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EPIDEMIOLOGICAL PROFILE OF CONGENITAL SYPHILIS CASES IN BRAZIL: ANALYSIS OF CASES BETWEEN 2019 AND 2023

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ABSTRACT

INTRODUCTION: Congenital syphilis (CS) is an infectious-contagious disease, of compulsory notification, caused by the bacterium Treponema pallidum, considered a sentinel event of the quality of prenatal care and responsible for unfavorable outcomes such as fetal or perinatal death, prematurity, low birth weight, neurological lesions and other sequelae, as well as important direct and indirect costs in public health. OBJECTIVE: To analyze the epidemiological profile of congenital syphilis in the state of Piauí from 2019 to 2023. MATERIAL AND METHODS: This is an epidemiological study with a quantitative approach, based on data obtained from the Department of Information and Informatics of the Unified Health System (DATASUS) of CS cases notified in the period from 2019 to 2023, considering the variables: year of notification, macro-regions, prenatal follow-up, and age group at diagnosis, seeking to identify epidemiological patterns and associations between the variables studied. RESULTS AND DISCUSSION: Between 2019 and 2023, the analysis of congenital syphilis in Brazil shows a high prevalence of recent cases, with regional inequalities and failures in prenatal care and in the treatment of partners. Even with 82.3% of pregnant women in prenatal care, the lack of treatment for 49.7% of the partners promotes reinfection and vertical transmission. The high rate of stillbirths and miscarriages (3.9%) highlights the impact of untreated syphilis, indicating the need to strengthen prenatal care, ensure treatment for partners, and adapt surveillance according to regional demands. CONCLUSION: It is concluded that congenital syphilis continues to be a critical public health problem in Brazil, aggravated by the low adherence to treatment of partners and

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regional disparities in access to health. Although most pregnant women receive prenatal care, the lack of comprehensive treatment compromises the control of vertical transmission and results in serious consequences, such as stillbirths and miscarriages. To address this challenge, it is necessary to strengthen prenatal care and include the partner in treatment, with public health policies that ensure adequate monitoring and care in all regions.

Keywords: Congenital Syphilis. Epidemiology. Brazil.

INTRODUCTION

Syphilis is a systemic infection caused by Treponema pallidum (T. pallidum), exclusive to humans, and which, when not treated early, can progress to a chronic disease with irreversible long-term sequelae. It is transmitted predominantly sexually and vertically. During the natural evolution of the disease, periods of activity with distinct clinical, immunological, and histopathological characteristics occur, interspersed with periods of latency, during which the presence of signs or symptoms is not observed (Simms et al., 2019).

Vertical syphilis contamination is the transmission of the Treponema pallidum bacterium from the infected mother to her baby during pregnancy or childbirth. This transmission can occur at any time during pregnancy. When the bacteria crosses the placental barrier, it can infect the fetus and cause congenital syphilis, which can lead to serious complications such as malformations, miscarriage, premature birth, or even neonatal death. This condition is highly preventable through early diagnosis and treatment of maternal syphilis, preferably with benzathine penicillin (Oliveira et al., et al 2019).

Early diagnosis and treatment of syphilis in pregnant women are essential for the prevention of congenital syphilis and its serious consequences for the fetus. Diagnosis is carried out mainly through serological tests, such as the rapid test and VDRL, recommended for all pregnant women during prenatal care, repeated in the third trimester and at the time of delivery in regions of high prevalence (Domingues et al 2017). The standard treatment is benzathine penicillin, the only antibiotic with proven efficacy in preventing vertical transmission of Treponema pallidum. Adequate and timely application of treatment is essential, as the absence or delay in treatment of maternal infection increases the risk of adverse outcomes (Silva et al., 2020).

Infected newborns can present with a wide range of symptoms, from early manifestations, such as skin lesions, hepatosplenomegaly, and anemia, to late complications, including bone, neurological, and auditory changes Congenital syphilis is considered a serious public health problem, especially in low- and middle-income countries, where barriers to access to prenatal care and appropriate treatment still pose significant challenges to eradicating this condition (Korenromp et al., 2020).

