary and/or secondary lesions for more than a year and with reagent[d] RT[b]				
2,400,000 IU[e] BB[c] in a single dose	3 (4.5)	2 (10.0)	5 (5.8)	<0.000[a]
4,800,000 IU[e] BB[c] in 2 doses with 7-day intervals	4 (6.0)	1 (5.0)	5 (5.8)	
7,200,000 IU[e] BB[3] in 3 doses with 7-day intervals	47 (70.1)	3 (15.0)	50 (57.4)	
Did not prescribe treatment	13 (19.4)	14 (70.0)	27 (31.0)	

Note: [a] Fisher's exact test; [b] rapid test; [c] Benzathine benzylpenicillin; [d] the question answered: "It depends on the symptoms presented" was excluded from the comparisons due to its low frequency and the fact that it cannot be regrouped; [e] International Units.

Table 5 - Inferential analysis between the performance of prenatal care by nurses for partners and concomitant treatment of partners with pregnant women diagnosed with syphilis – Regional Health Department (In Portuguese, *Departamento Regional de Saúde* - DRS) XIV, São Paulo, Brazil, 2021–2022

Variables	Nurse providing prenatal care to partners		Total[b] n (%)	*p*-value
	Yes n (%)	No n (%)		
Partners are treated at the same time as pregnant women.				
Yes, using the reagent RT[c]	11 (15.3)	6 (40.0)	17 (19.5)	
Yes, after checking the reagent VDRL[d]	21 (29.2)	6 (40.0)	27 (31.0)	0.018[a]
Yes, regardless of the result of the RT[c] and VDRL[d]	40 (55.5)	3 (20.0)	43 (49.5)	
Total	72 (100)	15 (100)	87 *(100)	

Notes: [a] Fisher's exact test; [b] the answered question: "It depends on the symptoms presented" was excluded from the comparisons due to its low frequency and the fact that it cannot be regrouped; [c] rapid test; [d] Venereal Disease Research Laboratory. *Two blank answers therefore n = 87.

DISCUSSION

The results highlight the relevance of professional development and the use of standardized protocols in the care of pregnant women with syphilis. Adherence to municipal protocols was associated with better care practices, including rapid testing in all gestational trimesters, subsequent prenatal consultations, and concomitant treatment of partners. Nurses' autonomy in benzathine benzylpenicillin administration and compulsory reporting reinforce the importance of these professionals on the front line of syphilis prevention and management within PHC. However, variations in the prescription of treatments and gaps in knowledge about monitoring protocols suggest areas for improvement. These findings highlight the need for continuing education programs and institutional support to ensure the quality and consistency of care, resulting in better maternal and child outcomes.

Nurses' job tenure in FHS was less than or equal to five years. However, the majority had more than 10 years of training, which indicates a probable turnover of these professionals or turnover in functions, and consequently, less experience in relation to the protocols for caring for pregnant women diagnosed with syphilis.

There is a high turnover of nurses and constant relocations in PHC, which prevents these professionals from being linked to their territory and consequently weakens the implementation of public policies[17,18]. This phenomenon may be influenced, in turn, by the fractional care model and the incipient training in the area[18].

A period of service equal to or greater than 11 years in FHS can contribute to professionals being able to take assertive actions with greater autonomy, in addition to promoting a long and close relationship with the community and, consequently, developing comprehensive care[19].

Therefore, it is necessary to invest in strategies that make FHS attractive for nurses' professional work and strategies for their retention and continuity in certain

areas of care for the population, in addition to a policy of continuing education in the site so that they develop the expertise necessary for quality care.

The association found among professionals who were trained on syphilis less than five years ago and sensitive indicators in care suggests that professional updating in syphilis is associated with more rigorous and adherent prenatal care practices, which can significantly contribute to improving maternal and child outcomes. Continuous training of health professionals, therefore, emerges as a crucial strategy for the effective CS prevention and control.

Likewise, the association found between basing care for pregnant women diagnosed with syphilis on a municipal protocol, carrying out subsequent prenatal consultations, carrying out the rapid test for syphilis in the first prenatal consultation, in the second and third trimesters of pregnancy, carrying out prenatal care for partners and administering benzathine benzylpenicillin in the unit even without the presence of a physician indicates not only adherence to important prenatal indicators referenced in the MoH[1,20] and SES/SP[21] protocols but also their interrelation.

Although the data indicate good practices on the part of the majority, it is noteworthy that approximately 30.0% of the nurses participating in the research did not share these same acts. Hence, it is important to highlight the need for a local policy of continuing education. A study carried out in Santa Catarina found that, after the development and training for the use of a municipal protocol for syphilis care by nurses, improvements were observed in their clinical practice in individual care, greater autonomy, and professional security, in addition to better results in indicators such as the number of diagnoses and treatments performed by nurses during the subsequent years[9].

