

**CONGENITAL
SYPHILIS IN BRAZIL:
A REFLECTION OF
THE FRAGILITY OF
SCREENING AND
TREATMENT OF
MATERNAL SYPHILIS**

Carolina Ribeiro Mainardi

Universidade do Estado do Pará (UEPA),
Belém/Pará

<http://lattes.cnpq.br/2968187939322362>

Emanuely Magno da Silva

Universidade Federal do Pará (UFPA),
Belém/Pará

<http://lattes.cnpq.br/4314331118543065>

Daniele Socorro de Brito Souza Paiva

Fundação Santa Casa de Misericórdia do
Pará (FSCMP), Belém/Pará

Universidade do Estado do Pará (UEPA),
Belém/Pará

<http://lattes.cnpq.br/1851885133301131>

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Abstract: Goal: The present study aims to verify the relationship between maternal syphilis and congenital syphilis in Brazil. **Methods:** Ecological study, with data referring to syphilis in pregnant women and congenital syphilis in Brazil from 2012 to 2021, obtained from the online platform of Syphilis Indicators of the Ministry of Health. **Results:** A gradual increase in the incidence and detection rate of maternal syphilis and, consequently, of congenital syphilis was observed. A total of 452,826 cases of syphilis in pregnant women and 211,999 cases of congenital syphilis were reported during the study period. In cases of congenital syphilis, the pregnant women received prenatal care (79.5%), and in 53.0% the diagnosis was made during this follow-up, but the treatment was only considered adequate in 4.5%. However, over the years under study, there was a gradual increase in maternal prenatal diagnosis of syphilis in the latent phases and in the 1st trimester. **Conclusion:** Maternal syphilis and congenital syphilis still have a growing number of records. There seem to be improvements in prenatal care regarding the diagnosis of maternal syphilis, but there are still weaknesses, especially in the treatment, still resulting in a significant number of cases of congenital syphilis.

Keywords: Syphilis, Pregnant women, Congenital syphilis, Epidemiology.

INTRODUCTION

Syphilis is a sexually transmitted infection caused by *Treponema pallidum*^{1,2}, which in addition to the sexual route can be transmitted vertically, from mother to child during the gestational period³. In vertical transmission, the infection spreads to the fetus via hematology, predominantly via the placenta, and may cause consequences such as miscarriages, stillbirths, premature birth, infant or neonatal death and early or late

congenital manifestations.^{4,5}

Screening for syphilis in pregnancy recommended by the Ministry of Health must be carried out in the 1st prenatal consultation (preferably in the 1st trimester), at the beginning of the 3rd trimester and in the maternity ward at the time of delivery or abortion⁶. For the diagnosis of syphilis in pregnancy, a non-treponemal test in association with a treponemal test is required⁷. PAHO recommends that 95% of pregnant women have access to at least one prenatal visit and be tested and treated for syphilis.⁵

Penicillin G Benzathine is recommended as the first choice for treatment and it is considered to be adequate when the pregnant woman completes it within 30 days before delivery, the dosage being in accordance with the clinical phase of the disease.^{2,7}

According to the Ministry of Health's 2022 epidemiological bulletin on syphilis, in Brazil, from 2011 to 2021, 466,584 cases of syphilis were reported in pregnant women, 221,600 cases of congenital syphilis and 2,064 deaths from congenital syphilis, the detection rates for pregnant women with syphilis have maintained growth, but with less intensity from 2018 onwards. The incidence of congenital syphilis, between 2011 and 2017, showed an average increase of 17.6%, followed by stability in subsequent years and an increase of 16.7% in 2021.⁸

Syphilis infection requires compulsory notification to contribute to epidemiological incidence investigations. The first to become compulsory notification was congenital syphilis in 1986, while gestational syphilis and acquired syphilis have their mandatory notification from 2005 and 2010, respectively, which represents an instrument of epidemiological surveillance^{8,4}. The notification feeds the Notifiable Diseases Information System (SINAN), and its data help in actions, monitoring and programs for

syphilis control.⁹

Thus, it is understood that epidemiology, through the analysis of time series, has expanded access to health information and contributed to the identification of the behavioral characteristics of several diseases, especially syphilis, based on its distribution over time and in space. These tools allow the planning of health actions, based on the identification of areas of concentration and the movement of cases over time³.