Congenital syphilis represents a preventable public health problem, but it continues to have high incidence rates in several regions, especially in developing countries. Through epidemiological analysis, it is possible to identify more vulnerable populations, monitor the effectiveness of prevention strategies, such as prenatal care and appropriate treatment of pregnant women, and assess the impact of interventions over time. In this way, it guides the

allocation of resources, adjust care protocols and reinforce education and screening actions, directly contributing to the reduction of cases and to the improvement of the quality of life of mothers and newborns.

METHODOLOGY

This study is characterized as a descriptive, retrospective epidemiological research with a quantitative approach, based on secondary data. The objective is to analyze the epidemiological profile of congenital syphilis in the state of Piauí from 2019 to 2023.

The main objective of this descriptive study is to describe the characteristics and distribution of health events in a population. This type of research examines variables such as the frequency, distribution of diseases, or health conditions, considering aspects such as time, place, and person (Friis and Sellers, 2020). Retrospective, on the other hand, is an observational study in which data is collected based on events that have already occurred. This type of research examines past or historical records to identify associations between exposure factors and health outcomes (Merrill 2023).

The quantitative approach is a systematic and structured method of scientific research that uses numerical data to examine relationships and measure variables. This type of research focuses on the quantification of information, which allows for statistical analysis and the possibility of generalizing the results to a wider audience (Fowler 2020).

The research involves only secondary information in the public domain and, therefore, does not require the approval of the Ethics Committee, according to Resolution 466/2012 of the National Council for Ethics in Research. The study population was composed of notifications of congenital syphilis that occurred in Piauí in the period between 2019 and 2023, registered on the DATASUS platform.

Data were collected in a secondary way from the health information system through the electronic platform of the Department of Informatics of the Unified Health System, at the electronic address www.datasus.gov.br. Data collection was carried out in November 2024 by the researchers themselves. To obtain the data, the following indicators were used: prenatal care, year, region, classification and treatment of partner.

Information from notifications of hospitalization for iron deficiency anemia in Brazil, registered in DATASUS, which were not within the sample from 2019 to 2023, were excluded from the survey.

Subsequently, the data were organized in Excel tables and then interpreted and presented in charts and graphs. In addition, to ensure a comprehensive and diversified

discussion, a search of the academic literature was carried out using the PubMed, Scopus, SciELO (Scientific Electronic Library Online) and Google Scholar databases.

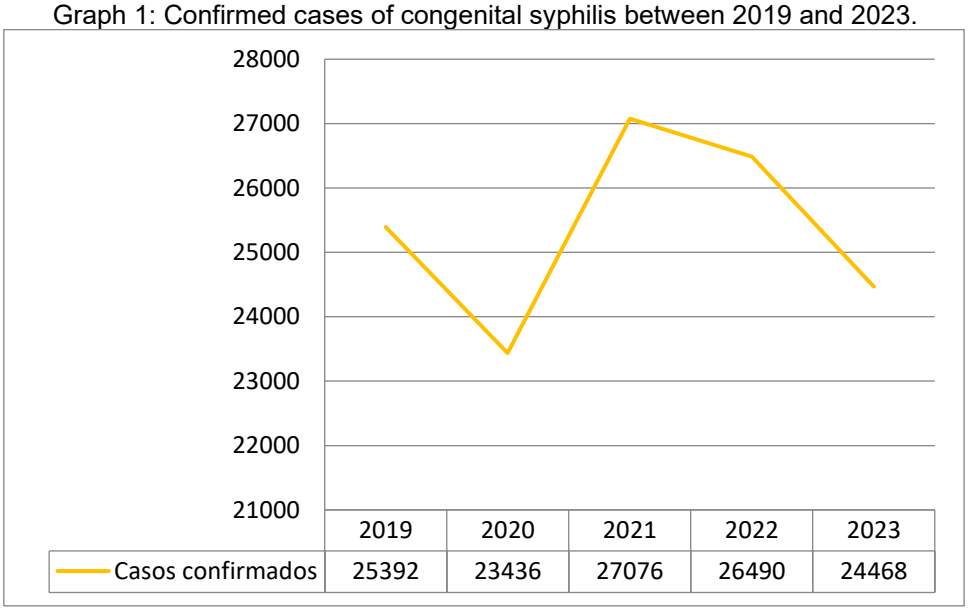
RESULTS

Based on the data analyzed on the prevention, diagnosis and treatment of congenital syphilis, we infer that 126,862 cases were reported during the analyzed period.

