

Syphilis in pregnancy and congenital syphilis in Palmas, Tocantins State, Brazil, 2007-2014*

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Abstract

Objective: to describe the epidemiological profile of reported cases of syphilis in pregnant women and congenital syphilis in the period 2007-2014 in Palmas-TO, Brazil. **Methods:** this is a descriptive study with data from the Information System for Notifiable Diseases (Sinan). **Results:** 171 pregnant women with syphilis (4.7/1,000 live births [LB]) and 204 cases of congenital syphilis (5.6/1,000 LB) were identified; most women were brown-skinned (71.3%), had low education level (48.0%) and received late diagnosis during prenatal care (71.9%); the incidence of congenital syphilis varied from 2.9 to 8.1/1,000 LB in the period; the predominant maternal characteristics were age from 20 to 34 years (73.5%), having up to complete high school (85.3%), attending prenatal care (81.4%), diagnosis of syphilis during prenatal care (48.0%), and untreated partners of mothers who attended prenatal care (83.0%), reaching almost 80% of live births with congenital syphilis. **Conclusion:** it is necessary to adopt new strategies for the effectiveness of the prenatal care provided, and, consequently, to reduce the incidence of congenital syphilis.

Keywords: Pregnant Women; Prenatal Care; Congenital Syphilis; Syphilis; Epidemiology, Descriptive.

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Introduction

Syphilis is still a serious Public Health issue, at global level, despite the availability of low-cost diagnostic methods and the effective treatment since the decade of 1950. The disease shows a scenario worse than the vertical transmission of human immunodeficiency virus (HIV) and is a determinant factor in the rise of maternal and perinatal morbidity and mortality indicators.¹

In 2011, the World Health Organization (WHO) estimated that 2 million cases of syphilis in pregnant women occur each year. About 25% of untreated cases, or treated inappropriately, would result in miscarriage or stillbirths.²

Infection's surveillance of syphilis in pregnant women aims to meet the serological status and start maternal therapy early, aiming to strengthen planning and evaluation of prevention and control measures, particularly the vertical transmission of the *Treponema pallidum*.³

The high incidence of syphilis in pregnant women and congenital syphilis are still a challenge to health services.

The effective control of syphilis has as its fundamental premise the serological screening and treatment of pregnant women and sexual partners, since the quality of prenatal and delivery assistance are important determinants in reducing mother-to-child transmission. Penicillin is the drug of first choice in the treatment of syphilis and the only indicated for pregnant women: it presents 98% effectiveness in preventing congenital syphilis, acting at all stages of the disease. There is no report on the resistance of *Treponema pallidum* to penicillin.^{3,4} Notwithstanding, the high incidence of syphilis in pregnant women and congenital syphilis are still a challenge to health services.

From 2007 to 2013, 685 cases of syphilis in pregnant women and 535 cases of congenital syphilis were registered in individuals resident in Tocantins State.⁵ According to an agreement between the Ministry of Health and the Pan-American Health Organization (PAHO), the target for 2015 was to reduce the incidence to 0.5 cases per 1,000 live births.^{1,3}

Primary Health Care is essential in tackling congenital syphilis, since it is the main entrance to health services. Family Health teams are the closest bond between the health professional and the patient and may help change the epidemiological picture of this disease. The professionals who work directly with pregnant women need technical qualification and an interdisciplinary look, given the difficulties in diagnosis and assistance for this disease.⁴

In Brazil, there are several discussions over this subject. However, there are few studies on the epidemiological characteristics of congenital syphilis in several places.⁶ This fact justifies the conduction of studies that may contribute to a better knowledge and understanding of syphilis epidemiology, enabling a (i) better planning of education and prevention measures in most vulnerable groups and (ii) assessment of the action to reduce the mother-to-child transmission of syphilis.

This study aimed to describe the epidemiological profile of reported cases of syphilis in pregnant women and congenital syphilis in the period 2007-2014 in Palmas, Tocantins State, Brazil.

Methods

This is a descriptive study with data from the Information System for Notifiable Diseases (Sinan), which is fed by forms of compulsory notification; these files are standardized forms that contain sociodemographic and clinical information, and are filled in by health professionals.