In relation to subsequent consultations and rapid testing, the MoH recommends alternating consultations between physicians and nurses within the scope of PHC, and the performance of rapid tests for STIs in the first and third trimesters of pregnancy[20]. The state of São Paulo also recommends further testing in the second trimester of pregnancy[21].

The association between basing care on municipal protocols and recommending treatment stands out, with the majority reporting the indication of the treatment protocol of 7,200,000 IU of benzylpenicillin for all reagent pregnant women, regardless of the stage of syphilis. It is also worth considering that more than 30% of the participating nurses did not prescribe benzylpenicillin for reagent pregnant women, which is a worrying reality. It reveals professional performance that is not consistent with the treatment recommended by the MoH, which indicates a single dose of 2,400,000 IU of benzathine benzylpenicillin for the recent stages of syphilis, such as primary syphilis, secondary syphilis and recent latent syphilis, considering an extra dose beneficial in cases of pregnant women (4,800,000 IU and 7,200,000 IU, distributed in three doses of 2,400,000 IU, with an interval of seven days, with an interval of up to nine days being acceptable, for late latent syphilis, latent syphilis of unknown duration and tertiary syphilis[22,23].

Other studies found this weakness in the indication of treatment recommended by the MoH[24,25], revealing that treatment protocols prescribed by all nurses do not match the stage of syphilis observed or that they recommend lower or higher doses than those recommended by national guidelines.

Classifying the stage of syphilis is extremely important since the Jarisch-Herxheimer reaction is an event that can occur after the application of the first dose of benzylpenicillin; more prevalent in primary and secondary stage infections and in pregnant women, this adverse event can progress to premature labor[26-28].

Still, in this context of the role of nurses in syphilis treatment, the importance of prescribing benzathine benzylpenicillin is emphasized. COFEN establishes in Technical Note CTLN 03/2017 that benzylpenicillin must be administered by PHC nursing professionals upon medical or nurse prescription and that nurses must prescribe benzylpenicillin according to federal, state, and/or municipal protocol[8].

An ecological study carried out in Brazil in 2020 reveals that the mean incidence of gestational syphilis was higher in municipalities where BHU administered benzathine benzylpenicillin. However, the incidence of CS was lower, which shows that benzylpenicillin administration in BHU is related to the qualification of care and reduction in vertical transmission of syphilis[29].

The association between providing prenatal care for partners and treating the partners of a pregnant woman who tested positive for syphilis regardless of the results of the rapid test and VDRL represent positive findings but reflect practices of less than half of the total participants. Prenatal care for the partner promotes a bond between the man and the service and the pregnant woman, bringing benefits to the mother and baby.

The lack of treatment of partners together with pregnant women is a major concern in CS elimination[30]. It is known that 33.3% of sexual partners of people with recent syphilis will develop the infection within one month of exposure; therefore, it is recommended that presumptive treatment be offered to these partners in

order to interrupt the chain of transmission and prevent CS[1].

Despite the contributions to understanding prenatal care provided by nurses to women with gestational syphilis, the study has limitations, such as not obtaining the participation of nurses from two of the 20 municipalities that make up the Regional Health Department XIV, in addition to the heterogeneous participation of nurses in the municipalities. Although we sought to recruit all and obtain the consent of all units, it is important to remember that the decision to authorize or not the study and to accept or not the invitation is free.

CONCLUSION

Nurses who received training on syphilis in the last five years demonstrated practices that were more adherent to protocols, including performing rapid tests in all three trimesters of pregnancy, subsequent prenatal consultations, and concomitant treatment of partners. The use of municipal protocols was significantly associated with these best care practices, highlighting the importance of clear and standardized guidelines for syphilis management in pregnant women.

However, the study identified practices that do not comply with the MoH guidelines, such as non-prescription of benzathine benzylpenicillin for pregnant women diagnosed with syphilis and prescription of a protocol with the maximum recommended dose even in the early stages of syphilis. This inconsistency highlights the need for continuous improvement and continuing education programs to ensure the correct classification of the stage of syphilis and the administration of appropriate doses.

High turnover and short duration of nurses' work in FHS, despite their long time since completing their undergraduate training, indicate the need for strategies to improve professional retention and continuity. Continuity and accumulated experience are essential for quality care and for developing ties with the community.

The implementation of policies that promote continuing education and the retention of qualified professionals can result in better maternal and child outcomes, contributing significantly to CS prevention.

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Conflict of Interest

None.

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Authors' contributions - CRediT

EMCR: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing – original draft and writing – review & editing.
SSM: formal analysis; funding acquisition; methodology; visualization; writing – original draft and writing – review & editing.
CAPC: formal analysis; funding acquisition; methodology; visualization; writing – original draft and writing – review & editing.
SAS: formal analysis; funding acquisition; methodology; visualization; writing – original draft and writing – review & editing.
CAS: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing – original draft and writing – review & editing.
PSF: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing – original draft and writing – review & editing.

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