Of the reported cases, 104,395 (82.3%) reported prenatal care, while 15,618 (12.3%) pregnant women did not undergo prenatal care, and 6,849 (5.4%) had this information ignored. Prenatal care is crucial for early diagnosis and preventive treatment of congenital syphilis, but the high proportion of cases without prenatal care or with unknown data indicates a significant gap in preventive care.

Between 2019 and 2023 (Graph 1), there was a variation in the number of cases, with a peak in 2021, when 27,076 cases were recorded. In the following years, this number decreased, with 26,490 in 2022 and 24,468 in 2023. The reduction in the number of cases in 2020, with 23,436 cases, which is associated with the challenges of the COVID-19 pandemic, which affected pregnant women's access to proper diagnosis and treatment.

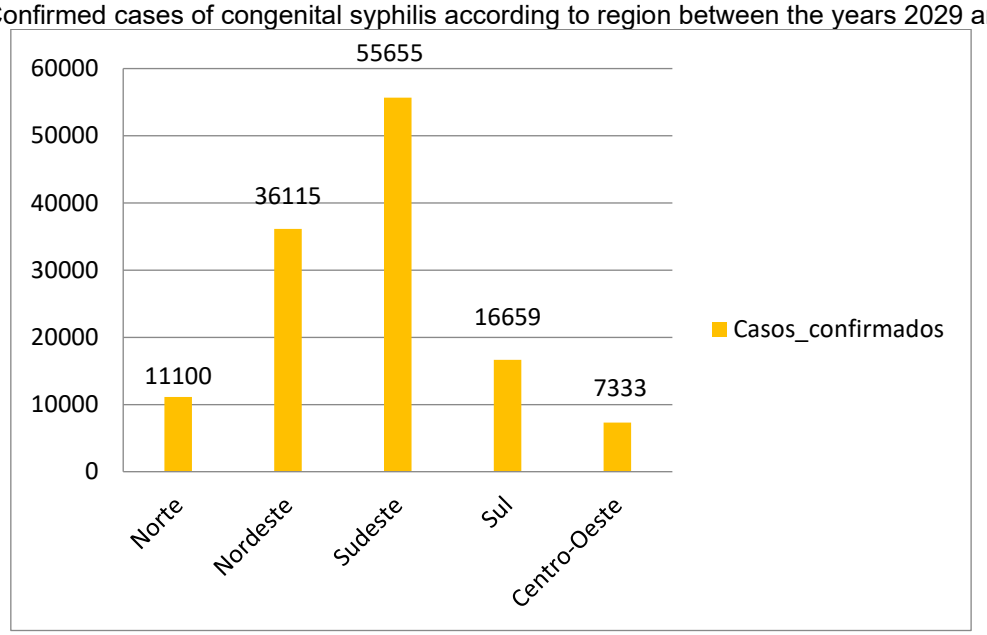
Graph 1: Confirmed cases of congenital syphilis between 2019 and 2023.



Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

Regarding the distribution of cases by region (Graph 2), it reveals significant disparities: the Southeast is the region with the highest number of cases, with 55,655 (43.8%), followed by the Northeast with 36,115 cases (28.5%), the South with 16,659 (13.1%), the North with 11,100 (8.7%) and the Midwest with 7,333 (5.8%). These regional differences may reflect variations in access to health services, as well as socioeconomic differences and in the coverage of prevention policies.