GOALS

The present study has the general objective of verifying the incidence relationship between maternal syphilis and congenital syphilis in Brazil and, as specific objectives, to present the number of cases and the detection rate of syphilis in both pregnant and congenital syphilis, gross coefficient of mortality due to congenital syphilis and to correlate maternal diagnosis and treatment with the incidence of congenital syphilis.

METHOD

This is an ecological study, with data referring to syphilis in pregnant women and congenital syphilis in Brazil from 2012 to 2021, obtained from the online platform Indicators and Basic Data of Syphilis in Brazilian Municipalities of the Department of Diseases, Chronic Conditions and Sexually Infected Diseases (DCCI) of the Ministry of Health (MS), based on SINAN. The investigated variables were: number of reported cases and detection rate of syphilis in pregnant women and congenital syphilis; crude coefficient of mortality from congenital syphilis; final diagnosis of congenital syphilis; prenatal care, time of diagnosis of maternal syphilis and treatment scheme of the mother in cases of congenital syphilis; gestational period and clinical classification of pregnant women notified with syphilis. For data

analysis, The data were organized into tables and graphs in Microsoft Office Excel 2016 and Microsoft Word 2016. Because we used an online platform of the Ministry of Health, whose data are available for free access, this study did not require approval by an ethics committee in research with human beings.

RESULTS

During the study period, 452,826 cases of syphilis in pregnant women and 211,999 cases of congenital syphilis were reported. A progressive increase in notifications of syphilis in pregnant women over the years was observed, in 2012 there were 16,438, reaching 74,095 in 2021 (n:74,095) (Table 1).

Likewise, notifications of congenital syphilis were 11,743 cases in 2012, gradually increasing until 2018 (26,839), with a slight decrease in cases in 2019 (25,387) and 2020 (23,578), but with a peak in 2021 (27,019). However, the ratio between the number of cases of congenital syphilis and maternal syphilis decreased over the years surveyed, in 2012 it corresponded to 0.71, reaching 0.36 in 2021. (Table 1).

The detection rate for every 1,000 live births of both forms of syphilis (maternal and congenital) also showed an increasing increase, in 2012 it represented 5.7 and 4.0, respectively, and in 2021 it was 27.1 and 9.9 (Table 1).

Regarding congenital syphilis, about 93% of notifications are in the early form. It is worth mentioning that, in addition to the increase in cases in children under one year old, an increase in the incidence of miscarriages and stillbirths due to syphilis was also observed (Table 2).

Likewise, an increase in the crude coefficient of mortality from congenital syphilis in children under one year old was observed, with its peak in 2018 (Graph 1).

In most cases of congenital syphilis,

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Syphilis in pregnant women | 16,438 | 20,916 | 26,624 | 32,783 | 38,305 | 49,845 | 63,407 | 64,578 | 65,835 | 74,095 | 452,826 |
| Congenital syphilis | 11,743 | 14,115 | 16,491 | 19,913 | 21,547 | 25,367 | 26,839 | 25,387 | 23,578 | 27,019 | 211,999 |
| Congenital syphilis/maternal syphilis | 0.71 | 0.67 | 0.62 | 0.61 | 0.56 | 0.51 | 0.42 | 0.39 | 0.36 | 0.36 | -- |
| Detection rate (pregnant women) | 5.7 | 7.2 | 8.9 | 10.9 | 13.4 | 17.0 | 21.5 | 22.7 | 24.1 | 27.1 | -- |
| Detection rate (congenital) | 4.0 | 4.9 | 5.5 | 6.6 | 7.5 | 8.7 | 9.1 | 8.9 | 8.6 | 9.9 | -- |