The place of study was Palmas, the capital of Tocantins State, located in the central region of that state; it occupies an area of 2,218.943 km² and, in 2015, it had a population of 272,726.⁷

We included in this study all the cases of syphilis during pregnancy and congenital syphilis in residents of Palmas, registered on Sinan, from 2007 to 2014, which fit the definition criterion of confirmed case, according to the Brazilian Ministry of Health.⁸ The duplicate cases identified after analysis on Sinan were excluded. The variables studied were related to the notification files of syphilis during pregnancy and congenital syphilis, as follows:

- a) Maternal sociodemographic
 - age (in years: 10 to 14; 15 to 19; 20 to 34; 35 to 49)
 - ethnicity/skin color (white; black; Asian; brown; indigenous)

- education level (illiterate; 1st to 4th grade of elementary school incomplete; 4th grade of elementary school complete; 5th to 8th grade of elementary school incomplete; complete elementary school; incomplete high school; higher education degree; unknown)
- b) Prenatal care (yes; no; unknown/blank)
- c) Obstetric and treatment
 - moment of maternal diagnosis (1st, 2nd, 3rd trimester or gestational age ignored)
 - clinical classification of the disease (primary; secondary; tertiary; latent; unknown/blank)
 - treponemal test (reactive; nonreactive; not conducted; unknown/blank)
 - nontreponemal test (reactive; nonreactive; not conducted)
 - treatment scheme prescribed to the pregnant woman (penicillin G benzathine 2,400,000 IU; penicillin G benzathine 4,800,000 IU; penicillin G benzathine 7,200,000 IU; other scheme; not conducted; unknown/blank)
 - partner's treatment (yes; no; unknown/blank)
- d) Newborn's clinical and laboratory information
 - VDRL test (venereal disease research laboratory) in peripheral blood (positive, negative, not conducted, unknown/blank)
 - CSF VDRL test (positive; negative; not conducted, unknown/blank)
 - long bone radiography (yes; no; not conducted; unknown/blank)
 - case evolution (alive; death due to congenital syphilis; death due to other causes; miscarriage; stillbirths)

To calculate the prevalence rate of syphilis during pregnancy, we used the number of notified cases per year, divided by the number of live births in the same year, multiplied by 1,000. To calculate the incidence of congenital syphilis, we used the number of new cases per year, divided by the number of live births in the same year, multiplied by 1,000.⁹ The number of live births was obtained at the Information System on Live Births (Sinasc).

The statistics softwares – open distribution – used to conduct the analyses were BioEstat 5.0 and Epi Info 3.5.2; data were tabulated with Tabwin 32.

The research project was approved by the Ethics in Research Committee of the *Centro Universitário Luterano de Palmas*, under the report No. 985.502, dated March 13th, 2015; the project was conducted

according to the Resolution of the National Health Council (CNS) No. 466, dated December 12th, 2012.

Results

From 2007 to 2014, 171 cases of syphilis in pregnant women and 204 cases of congenital syphilis were identified. The year of 2014 presented the highest number of notified cases of syphilis in pregnant women (n=39; 23.0%), with a prevalence rate of 7.5/1,000 live births (Figure 1), which is equivalent to an increase of 38.8% when compared to the previous year and of 78.5% in relation the average of the previous years (4.2/1,000 live births).

The majority of the 116 pregnant women with syphilis (67.8%) were in the age group of 20-34 years old (average age of 25 years; range from 13 to 43 years) (Table 1). More than two thirds of those women (71.3%) were brown-skinned and 76.0% had from incomplete elementary school to complete high school. In 51 (29.8%) cases, the partner did not receive treatment (Table 1).