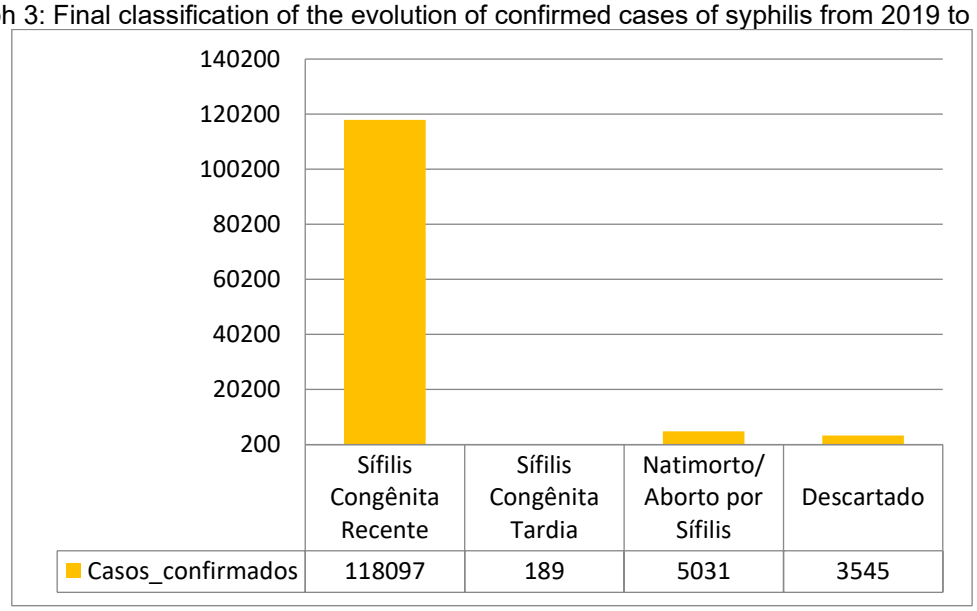
Graph: Confirmed cases of congenital syphilis according to region between the years 2029 and 2023.



Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

In addition, most of the cases 118,097 (92.5%) were of recent congenital syphilis, while 189 (0.1%) were classified as late congenital syphilis. In addition, 5,031 (3.9%) cases of stillbirth/abortion due to congenital syphilis were recorded, an alarming number that points to the serious impact of untreated infection. There were also 3,545 cases (2.8%) discarded (Graph 3). The predominance of recent syphilis cases proves that most infections occurred during or shortly before pregnancy, which reinforces the need for early diagnosis and treatment to reduce the risk of serious complications.

Graph 3: Final classification of the evolution of confirmed cases of syphilis from 2019 to 2023.

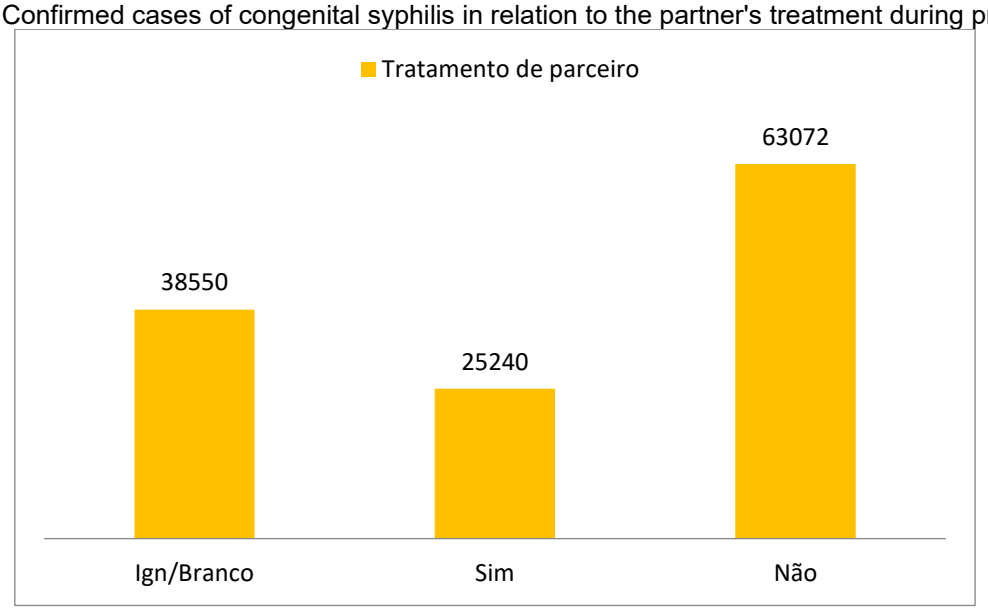


Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

In addition, among the cases recorded, only 25,240 (19.9%) indicated that the partner was treated, while 63,072 (49.7%) partners were not treated, and in 38,550 (30.4%)

of the cases the information was ignored (Graph 4). Treatment of the partner is essential to avoid reinfection in pregnant women, but data show low adherence to this practice. This low adherence highlights a critical point in the prevention of new cases of congenital syphilis and highlights the need for public health strategies that include the partner in the treatment process.

