Original

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Prenatal care of pregnant women with syphilis assisted by the family health strategy

Assistência pré-natal de gestantes com sífilis assistidas pela estratégia de saúde da família

Atención prenatal de mujeres embarazadas con sífilis asistida por la estrategia de salud familiar

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ABSTRACT

Objective: This study evaluated prenatal care for pregnant women with a diagnosis of syphilis treated by the Family Health Strategy of Teresina, Piauí. **Methods:** Data were analyzed from the Notifiable Diseases Information System, the pregnant and newborn medical records and other forms of 62 women diagnosed with syphilis in pregnancy between 2013 and 2015. **Results:** The diagnosis was made in 85.5% of the cases during the prenatal, where the latent syphilis prevailed. 41.69% of women performed the 2nd Venereal Disease Research Laboratory. In 82.3% of the cases, the prescribed treatment was in accordance with the recommendations of the Ministry of Health, but the partner was treated correctly only in 59.7% of the cases. Half of the live births were diagnosed as congenital syphilis, of these 77.4% were hospitalized after birth. **Conclusion:** The protocols for the treatment of syphilis in the prenatal have positively impacted the programs of health promotion strategy.
Keywords: Congenital Syphilis; Pregnancy; Prenatal Care; Syphilis.

RESUMO

Objetivo: Este estudo avaliou o pré-natal de gestantes com diagnóstico de sífilis atendidas pela Estratégia de Saúde da Família de Teresina, Piauí. **Métodos**: Os dados foram analisados no Sistema de Informação de Doenças Notificáveis, nos prontuários de gestantes e recém-nascidos e em outras formas de 62 mulheres diagnosticadas com sífilis na gravidez entre 2013 e 2015. **Resultados**: O diagnóstico foi realizado em 85,5% dos casos durante o pré-natal, onde prevaleceu a sífilis latente. 41,69% das mulheres realizaram o 2º Laboratório de Pesquisa em Doenças Venéreas. Em 82,3% dos casos, o tratamento prescrito estava de acordo com as recomendações do Ministério da Saúde, mas o parceiro foi tratado corretamente apenas em 59,7% dos casos. Metade dos nascidos vivos foi diagnosticada como sífilis congênita, desses 77,4% foram hospitalizados após o nascimento. **Conclusão**: Os protocolos para o tratamento da sífilis no pré-natal impactaram positivamente os programas de estratégia de promoção da saúde.
Palavras-chave: Sífilis congênita; Gravidez; Cuidados pré-natais; Sífilis.

RESUMÉN

Objetivo: Este estudio evaluó la atención prenatal para mujeres embarazadas con un diagnóstico de sífilis tratada por la Estrategia de Salud Familiar de Teresina, Piauí. **Métodos**: Se analizaron datos del Sistema de información de enfermedades de notificación obligatoria, los registros médicos de embarazadas y recién nacidos y otras formas de 62 mujeres diagnosticadas con sífilis en el embarazo entre 2013 y 2015. **Resultados**: El diagnóstico se realizó en el 85.5% de los casos durante el prenatal, donde prevaleció la sífilis latente. El 41,69% de las mujeres realizó el 2º Laboratorio de Investigación de Enfermedades Venéreas. En el 82.3% de los casos, el tratamiento prescrito estaba de acuerdo con las recomendaciones del Ministerio de Salud, pero la pareja fue tratada correctamente solo en el 59.7% de los casos. La mitad de los nacidos vivos fueron diagnosticados como sífilis congénita, de estos 77.4% fueron hospitalizados después del nacimiento. **Conclusión**: Los protocolos para el tratamiento de la sífilis en el prenatal han impactado positivamente los programas de estrategia de promoción de la salud.
Palabras clave: Sífilis congénita; Embarazo; Cuidado prenatal; Sífilis.

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INTRODUCTION

Syphilis is a bacterial infection, of systemic character, curable and exclusive to human. Each year, about two million pregnant women are infected with syphilis worldwide, most of whom live in developing countries.[1] It is a ancient disease whose etiological agent was discovered in 1905, a gram-negative bacterium of the group of spirochetes called *Treponema pallidum*.[2,3] It has as main route of transmission is sexual contact, followed by vertical transmission that occurs when the pregnant woman with syphilis ceases to be treated or is inadequately treated.[3] When syphilis is not treated during pregnancy, may occur the loss of the fetus or newborn with neonatal death, premature birth, low birth weight or congenital syphilis.[4]

In pregnant women, intrauterine vertical transmission can occur with up to 80% transmission rate, because *T. pallidum* penetrate the placenta easily.[5] Transmission can occur at any stage of pregnancy, with possible occurrence in the passage of the fetus through the birth canal. The probability of fetal infection is influenced by the stage of syphilis in the mother and the duration of fetal exposure to the etiological agent. In this way, the transmission is more likely to happen when a woman has primary or secondary syphilis during pregnancy. Congenital syphilis causes 30-50% of intrauterine death, preterm birth or death.[1,5] WHO estimates that in 2088 approximately 1.4 million pregnant women worldwide have active syphilis or syphilis infections sufficiently active to result in mother-to-child transmission and the potential for subsequent adverse pregnancy outcomes.[6]

As there is no vaccine to prevent infection by *T. pallidum*, the penicillin antibiotic treatment is a key component of syphilis control programs.[7] Assistance programs that include syphilis test along with appropriate and immediate penicillin treatment for pregnant women tested positive for *T. pallidum* infection have been shown to be effective in reducing adverse pregnancy outcomes.[4] However, existing barriers to the expansion of programs with follow-up of infected individuals can only be overcome through the involvement of formulators of public policies health and social.