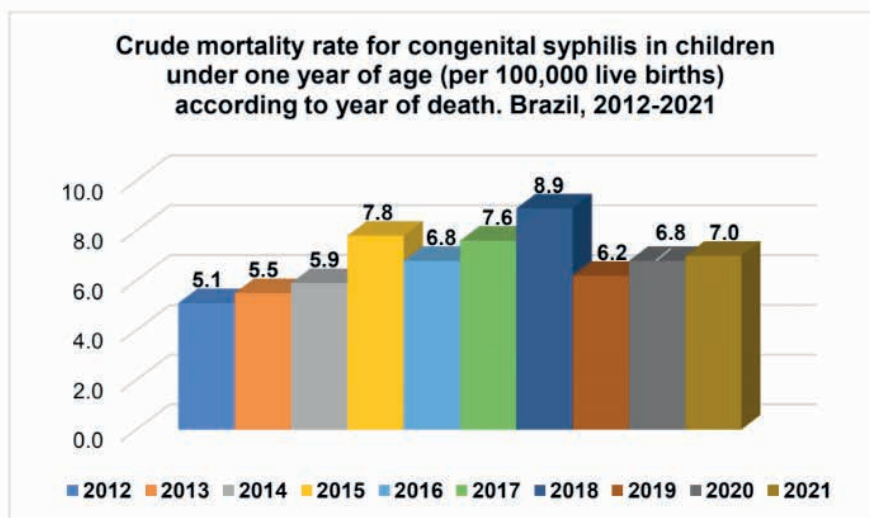
Table 1– Number of cases and detection rate of syphilis in pregnant women and congenital syphilis in children under one year of age (per 1,000 live births) per year of diagnosis. Brazil, 2012 - 2021.

Source: Mainardi; Silva; Paiva, 2023. Data extracted from the Syphilis Indicators / DCCI, 2023.

| Final Diagnosis | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| recent congenital syphilis | 10,681 | 13,077 | 15,214 | 18,468 | 20,106 | 23,627 | 25,124 | 23,757 | 21,977 | 25,216 |
| late congenital syphilis | 25 | 10 | 26 | 39 | 40 | 35 | 41 | 53 | 28 | 27 |
| syphilis abortion | 457 | 473 | 630 | 709 | 739 | 897 | 917 | 942 | 867 | 1,026 |
| Stillbirth due to syphilis | 580 | 555 | 621 | 697 | 662 | 808 | 757 | 635 | 706 | 750 |

Table 2- Cases of congenital syphilis according to final diagnosis by year of diagnosis. Brazil, 2012 - 2021.

Source: Mainardi; Silva; Paiva, 2023. Data extracted from the Syphilis Indicators / DCCI, 2023.



Graphic 1:Crude mortality rate for congenital syphilis in children under one year of age (per 100,000 live births) by year of death. Brazil, 2012-2021

Source: Mainardi; Silva; Paiva, 2023. Data extracted from the Syphilis Indicators / DCCI, 2023.

pregnant women received prenatal care (79.5%), ranging from 73.3% (2012) to 82.7% (2021). Furthermore, a reduction of pregnant women who did not undergo this follow-up was noted, from 20.6% (2012) to 11.4% (2021) (Graph 2).

Regarding the time of diagnosis of maternal syphilis in cases that progressed to congenital syphilis, an increase in prenatal diagnosis was observed (42.3% in 2012 and 57.1% in 2021), on the other hand, there was a gradual reduction in the time of childbirth/curettage and postpartum, respectively 41.3% and 11.0% in 2012 and 31.5% and 5.5% in 2022. As for maternal treatment, it was considered adequate only in 4.5%, inadequate in 54.9% and not performed in 28.3% (Graph 2).

Still in relation to the maternal treatment of pregnant women with syphilis, data are available on the medication used only from 2018 and in 89.5% the treatment performed was with Penicillin.