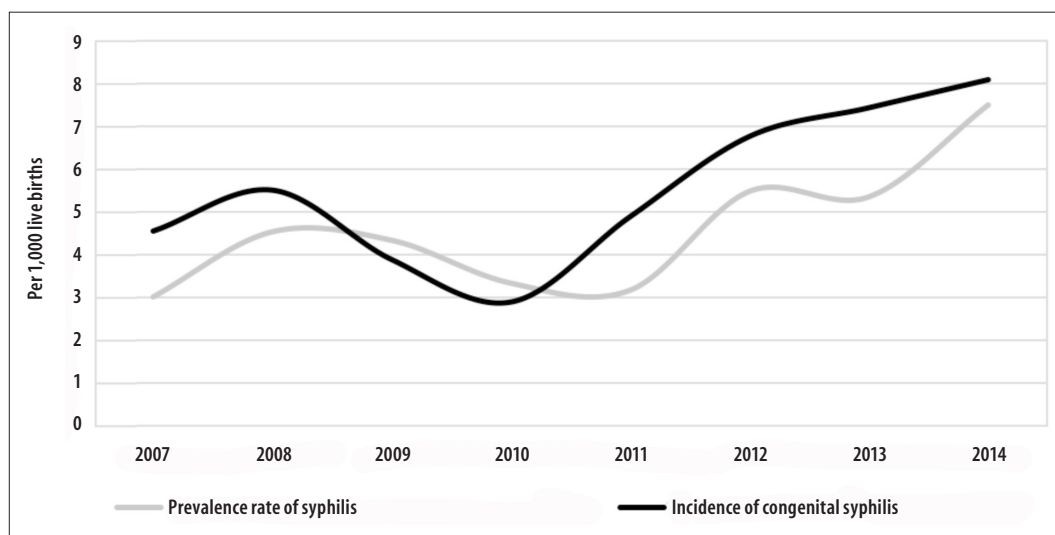
In 47.3% of the cases syphilis was primary and/or secondary. In 93.0% of cases, we could identify the VDRL test, which varied between 1:1 and 1:128, with median of 1:4 and mode of 1:2. In 11 (7.0%) cases, the VDRL was informed with inexistent titles.

Of the 167 pregnant women with positive VDRL, 36.8% tested positive in the treponemal test (fluorescent treponemal antibody-absorption [FTA-ABS]); and 2.9% tested negative, being, thus, discarded for syphilis.

From 2007 to 2014, the annual incidence rate of congenital syphilis raised from 2.9 to 8.1 cases per 1,000 live births. Among the mothers of cases that fit into the criteria of definition for congenital syphilis, most were brown-skinned (90.2%), in the age group from 20 to 34 years old (73.5%), with incomplete or complete high school (48.0%) (Table 2).

Of the total of cases of congenital syphilis, 81.4% of the mothers attended prenatal care during pregnancy and 48.0% were diagnosed during prenatal care (Table 2). The partners of 83.0% of the mothers who attended prenatal care were not treated for the disease.

Most of mothers of notified cases of congenital syphilis did not receive treatment (54.4%), and many of them received inadequate treatment (40.7%). The



Sources: Information System for Notifiable Diseases (Sinan) and Information System on Live Births (Sinasc)

Figure 1 – Annual incidence of congenital syphilis and prevalence rate of syphilis during pregnancy (per 1,000 live births) in the municipality of Palmas, Tocantins, 2007-2014

performance of adequate treatment for pregnant women during the historical series was low (1.0%) (Table 2).

Among the live births with congenital syphilis, 51.0% presented VDRL in peripheral blood positive and only 1.0% presented changes in the long bone radiography; however, this latter was not performed in 68 cases (33.3%) (Table 3).

By analyzing the evolution of cases of congenital syphilis, we could observe: 78.9% of cases were alive; 2.5% died due to syphilis; 3.4% died due to other causes; 9.3% were miscarriages; and 5.9% were stillbirths (Table 3).