The Family Health Strategy (FHS) performs prenatal care at Basic Health Units (BHU) with early pregnancy screening and qualification of care. According to the recommendation, there is a response to intercurrences, with risk and vulnerability assessment and classification, access to high-risk prenatal care in a timely manner, routine examinations and access to results in a timely manner, linking the pregnant woman to the place in which will be delivered, implementation of educational programs related to sexual health and reproductive health, prevention and treatment of STI/HIV/AIDS and Hepatitis among other actions. Therefore, in this paper, an attempt was made to analyze prenatal care for pregnant women diagnosed with syphilis assisted by the Family Health Strategy of the city of Teresina-PI, using as basis for the prevalence of syphilis.

METHODS

Study outline

A study of descriptive and quantitative approach was conducted, this research corresponds to the judgment which is made on the social practices from the formulation of a question not yet answered in the literature on the characteristics of these practices.[8,9]

Place and period of study

The study was developed in the city of Teresina, capital of the state of Piauí, with an estimated population of 830,223 inhabitants, which has 243 family health teams, distributed in health regions: Center/North, South, East/Southeast. Data were collected from January 2013 to December June 2015. Initially, Notification Disease Information System (as per its Portuguese acronym, SINAN) municipal data were analyzed within the defined period. From SINAN data, a list of pregnant women with syphilis was generated. Through this listing the random lottery of the pregnant women was performed through the software BioEstat, version 5.3. After the draw, the Basic Health Units were located in which they performed the prenatal care, and the questionnaire was filled in with the SINAN data of the pregnant woman and the newborn. Subsequently, the medical records of the pregnant women and their respective newborns were searched in the BHU, and the data that the SINAN form was not contemplated when the SINAN form and the medical records did not contain all the necessary data for the study. Based on this, the pregnant women were searched without the complete record, through the address for the interviews. In all, 175 medical records were searched and of these 113 medical records were incomplete and/or the pregnant women were not located at the addresses indicated.

Population and sample

They were used as inclusion criteria: be pregnant with a diagnosis of syphilis reported in SINAN, in the city of Teresina, from January 2013 to December 2015. Pregnant women who have not been located by area covered by the FHS were excluded and those who did not perform prenatal care. For the sample calculation, the formula for finite populations was used based on the estimation of the population proportion:

$$n = \frac{N \cdot p \cdot (1-p) \cdot Z^2}{p \cdot (1-p) \cdot Z^2 + (N-1) \cdot E^2}$$

Procedures for data analysis

The present study is an observational study with quantitative descriptive approach. SPSS, Statistical Package for the Social Sciences (SPSS), version 20.0 was used. For characterization of the population, a statistical study was done describing the sample (n = 62) through absolute (n) and relative (%) frequency distributions, central tendency measurements (minimum and maximum) and dispersion (mean and standard deviation).

In order to verify whether the variables involved were independent (unrelated), or if there was any association between them, the Chi-square test with Yattes correction was used - in the last table 10. The significance level adopted was 5%.

Operation of the study

After the search of the pregnant women in the SINAN municipal database, a random lottery was carried out based on the list of pregnant women. After the draw, the BHU were located according to the prenatal accomplishment. The BHU for prenatal care is included in SINAN data. Pregnant women who did not undergo prenatal care and who were not located in the coverage area were excluded, and were also replaced by random lottery.

Ethical and legal aspects

The ethical aspects of research involving human beings were observed, as determined by Resolution No. 466 of 2012 of the National Health Council. The study was approved according to opinion number 1,794,202 of October 26, 2016.

RESULTS

As described in Supplement 1, the mean age of pregnant women with syphilis was 23.2 (± 7.8) years, with a minimum of 15 and a maximum of 41 years, of which 20 (35.7%) had between 15 and 19 years old. In their totality, they came from the urban area of the municipality of Teresina, 62 (100.0%). The majority were married or in stable union (54.8%) and of brown color (77.4%). They presented, on average, 7.6 years of study, with a maximum of 16 years. More than half (54.8%) reported not having paid work, and 5 (22.5%) had monthly family income below a minimum wage.

As described in Table 01, all pregnant women diagnosed with syphilis (computed according to the inclusion and exclusion criteria) performed prenatal care in the city's primary care (100.0%), but only 18 (29%) number of SISPRENATAL.