Graph 4: Confirmed cases of congenital syphilis in relation to the partner's treatment during pregnancy.



Source: Ministry of Health/SVS - Notifiable Diseases Information System - Sinan Net.

DISCUSSION

Congenital syphilis is an infectious disease of compulsory notification, caused by the bacterium Treponema pallidum (TP) and has high rates of vertical transmission. It is considered an important indicator of the quality of prenatal care and, if not diagnosed early, is responsible for unfavorable outcomes such as fetal or perinatal death, miscarriage, prematurity, fetal neurological sequelae and other complications (DA SILVA FEITOSA; DA ROCHA; COSTA, 2016).

Vertical transmission occurs when the pregnant woman is infected and transmits the spirochete bacteria to the fetus, and can happen before, during or after birth. In most cases, transmission is intrauterine, transplacental, it is also possible to occur during delivery and breastfeeding, if there is contact of the newborn (NB) with maternal lesions. It is known that the infection can already be transmitted in the first trimester, although the risk increases considerably as pregnancy progresses, being more frequent in the second and third trimesters. In addition, the risk of maternal-fetal transmission is closely related to the stage of infection in the mother. The primary and secondary stages of syphilis are the most at risk of transmission (with rates ranging from 60 to 100%), with transmission being most likely in

the secondary stage. On the other hand, early and late latent syphilis have lower transmission rates, about 40% and 8%, respectively (DOMINGUES et al., 2024)

When crossing the placental barrier, the bacterium spreads throughout the fetus' body, and can affect several organs, since the fetal immune response, still in development, does not have full defense capacity against infection. The placenta, although it exerts a certain degree of protection, does not completely prevent the passage of Treponema pallidum. Therefore, the effects of syphilis may be more severe in babies born to mothers with untreated or inadequately treated infection (CASELLI et al., 2022).

The clinical manifestations of congenital syphilis can be divided into two categories: early and late. Early congenital syphilis is the most severe form and occurs in the first two years of life, it can be asymptomatic in approximately 70% of cases, which makes its diagnosis difficult (GUERRA et al., 2017).

In the first months of life, the baby may present symptoms such as nasal congestion, bullous skin rashes, especially on the palms of the hands, soles of the feet and periorificial regions. These lesions are often accompanied by epidermal scaling. The clinical picture also includes hepatomegaly and splenomegaly, diffuse liver fibrosis, hemolytic anemia associated with jaundice, and painful osteochondritis and periostitis. Although periostitis can affect all bones, nasal and lower leg lesions are particularly characteristic of this form of the disease. Destruction of the vomer bone, located in the nose, can lead to the collapse of the nasal bridge, resulting in the deformity known as "saddle nose." In more severe cases, a disturbance occurs in the formation of the endochondral bone, which causes the epiphyses of the bones to widen due to the excessive growth of cartilage. (GUERRA et al., 2017).

Late congenital syphilis, on the other hand, manifests itself after the first two years of life and is characterized by chronic sequelae. The most common clinical signs are represented by a triad composed of interstitial keratitis, Hutchinson's teeth (deformed upper median incisor teeth), and deafness of the eighth cranial nerve. In addition, children with late congenital syphilis may develop osteochondritis and deformities in the joints, shortened jaw, elevation of the palatal arch, "Olympipic" forehead, arthritis of "clutton" and tibial periostitis, a condition in which the bone has an anomalous curvature and increased volume on the anterior surfaces, which can result in problems with growth and mobility. Although late congenital syphilis is less severe than the early form, it can still cause significant deficiencies in the child's development and quality of life, if not treated properly (BRASIL, 2006).

Timely diagnosis is essential and serological tests are performed in patients suspected of having syphilis in order to identify the disease early and be able to adopt appropriate prophylactic measures (SUTO CSS, et al., 2016).