Discussion

An increase in the prevalence of syphilis during pregnancy and raising incidence of congenital syphilis were observed in Palmas-TO, Brazil. This increase has also been reported in other Brazilian municipalities⁹ and around the world.¹⁰ Women with syphilis are mainly young, brown-skinned, with low education level and who attended prenatal care, a profile similar to other studies.¹¹⁻¹⁵

It is important to highlight that the low education level is considered a marker of greater risk of exposition to sexually transmitted diseases, due to the little knowledge on the importance of prevention.¹⁶

In this study, we can notice that most of mothers of notified infants had low education level. This finding is similar to a research conducted between 2010 and 2013, in Belo Horizonte, capital of Minas Gerais State,¹⁷ and to results of other studies that confirmed higher occurrence of syphilis in pregnant women with low education level.^{12,13,18}

We could also observe a high frequency of syphilis diagnosis in the 2nd and 3rd trimesters of pregnancy,¹⁹ possibly related to the (i) late search for prenatal care and (ii) low sensibility and quality of pregnant women health care. These results reaffirm the importance of the timely detection of cases of syphilis in pregnant women, as well as the offer of correct treatment for those women and their partners: the adequate prenatal care is essential for the maternal-infant health and, consequently, for the reduction of congenital syphilis. Similar results were found in some studies conducted in municipalities from the states of Rio de Janeiro (1994 to 1999), and Ceará (2000 to 2005), as well as in the Federal District (2005 to 2009).^{18,19,20} The improvement in timely diagnose in pregnant women from Palmas may be related to the implementation of rapid tests in the primary health care units (PHU), since 2013.²¹

According to the Ministry of Health, there are some difficulties in the clinical diagnose for syphilis in pregnant women, because the chancre does not

Table 1 – Distribution of pregnant women with syphilis (n=171), according to sociodemographic, obstetric, and partners' information, notified on Sinan^a in the municipality of Palmas, Tocantins, 2007-2014

Variables	n	%
Age group (in years)		
10-14	1	0.6
15-19	34	19.9
20-34	116	67.8
35-49	20	11.7
Ethnicity/skin color		
White	29	17.0
Black	17	9.9
Asian	1	0.6
Brown	122	71.3
Indigenous	1	0.6
Unknown/blank	1	0.6
Education level		
Illiterate	1	0.6
Incomplete or complete elementary school	72	42.1
Incomplete or complete high school	58	33.9
Incomplete or complete higher education	3	1.8
Unknown/blank	37	21.6
Moment of diagnosis (gestational trimester)		
1 st trimester	43	25.1
2 nd trimester	63	36.8
3 rd trimester	60	35.1
Unknown gestational age	5	3.0
Clinical classification of the disease		
Primary	63	36.8
Secondary	18	10.5
Tertiary	22	12.9
Latent	51	29.8
Unknown/blank	17	10.0
Treponemal test (rapid test or FTA-Abs test^b)		
Reactive	63	36.8
Non-reactive	5	2.9
Not conducted	96	56.1
Unknown/blank	7	4.2
Nontreponemal test (VDRL^c)		
Reactive	167	97.7
Non-reactive	1	0.6
Not conducted	3	1.7

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Table 1 – Conclusion

Variables	n	%
Treatment scheme prescribed to the pregnant woman		
Penicillin G benzathine 2,400,000 IU ^d	59	34.5
Penicillin G benzathine 4,800,000 IU ^d	24	14.1
Penicillin G benzathine 7,200,000 IU ^d	76	44.4
Others	4	2.3
Not conducted	6	3.5
Unknown/blank	2	1.2
Partner treated at the same time as the pregnant woman		
Yes	46	26.9
No	51	29.8
Unknown/blank	74	43.3

a) Sinan: Information System for Notifiable Diseases

b) Fluorescent treponemal antibody-absorption

c) VDRL: Venereal disease research laboratory

d) International Units

present symptoms and is usually located in areas of limited view: vaginal wall, cervix or perineum.²² This study showed that many pregnant women were misclassified, regarding the disease stage, given the high number of women on the primary and tertiary stages, which is different from what is expected during screening, when the latent stage is more common.²² It is important to highlight that the mistakes in interpretations and classification of the clinical stage of syphilis may lead to inadequate treatments, and cases in which it is not possible to find out the evolution of the disease or those with absence of clinical signs, must be classified as of syphilis with unknown duration, and, in those cases, the treatment advised are three doses of benzathine penicillin.^{3,22}

In São Paulo, 40% of congenital syphilis cases lead to fetal death (miscarriage, stillbirths) or early neonate death.²³ In this study, in almost one fifth of miscarriage cases, mothers were diagnosed with syphilis only during delivery and curettage. For almost all live births (symptomatic or not), the mothers were diagnosed during prenatal care, which proves that prenatal care enables a more favorable outcome of cases.