Table 01: Assistance provided to pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Variables	n	%
Performed prenatal care during pregnancy		
Yes	62	100,0
No	-	-
SISPRENATAL number		
Yes	18	29,0
No	44	71,0
Syphilis diagnosis in pregnant women		
During prenatal care	53	85,5
Moment of childbirth	9	14,5
Clinical classification		
Primary	10	16,1
Secondary	4	6,5
Tertiary	5	8,1

Latent	43	69,4
Non-treponemic prenatal test		
Reagent	56	90,3
Non-reagent	2	3,2
Unrealized	4	6,5
Prenatal treponemal test		
Reagent	32	51,6
Non-reagent	2	3,2
Unrealized	28	45,2
Performed rapid pregnancy test		
Yes	5	8,1
No	57	91,9
Performed rapid HIV test		
Yes	4	6,5
No	58	93,5
Performed rapid syphilis test		
Yes	13	21,0
No	49	79,0

Table 02 describes the treatment of pregnant women and their partner. Regarding the treatment, 5 (8.1%) of the pregnant women did not perform; for those who performed, the main prescribed regimen was penicillin G benzathine 7,200,000 IU 51 (82.3%).

Table 02: Data on the treatment of pregnant women and their partners (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

	n	**%**
Treatment schedule prescribed (pregnant)		
Penicilin G benzathine 2.400.000 UI	3	4,8
Penicilin G benzathine 4.800.000 UI	3	4,8
Penicilin G benzathine 7.200.000 UI	51	82,3
Unrealized	5	8,1
Performed active search of partner		
Yes	3	4,8
No	21	33,9
It was not necessary	38	61,3
Partner treated concomitantly with the pregnant woman		

Yes	36	58,1
No	26	41,9
Prescribed treatment schedule (partner)		
Penicilin G benzathine 2.400.000 UI	2	3,2
Penicilin G benzathine 4.800.000 UI	1	1,6
Penicilin G benzathine 7.200.000 UI	38	61,3
Unrealized	21	33,9
Reason for not treating partner		
Partner was treated	37	59,7
Partner had no more contact with the pregnant woman	9	14,5
Partner was not communicated/invited to BHU for treatment	-	-
Partner was communicated/invited to BHU for treatment, but did not attend	2	3,2
Partner was communicated/invited to BHU for treatment, but refused treatment	2	3,2
Partner with non-reagent serology	1	1,6
Other	11	17,8

The pregnant women performed 1 to 10 prenatal consultations, and only 42.1% had six or more visits, most of the women had pregnancy with single fetus 60 (96.8%) and 52 (83.9%) were not visited by Family Health Strategy teams during pregnancy (Supplement 2). More than half had previous gestation 33 (53.2%). Only 9 (14.5%) had a planned pregnancy. Only 6.5% participated in educational activities.

According to Table 03, the majority of the women had a gap between the previous gestation and the current, greater than one year 56 (90.3%). Most of the pregnant women were in the first gestation and 10 (16.1%) had 1 abortion. The number of live births ranged from 1 (minimum) and 4 (maximum). Approximately 22.6% of the pregnant women had a diagnosis of syphilis in the previous gestation.

Table 03: Obstetric characteristics of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Variables	**N**	**%**
End of previous gestation less than 1 year		
Yes	6	9,7
No	56	90,3
Number of pregnancies		
1	24	38,7
2	17	27,4
3	8	12,9
4	12	19,4

5	1	1,6
Number of abortions		
0	51	82,3
1	10	16,1
2	1	1,6
Number of live births		
0	26	41,9
1	19	30,6
2	9	14,5
3	7	11,3
4	1	1,6
Diagnosis of syphilis in previous gestation		
Yes	14	22,6
No	48	77,4

Table 04 denotes the clinical characteristics of pregnant women with syphilis. They were 21 (33.9%) patients presenting any clinical condition or risk, it is emphasized drug addiction 5 (8.1%), hypertension 3 (4.8%), pre-eclampsia 2 (4.8%) diabetes mellitus 2 (4.8%), tuberculosis 2 (4.8%), smoking 2 (4.8%), followed by HIV 1 (1.6%), stillbirth 1 (1.6%), obesity, 1 (1.6%), alcoholism 1 (1.6%), prematurity 1 (1.6%).

Table 04: Clinical characteristics of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Variables	**N**	**%**
Presence of clinical conditions		
Yes	21	33,9
No	40	64,5
Did not answer	1	1,6
Specification of Clinical Conditions		
Pre eclampsia	2	3,2
Diabetes	2	3,2
Hypertension	3	4,8
Drug addiction	5	8,1
HIV	1	1,6
Stillborn	1	1,6
Obesity	1	1,6
Prematurity	1	1,6

Mental state	1	1,6
Tuberculosis	2	3,2
Stylist	1	1,6
Smoker	2	3,2

According to Table 05, the pregnant women did not perform an examination as recommended by the Ministry of Health. It was verified 50 (80.6%) pregnant women performed blood typing and Rh factor, 45 (72.6%) performed glycemia on the first exam and the second exam, 43 (69.4%) performed serology for Hepatitis B, 48 (77.4%) had urine test, anti-HIV and obstetric ultrasound examination 48 (77.4%), 51% (82.3%) had hemogram.