Due to the importance of the diagnosis of maternal syphilis in the control of cases of congenital syphilis, the gestational period and the clinical classification of pregnant women notified with syphilis were analyzed (Graph 3).

A gradual increase in diagnoses was observed in the 1st quarter, 23.2% in 2012 and 42.2% in 2021, and a reduction in the 2nd and 3rd quarters. Likewise, the diagnosis of latent syphilis increased progressively, from 19.5% (2012) to 38.0% (2021), with a decrease in other clinical forms (Graph 3).

DISCUSSION

An increase in the diagnosis of maternal syphilis was identified, with a direct impact on the increase in the diagnosis of congenital syphilis. Several studies corroborate this increase in Brazil and also in other countries in Latin America.¹⁰

The number of syphilis cases in pregnant

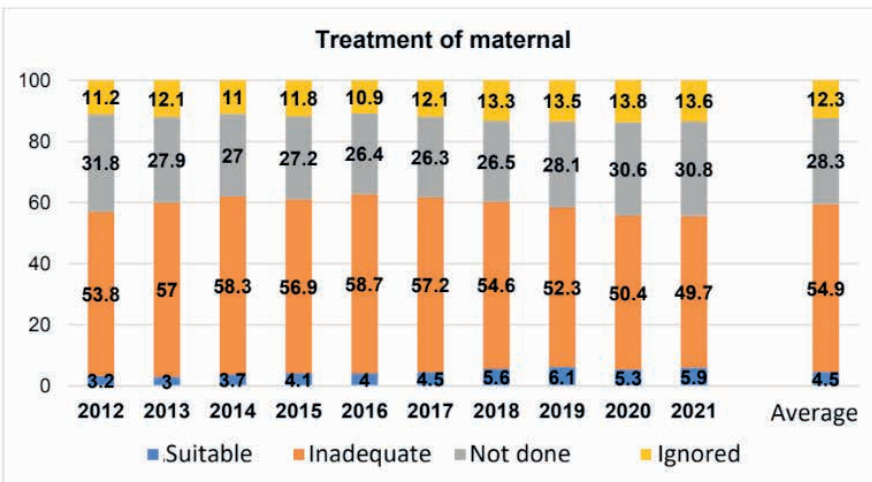
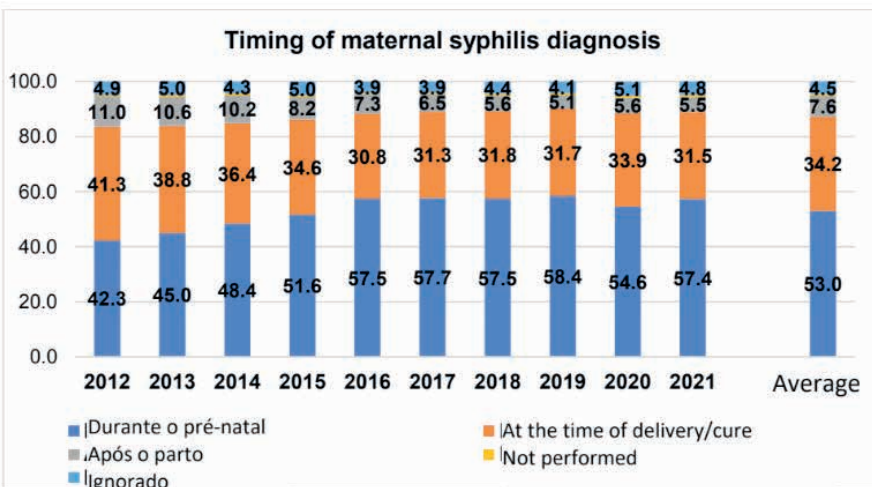
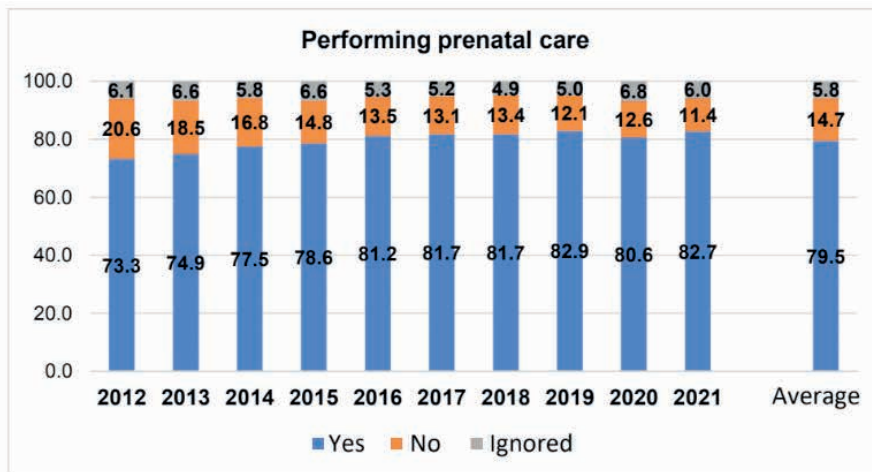
women may result from the increase in the number of cases per se, but also, in part, from the better availability of screening tests. Figueiredo et al. reported a directly proportional relationship between the diagnosis of maternal syphilis and the availability of rapid tests in primary care, as well as an inversely proportional relationship between the accessibility of treatment with Penicillin and cases of congenital syphilis.¹¹