In Palmas, we observed a high percentage of exams not performed on newborns with congenital syphilis (CSF VDRL test and long bone radiography). The long bone radiography may

offer diagnose assistance and present, as more frequent alteration, periostitis, osteomyelitis and osteochondritis.^{22,24} Other studies conducted in Belo Horizonte-MG, Caxias do Sul-RS and Natal-RN, from 2001 to 2013,^{17,25,26} also observed a prevalence of information absence regarding the radiological diagnosis and the CSF VDRL test, which may hamper the effective follow-up of cases.

This study presented some limitations, which are common in researches with secondary data – limited to coverage and registers quality –, given the possibility of underreporting and the low quality of the information registered.

The results presented help understand the fragility of health services, regarding the control of congenital syphilis. Several important failures were found, with influence over diagnose and follow-up, for both the pregnant women during prenatal care, and the infants, and the non-compliance of an adequate treatment for the mothers and their partners stands out.

The Primary Health Care is essential in tackling the vertical transmission of syphilis, considering it is the main entrance to health services, whilst the Family Health teams are the closest bond between the health professional and the patient, and can help change the epidemiological picture of congenital syphilis. Health professionals who work directly with pregnant women need to get involved with the

Table 2 – Sociodemographic and clinical characteristics of mothers of live births with congenital syphilis (n=204), notified on Sinan^a in the municipality of Palmas, Tocantins, 2007-2014

Maternal variables	n	%
Prenatal care		
Yes	166	81.4
No	35	17.2
Unknown/blank	3	1.5
Partner's treatment		
Yes	24	11.8
No	173	84.8
Unknown/blank	7	3.4
Age group (in years)		
10-14	1	0.5
15-19	39	19.1
20-34	150	73.5
35-49	14	6.9
Ethnicity/skin color		
White	16	7.8
Black	3	1.5
Asian	1	0.5
Brown	184	90.2
Indigenous	–	–
Unknown/blank	–	–
Education level		
Illiterate	–	1.0
Incomplete or complete elementary school	11	36.3
Incomplete or complete high school	24	48.0
Incomplete or complete higher education	–	3.4
Unknown/blank	7	11.3
Scheme of maternal treatment		
Adequate	2	1.0
Inadequate	83	40.7
Not conducted	111	54.4
Unknown/blank	8	3.9
Diagnosis of maternal syphilis		
During prenatal care	98	48.0
During delivery/curettage	96	47.1
After delivery	6	2.9
Not conducted	2	1.0
Unknown/blank	2	1.0

a) Sinan: Information System for Notifiable Diseases

Table 3 – Diagnosis characteristics of cases of congenital syphilis (n=204), notified on Sinan^a in the municipality of Palmas, Tocantins, 2007-2014

Variables	n	%
VDRL in peripheral blood		
Positive	104	51.0
Negative	59	28.9
Not conducted	39	19.1
Unknown/blank	2	1.0
CSF VDRL		
Positive	1	0.5
Negative	95	46.6
Not conducted	100	49
Unknown/blank	8	3.9
Alteration in long bone radiography		
Yes	2	1.0
No	117	57.4
Not conducted	68	33.3
Unknown/blank	17	8.3
Case evolution		
Alive	161	78.9
Death due to congenital syphilis	5	2.5
Death due to other causes	7	3.4
Miscarriage	19	9.3
Stillbirth	12	5.9

a) Sinan: Information System for Notifiable Diseases

b) VDRL: venereal disease research laboratory

cause, besides receiving technical qualification and having an interdisciplinary look, given the difficulties in diagnosis and assistance for this disease. The health professionals should be aware, in order to minimize a totally avoidable risk with timely diagnose, adequate treatment and education in health for pregnant women and their partners.

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Authors' contributions

Cavalcante PAM, Pereira RBL and Castro JGD contributed to all the stages of the manuscript *i.e.*, study conception, data analysis and writing. They approved its final version, ensuring the reliability of data, accuracy and integrity of information.

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