The majority of the pregnant women, 52 (83.9%), performed the 1st VDRL exam, and only 26 (41.9%) did the 2nd exam. Only 13 (21%) made the monthly monitoring of such an examination. Serology for toxoplasmosis was performed in 45 (72.6%) pregnant women and uroculture in only 1 (1.6%). Only 3.2% of the pregnant women performed indirect Coombs and parasitological stool, none performed hemoglobin electrophoresis. No pregnant woman performed the examination of vaginal secretion.

Table 05: Exams performed during the prenatal period of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

	Yes		**No**	
	n	**%**	**n**	**%**
Blood typing and Rh Factor	50	80,6	12	19,4
Fasting Glycemia (1st exam)	45	72,6	17	27,4
Fasting Glycemia (2nd exam)	29	46,8	33	53,2
Serology + p/Heb. B (HBsAg)	43	69,4	19	30,6
Urine	48	77,4	14	22,6
Anti-HIV	48	77,4	14	22,6
Obstetric Ultrasound	48	77,4	14	22,6
Hemogram	51	82,3	11	17,7
VDRL (1st exam)	52	83,9	10	16,1
VDRL (2nd exam)	26	41,9	36	58,1
Follow-up of the VDRL	13	21,0	47	75,8
Serology for Toxoplasmosis	55	88,7	7	11,3
Uroculture	1	1,6	59	95,2
Examination of vaginal secretion	-	-	62	100,0
Hemoglobin Electrophoresis	-	-	62	100,0

Indirect Coombs	2	3,2	60	96,8
Parasitological of Stool	2	3,2	60	96,8

The majority of pregnant women had live births 60 (96.8%), and 8 (12.9) were classified as preterm 53 (85.5%), while 9 (14.5%) were small for gestational age (Supplement 3). They were computed 31 (50.0%) newborns diagnosed with congenital syphilis and all were reported in the SINAN. Of these, 28 (45.2%) were in adequate treatment. Regarding the hospitalizations, 25 (40.3%) were in neonatal intensive care unit, intermediate care unit or joint accommodation. Of these hospitalized newborns, one (1.6%) died due to congenital syphilis. There was a significant association between the treatment of the concomitant partner with the pregnant woman and the diagnosis of congenital syphilis. The concomitant treatment of pregnant women increases 26.7% to 73.3% of the negative diagnosis for congenital syphilis (Supplement 4).

Regarding vaccination, 35 (56.5%) were vaccinated against tetanus, 7 (11.3%) were immunized for more than 5 years, 8 (12.9%) had incomplete vaccination and 2 (3.2 %) were not vaccinated. Twenty-four (38.7%) had complete vaccination against Hepatitis B and two (3.2%) were not vaccinated and 31 (50%) had no vaccination. Only 16 (25.8%) were vaccinated against influenza, and 15 (24.2%) were not registered (Supplement 5).

DISCUSSION

Brazil is a mixed country and we clearly notice this aspect when realizing that most of the pregnant women reported having brown skin color, similar to that also found in the Epidemiological Bulletin 2016.[10] Syphilis in the gestational period has a high incidence in young women with low schooling and low income.[11-13] According to table 01, the predominant age group of pregnant women with syphilis was 15 to 19 years. The young age of infection is usually associated with multiple sexual partners and low schooling and may be an aggravating factor for cross-dissemination of other sexually transmitted diseases (STDs) such as HIV.[14] The 2016 Epidemiological Bulletin of Syphilis in Brazil revealed that more than half of pregnant women with gestational syphilis were present in this age group, demonstrating the prevalence in younger women.[15] Such a record should serve as an alert since these pregnant women are considered adolescents in school and may have their lives compromised.

Regarding schooling, the analyzed pregnant women presented, on average, 7.6 years of study. The average schooling found in this study corroborates that found in other regions of Brazil such as Amazonas, Ceará, Federal District, Espírito Santo, Rio de Janeiro and Rio Grande do Sul, where the majority of women diagnosed with syphilis during pregnancy had less than 8 years of study.[10] These records reinforce the need for health promotion actions to prevent sexually transmitted diseases for this age group, reporting the consequences of

syphilis at all stages, including congenital syphilis. It is also important to emphasize that low education combined with low income can be considered a marker of greater risk for exposure to STDs.[16]

About the prenatal adherence, the data collected in this study revealed that all pregnant women participating in the study performed prenatal care in the primary care through the Family Health Strategy. According to MH guidelines, basic care is considered the user's preferred entry door into the SUS, whose assistance is developed through the practice of care practices.[17-20] Care practices should be oriented in the form of teamwork directed towards populations of defined territories, for which it assumes responsibility for health, observing criteria of risk, vulnerability, resilience and the ethical imperative that any demand, need for health or suffering must be taken, prevented and treated.[21]