Accordingly, according to Ramos et al., when low rates of congenital syphilis are identified in association with high rates of syphilis in pregnant women in a given region, this may be related to accessibility to diagnostic serological tests and also to effective and timely treatment of pregnant women, with consequent prophylaxis of vertical transmission.¹²

Despite this gradual increase in both maternal and congenital syphilis, there seems to be improvements in maternal care, since congenital syphilis did not show a proportional growth in the number of cases for pregnant women, which is confirmed by the ratio of the number of cases to each other.

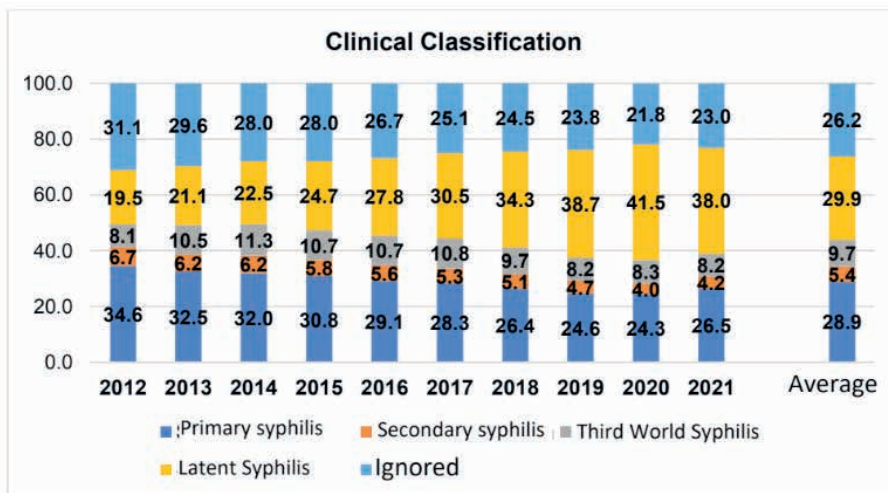
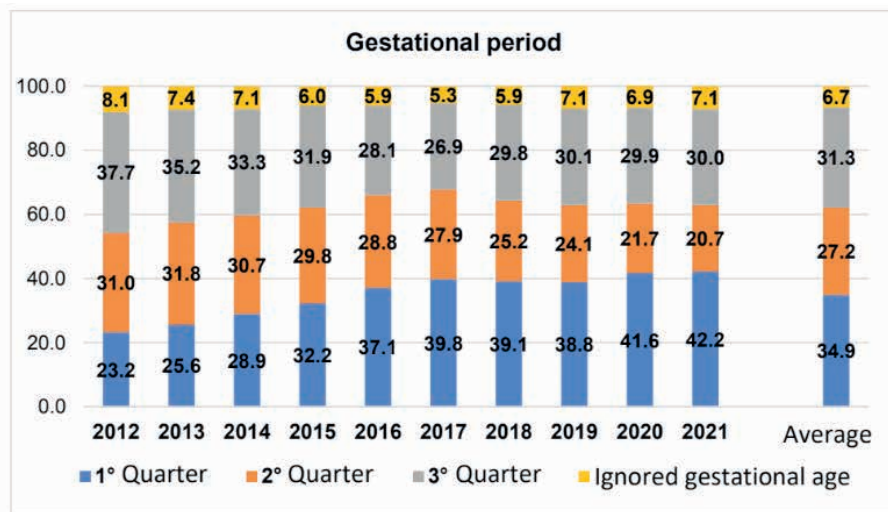
The increase in the number of cases of congenital syphilis was also accompanied by an increase in the gross coefficient of mortality in children under one year old caused by this infection, a situation that can be prevented with adequate treatment. Likewise, miscarriages and stillbirths due to syphilis could have been avoided. Bezerra et al. identified an increase in perinatal and infant mortality due to syphilis, associated with high rates of congenital syphilis and inefficiency of prenatal care.¹³