During prenatal care, VDRL (*Veneral Diseases Research Laboratory)* testing is mandatory. Serological tests are divided into two types: treponemal and non-treponemal. The most commonly used non-treponemal tests are VDRL and RPR (*Rapid Plasm Reagin*), being quantitative and titratable, and are useful for diagnosis and post-therapeutic follow-up. These tests are usually reactive from the second week after the appearance of hard chancre (primary syphilis), on average 21 days after the infective contact, and present progressive titers, with higher values in the secondary phase of the disease (BRASIL, 2012).

Treponemic tests, in turn, detect the presence of *anti-Treponema pallidum antibodies, being* specific and qualitative, confirming the infection. They are represented by the FTA-Abs (*Fluorescent Treponema Antibody Absorbent Test*), the MH-TP (Micro-Hemagglutination for *Treponema pallidum* or TPHA), the Elisa (enzyme-linked immunosorbent test), the *Western blotting* (WB) and the immunochromatographic tests (rapid tests). It is worth noting that they do not distinguish whether it is an active disease or a serological scar (BRASIL, 2012).

In this sense, the newborn child, in which the mother is considered positive for syphilis at the time of delivery or has a previous history of the disease, or when the pregnant woman is a carrier of syphilis inappropriately during prenatal care, regardless of the VDRL result, is mandatory to perform the VDRL test (DA SILVA BONFIM et al., 2021).

The Brazilian Ministry of Health's gold standard treatment for children with congenital syphilis is the application of Benzylpenicillin (crystalline, procaine, or benzathine), with benzathine benzylpenicillin (penicillin G) being the only drug with proven efficacy for the treatment of pregnant women with syphilis and in preventing vertical transmission of this infection (NOVAIS et al, 2024).

The therapeutic protocol includes crystalline penicillin G at a dose of 50,000 IU/Kg, intravenously, every 12 hours in the first 7 days of life and every 8 hours until completing 10 days, or penicillin G procaine 50,000 IU/Kg, a single daily dose, intramuscularly for 10 days, which is indicated in the following situations: symptomatic newborn, with clinical, serological, radiological and/or hematological alterations, whose mother with syphilis was adequately treated, or whose mother with syphilis was not treated or was inadequately treated (treatment performed with penicillin before 30 days of delivery, or without penicillin); and in newborns of treated mothers, who have VDRL higher than the maternal one, or

lower than or equal to the maternal one without the possibility of clinical follow-up, both cases with alterations in the exams. In cases of cerebrospinal fluid alterations, only the crystalline penicillin G regimen is used (SONDA et al., 2013).

In the case of asymptomatic newborns of inadequately treated mothers, or mothers treated without the possibility of clinical follow-up, both cases with negative tests and VDRL; and in newborns of treated mothers, who have VDRL lower than or equal to the maternal one, with the other negative tests, treatment with benzathine penicillin G, 50,000 IU/Kg, in a single intramuscular dose is indicated (SONDA et al., 2013).

From this perspective, ensuring and expanding quality care throughout pregnancy and the puerperium is essential to minimize cases of vertical transmission of syphilis. The increase in the number of cases reflects the low quality of care, especially failures such as: the late start of prenatal care, a break in the continuity of care, difficulty in diagnosing syphilis during pregnancy, in addition to the low socioeconomic level, associated with low education, since this scenario contributes to the lack of understanding about STIs and the care to be taken in prenatal care (DOMINGUES et al., 2013).

CONCLUSION

It is concluded that, according to the data analyzed, there is a high prevalence of recent congenital syphilis, with a significant impact on neonatal health, as demonstrated by the high rate of stillbirths and miscarriages. The analysis showed that, despite a high coverage of prenatal care, there are still gaps in the completeness of the data and in the treatment of partners, with direct consequences for the control of congenital syphilis. The discrepancy in regional distribution highlights the importance of differentiated interventions, considering the specificities and needs of each region.

Thus, public health strategies focused on increasing access to prenatal care, strengthening adherence to treatment by partners, and improving epidemiological surveillance are essential to reduce the incidence of congenital syphilis and mitigate its complications. The development of educational campaigns and the improvement of prevention policies are crucial to address this problem and promote a positive impact on neonatal health.

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