Most of the pregnant women in the study did not have the SISPRENATAL number on their medical records or their card. The registry in SISPRENATAL also contributes to identify factors that characterize the risk pregnancy, with the objective of promoting the health security of mother and child.[22-24] Syphilis in pregnancy can be devastating and is associated with poor fetal or infant outcomes in most cases, with an estimated 52% of cases of active syphilis resulting in an adverse perinatal outcome attributable to syphilis.[6]

In the present study, the diagnosis of syphilis of pregnant women was performed mainly during prenatal care, following the SISPRENATAL protocol. The diagnosis is fundamental for the control of the disease as shown in another study carried out in the Federal District, in which 60.4% were diagnosed with syphilis during pregnancy.[25] PAS (defined as serum reactivity for non-treponemal and treponemal tests) is used as a WHO reporting measure, since surveillance data generally does not include clinical information.[6]

Most of the pregnant women had latent clinical classification (69.4%), followed by the primary (16.1%) and tertiary (8.1%) forms. The primary lesion in women usually occurs in the internal genital. Most cases of syphilis in pregnancy are diagnosed in the latent phase, without signs or symptoms, only by serological screening with the non-treponemic test (VDRL).[13,26] Most of the pregnant women had latent clinical classification (69.4%), followed by the primary (16.1%) and tertiary (8.1%) forms. The primary lesion in women usually occurs in the internal genital. Most cases of syphilis in pregnancy are diagnosed in the latent phase, without signs or symptoms, only by serological screening with the non-treponemic test.[27-29] The risk of fetal loss and congenital syphilis falls slightly in the early latent stage and decreases to 10% in the latent late stage, respectively.[29]

Among the pregnant women studied, most did not perform rapid tests of HIV and syphilis for pregnancy. Failure to perform such tests may lead to serious risks adversely affecting the strategy for the elimination of congenital syphilis.[30] It was observed through the present study that the main regimen prescribed for pregnant women was penicillin G benzathine 7,200,000 IU. This prescription is in accordance with the one recommended by the Ministry of

Health of Brazil.[31] Treatment of maternal syphilis with penicillin prevents nearly 98% of congenital infections. Therefore, to eliminate congenital syphilis, prenatal screening and immediate treatment are essential.[29]

Analyzing the results, it was diagnosed that the reasons for not treating the partner were: absence of contact with the pregnant woman and breakdown of the scheme. The lack of action of public health promotion policies directly to the partner becomes a harmful factor in the control of syphilis. Partner treatment is critical to prevent reinfection during pregnancy and is important in treating and preventing new cases of sexually transmitted infections.[21] Despite the importance of the treatment and follow-up of the partner, it is noticed that the system still lacks improvements for the control and eradication of syphilis. In Minas Gerais (Brazil), 81.1% of the cases, there was no information in the electronic medical record about receiving any dose of penicillin by the partners.[31]

Studies show that the number of prenatal consultations can reduce rates of neonatal and maternal mortality, prevalence of prematurity, low birth weight.[32,33] However, the number of prenatal consultations ranged from one to ten consultations, with less than half having seven or more consultations, a result lower than that recommended by the Ministry of Health.[34]

Most of the pregnant women were not visited by Family Health Strategy teams according to data evaluation. This indicates the need to organize and restructure this system, since the number of consultations is reduced. Such a phenomenon should serve as an alert for intervention measures to be implemented in order to increase the number of consultations in order to prevent not only syphilis, but other diseases in general.

CONCLUSION

The present study identified that the realization of prenatal care is not sufficient for the control of congenital syphilis. It is essential to improve the quality of the services offered, ensuring the proper handling of the monitoring and treatment of pregnant women, including planning care for their respective partners. In addition, the care provided by the Family Health Strategy teams should be improved since the approach and implementation of educational actions are not being visualized by the pregnant women. In addition to training health professionals it is necessary to carry out monitoring, evaluation and monitoring of actions undertaken in primary care.

REFERENCES

1. Shahrook S, Mori R, Ochirbat T, Gomi H. Strategies of testing for syphilis during pregnancy. Cochrane Database Syst Rev. [Internet]. 2014 Oct [cited 2013 Jan 15]; 6(1):97-103. Available from: https://doi.org/10.1002/14651858.CD010385.pub2.

2. Tampa M, Sarbu I, Matei C, Benea V, Georgescu SR. Brief history of syphilis. J Med Life. [Internet]. 2014 Mar [cited 2019 August 17]; 7(1):4–10. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3956094/.

3. Cohen SE, Klausner JD, Engelman J, Philip S. Syphilis in the modern era: an update for physicians. Infect Dis Clin North Am. [Internet]. 2013 Dec [cited 2019 Jun 25]; 27(4):705–22. Available from: https://doi.org/10.1016/j.idc.2013.08.005.