It is noted that most maternal diagnoses of cases of congenital syphilis were made during the prenatal period, however, this number is almost proportional to the diagnoses made at the time of delivery added to the postpartum period. This indicates that prenatal coverage



Graph 2: Percentage distribution of cases of congenital syphilis according to information on prenatal care, time of diagnosis of maternal syphilis and maternal treatment, by year of diagnosis. Brazil, 2012-2021.

Source: Mainardi; Silva; Paiva, 2023. Data extracted from the Syphilis Indicators / DCCI, 2023.



Graph 3: Percentage distribution of cases of maternal syphilis according to gestational age and clinical classification, by year of diagnosis. Brazil, 2012-2021.

Source: Mainardi; Silva; Paiva, 2023. Data extracted from the Syphilis Indicators / DCCI, 2023.

in Brazil still does not satisfactorily provide screening for maternal syphilis, causing patients to receive the diagnosis at the time of delivery or after delivery, when it is no longer possible to prevent congenital syphilis.

Quality prenatal care is extremely important for screening syphilis during pregnancy, with consequent treatment and monitoring, a strategy for preventing vertical transmission.¹⁴

In agreement, Domingues observed the incidence of congenital syphilis and factors associated with vertical transmission of syphilis, where babies who had congenital syphilis had mothers with less prenatal care, in addition to starting care later and registering less adequacy in the number of consultations. Pregnant women diagnosed with syphilis, but with no congenital syphilis outcome, had a higher proportion of serology tests for syphilis during pregnancy, demonstrating that the effectiveness of prenatal care has an effective impact on congenital syphilis.¹⁵

Improvements in prenatal care may be related to the increase in the diagnosis of syphilis in the 1st trimester of pregnancy and in the latent phase, a window of opportunity for treatment. However, the growing number of cases of congenital syphilis demonstrates the weaknesses of this service.¹²

this phraseology is ratified by the finding that in more than half of the cases of congenital syphilis, maternal treatment was considered inadequate, not being efficient in reducing congenital syphilis, even when using the recommended medication.

Therefore, syphilis in pregnant women presents an increasing number of cases, and prenatal care is still unable to play its role in preventing vertical transmission in its entirety. Investments in public health are necessary, with accessibility to quality prenatal care, adequate screening and treatment of syphilis in pregnant women as a timely and effective

measure for the prevention of congenital syphilis. In short, congenital syphilis in Brazil is still a reflection of the fragility of screening and treatment of maternal syphilis.

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