4. Gomez GB, Kamb ML, Newman LM, Mark J, Broutet N, Hawkes SJ. Untreated maternal syphilis and adverse outcomes of pregnancy: a systematic review and meta-analysis. Bull World Health Organ. [Internet]. 2013 Mar [cited 2019 July 22]; 91(1):217–26. Available from: https://doi.org/10.2471/BLT.12.107623.

5. Kingston M, French P, Higgins S, McQuillan O, Sukthankar A, Stott C, et al. UK national guidelines on the management of syphilis 2015. Int J STD AIDS. [Internet]. 2016 Dec [cited 2019 Jun 28]; 27:421–46. Available from: https://doi.org/10.1177/0956462415624059.

6. Ham DC, Lin C, Newman L, Wijesooriya NS, Kamb M. Improving global estimates of syphilis in pregnancy by diagnostic test type: A systematic review and meta-analysis. Int J Gynaecol Obstet [Internet]. 2015 Apr [cited 2019 Jun 28]; 130(1):10–4. Available from: https://doi.org/10.1016/j.ijgo.2015.04.012.

7. Stamm L V. Syphilis: antibiotic treatment and resistance. Epidemiol Infect. [Internet]. 2015 Apr [cited 2019 Jun 28]; 143(8):1567–74. Available from: https://doi.org/10.1017/S0950268814002830.

8. Butler A, Hall H, Copnell B. A Guide to Writing a Qualitative Systematic Review Protocol to Enhance Evidence-Based Practice in Nursing and Health Care. Worldviews evidence-based Nurs. [Internet]. 2016 Jan [cited 2019 Aug 6]; 13(3):241–9. Available from: https://doi.org/10.1111/wvn.12134.

9. Wu YP, Thompson D, Aroian KJ, McQuaid EL, Deatrick JA. Commentary: Writing and Evaluating Qualitative Research Reports. J

Pediatr Psychol [Internet]. 2016 Apr [cited 2019 Apr 04]; 41(5):493–505. Available from: https://doi.org/10.1093/jpepsy/jsw032.

10. Saraceni V, Fernando G, Pereira M, Freitas M, Alix M, Araujo L, et al. Vigilância epidemiológica da transmissão vertical da sífilis : dados de seis unidades federativas no Brasil. Rev Panam Saúde Pública. [Internet]. 2017 Jun [cited 2019 Jun 20]; 41(1):1–11. Available from: https://scielosp.org/pdf/rpsp/2017.v41/e44/pt.

11. Warren HP, Cramer R, Kidd S, Leichliter JS. State Requirements for Prenatal Syphilis Screening in the United States, 2016. Matern Child Health J. [Internet]. 2018 Sep [cited 2019 Fev]; 22(9):1227–32. Available from: https://link.springer.com/article/10.1007%2Fs10995-018-2592-0.

12. Plotzker RE, Murphy RD, Stoltey JE. Congenital Syphilis Prevention: Strategies, Evidence, and Future Directions. Sex Transm Dis. [Internet]. 2018 Sep [cited 2019 Aug 1]; 45(1):29–37. Available from: https://doi.org/10.1097/OLQ.0000000000000846

13. Rowe CR, Newberry DM, Jnah AJ. Congenital Syphilis: A Discussion of Epidemiology, Diagnosis, Management, and Nurses' Role in Early

Identification and Treatment. Adv Neonatal Care. [Internet]. 2018 Dec [cited 2019 Aug 1]; 18(6):438–445. Available from: https://doi.org/10.1097/ANC.0000000000000534

14. Frickmann H, Schwarz NG, Girmann M, Hagen RM, Poppert S, Crusius S, et al. Serological survey of HIV and syphilis in pregnant women in Madagascar. Trop Med Int Health. [Internet]. 2013 Jan [cited 2019 Aug 1]; 18(1):35–9. Available from: https://doi.org/10.1111/tmi.12007.

15. Maria S, Flôr C. Epidemiological profile of cases of syphilis in pregnant women in the city of sobral, Ceará, from 2006 to 2010. Sanare [Internet]. 2011 Jan-Jul [cited 2019 mar]; 11(1):13–7. Available from: https://sanare.emnuvens.com.br/sanare/article/view/261.

16. Magalhães DM dos S, Kawaguchi IAL, Dias A, Calderon I de MP. Sífilis materna e congênita: ainda um desafio. Cad Saude Publica [Internet]. 2013 Jan [cited 2019 July 22]; 29(6):1109–20. Available from: http://dx.doi.org/10.1590/S0102-311X2013000600008.

17. Gava M, Ferreira LS, Palhares D, Mota ELA. Incorporation of information technology in Primary Care of SUS in North-eastern Brazil: expectations and experiences. Ciênc. saúde coletiva [Internet]. 2016 Mar [cited 2019 Aug 17]; 21(3):891–902. Available from: http://dx.doi.org/10.1590/1413-81232015213.01062015.

18. Oliveira L, Passador C. [Considerations on the Brazilian national health system (SUS) performance index]. Sante Publique. [Internet]. 2014 Nov [cited 2019 Aug 1]; 6(26):829–36. Available from: https://www.cairn.info/revue-sante-publique-2014-6-page-829.html

19. Pinto VLJ, Cerbino Neto J, Penna GO. The evolution of the federal funding policies for the public health surveillance component of Brazil's Unified Health System (SUS). Ciênc. saúde coletiva [Internet]. 2014 Dec [cited 2019 Aug 1]; 19(12):4841–9. Available from: http://dx.doi.org/10.1590/1413-812320141912.05962013.

20. Menicucci TMG. [The history of the public health reform in Brazil and of the Sistema Unico de Saude: changes, continuities, and the current agenda]. Hist Cienc Saude Manguinhos. [Internet]. 2014 Mar [cited 2019 Aug 1]; 21(1):77–92. Available from: http://dx.doi.org/10.1590/S0104-59702014000100004.

21. Serafim AS, Moretti GP, Serafim GS, Niero CV, da Rosa MI, Pires MM de S, et al. Incidence of congenital syphilis in the South Region of Brazil. Rev Soc Bras Med Trop. [Internet]. 2014 mar [cited 2019 July 18]; 47(2):170–8. Available from: http://dx.doi.org/10.1590/0037-8682-0045-2014.

22. Maia VKV, Lima E de FA, Machado RAV, Sousa AI, Leite FMC, Primo CC. Quality assessment of a system of prenatal information. Rev Gauch Enferm. [Internet]. 2017 Apr [cited 2019 Fev]; 38(3):1-10. Available from: http://dx.doi.org/10.1590/1983-1447.2017.03.67747.

23. Lima AP de, Correa AC de P. [Production of data for the pre-natal information system in basic health units]. [Internet]. Rev Esc Enferm USP. 2013 Aug [cited 2019 Fev]; 47(4):876–83. Available from:

http://dx.doi.org/10.1590/S0080-623420130000400015.

24. Andreucci CB, Cecatti JG, Macchetti CE, Sousa MH. SISPRENATAL as a tool for evaluating quality of prenatal care. Rev Saude Publica. [Internet]. 2011 Aug [cited 2019 April 24]; 45(5):854–64. Available from: http://dx.doi.org/10.1590/S0034-89102011005000064.

25. Muricy CL, Pinto VL. Congenital and maternal syphilis in the capital of Brazil. Rev Soc Bras Med Trop. [Internet]. 2015 Mar [cited 2019 July 25]; 48(2):216–9. Available from: http://dx.doi.org/10.1590/0037-8682-0168-2014

26. Jain K, Jain NK. Vaccines for visceral leishmaniasis: A review. J Immunol Methods. [Internet]. 2015 July [cited 2019 June 21]; 422:1–12. Available from: https://doi.org/10.1016/j.jim.2015.03.017.

27. Moline HR, Smith JFJ. The continuing threat of syphilis in pregnancy. Curr Opin Obstet Gynecol. [Internet]. 2016 April [cited 2019 February 20]; 28(2):101–4. Available from: https://doi.org/10.1097/GCO.0000000000000258

28. Braccio S, Sharland M, Ladhani SN. Prevention and treatment of mother-to-child transmission of syphilis. Curr Opin Infect Dis. [Internet]. 2016 Apr [cited 2019 Feb 20]; 29(3):268–74. Available from: https://insights.ovid.com/pubmed?pmid=27078816.

29. Li Y, Gonik B. Is Congenital Syphilis Really Congenital Syphilis? Infect Dis Obstet Gynecol [Internet]. 2006 Oct [cited 2018 Sep 20]; 2006(1):1-4. Available from: https://doi.org/10.1155/IDOG/2006/81629

30. Tinajeros F, Ares LR, Elías V, Reveiz L, Sánchez F, Mejía M, et al. Barreras del personal de salud para el tamizaje de sífilis en mujeres embarazadas de la Red Los Andes, Bolivia Investigación original. Rev Panam Salud Publica Pan Am J Public Heal [Internet]. 2017 May cited 2019 February 20]; 41:1–6. Available from: www.scielosp.org/article/rpsp/2017.v41/e21/.

31. Nonato SM, Melo APS, Guimarães MDC. Syphilis in pregnancy and factors associated with congenital syphilis in Belo Horizonte-MG, Brazil, 2010-2013. Epidemiol. Serv. Saúde [Internet]. 2015 Dec [cited 2019 Aug 20]; 24(4): 681-694. Available from: http://dx.doi.org/10.5123/S1679-49742015000400010.

32. Gobel A, Stuhrmann LY, Harder S, Schulte-Markwort M, Mudra S. The association between maternal-fetal bonding and prenatal anxiety: An explanatory analysis and systematic review. J Affect Disord. [Internet]. 2018 Oct [cited 2019 August 6]; 239(1):313–27. Available from: https://doi.org/10.1016/j.jad.2018.07.024.

33. de Jong A, Maya I, van Lith JMM. Prenatal screening: current practice, new developments, ethical challenges. Bioethics. [Internet]. 2015 Dec [cited 2019 January 14]; 29(1):1–8. Available from: https://doi.org/10.1111/bioe.12123.

34. Anjos JC dos, Boing AF. Regional differences and factors associated with the number of prenatal visits in Brazil: analysis of the Information System on Live Births in 2013. Rev Bras Epidemiol [Internet]. 2016 Oct [cited 2019 August 17]; 19(4):835–50. Available from: http://dx.doi.org/10.1590/1980-5497201600040013.

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CONFLICTS OF INTEREST

The authors declare that no have conflicts of interest.

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Attachments

Supplement 1 - Socioeconomic characterization of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Variables	N	%
Age		
10 to 14 years	3	4,8
15 to 19 years	25	40,3
20 to 29 years	19	30,6
30 to 39 years	14	22,6
Over 40 years	1	1,6
Mean ± Standard Deviation	23,1 + 7,1	
CI95%	21,2 - 24,9	
Minimum – Maximum	14 – 40	
Place of origin		
Teresina urban area	62	100,0
Marital Status		
Single	28	45,2
Married/stable union	34	54,8
Education (in years)		
Mean ± Standard Deviation	7,6 + 3,3	
IC95%	6,8 - 8,5	
Minimum – Maximum	0 –16	
Color/race		
White	5	8,1
Black	8	12,9
Brown	48	77,4
Yellow	1	1,6
Paid activity		
Yes	28	45,2
No	34	54,8
Family Income		
< 1 MW*	5	22,5
1 MW	9	45,0
2 MW	18	20,0
3 MW	8	12,5

***** Minimun wage.

Supplement 2 - Data regarding prenatal care of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Variables	N	%
Number of queries		
1,0	3	4,8
2,0	8	12,9
3,0	6	9,7
4,0	9	14,5
5,0	10	16,1
6,0	8	12,9
7,0	4	6,5
8,0	6	9,7
9,0	4	6,5
10,0	4	6,5
Type of pregnancy		
Only	60	96,8
Twin	2	3,2
Triple or more	0	0,0
FHS team visited		
Yes	10	16,1
No	52	83,9
Previous gestation		
Yes	33	53,2
No	29	46,8
Planned pregnancy		
Yes	9	14,5
No	35	56,5
Uninformed	18	29,0
Participation in educational activities		
Yes	4	6,5
No	58	93,5
Number of meetings		
None	58	93,5
1,0	3	4,8
3,0	1	1,6

Supplement 3 - Assistance to the newborn of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Variables	N	%
Birth conditions		
Born alive	60	96,8
Abortion	1	1,6
Fetal death	1	1,6
Classification of the newborn		

Pre-term	8	12,9
At term	53	85,5
Post-term	-	-
Not applicable	-	-
Did not answer	-	-
No information	1	1,6
Weight-age adequacy		
Small for gestational age	9	14,5
Suitable for gestational age	51	82,3
Big for gestational age	-	-
Not applicable	1	1,6
Did not answer	-	-
No Information	1	1,6
Newborn diagnosed with congenital syphilis		
Yes	31	50,0
No	30	48,4
Not applicable	1	1,6
Have been notified to SINAN		
Yes	31	50,0
No	-	-
Not diagnosed/Not applicable	31	50,0
Treated for congenital syphilis?		
Yes	28	45,2
No	3	4,68
Not diagnosed/Not applicable	31	50,0
NB hospitalization		
NICU/ICU/Joint Accommodation	25	40,3
Not hospitalized	6	9,7
Not applicable	31	50,0
In case of death of the newborn, the cause was congenital syphilis		
Yes	1	1,6
Birth conditions	-	-
Born alive	61	98,4

Supplement 4 - Association between the diagnosis of congenital syphilis of the newborn and the concomitant treatment of the pregnant woman and partner in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

Partner treated concomitantly with the pregnant woman	**Newborn diagnosed with congenital syphilis**				p-value[a]
	Yes		No		
	N	%	N	%	
Yes	14	(45,2)	22	(73,3)	0,048*
No	17	(54,8)	8	(26,7)	

Legend: [a] Chi-Square Test *. Significant at the 5% level.

Supplement 5 - Vaccination status of pregnant women with syphilis (n = 62) in the period from 2013 to 2015. Teresina, PI, Brazil, 2017.

	N	%
Vaccination: Tetanus		
Not vaccinated	4	6,5
Incomplete vaccination	8	12,9
Immunized for less than 5 years	2	3,2
Immunized for more than 5 years	7	11,3
Vaccinated	35	56,5
No information	6	8,6
Vaccination: Hepatitis B		
Not vaccinated	2	3,2
Incomplete vaccination	5	8,1
Complete vaccination	24	38,7
No information	29	50
Vaccination: Influenza		
Yes	16	25,8
No	31	50,0
	15	24,2