


## FACTORS RELATED TO GESTATIONAL AND CONGENITAL SYPHILIS: A SCOPING REVIEW

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### ABSTRACT

Introduction: Gestational and congenital syphilis is a preventable public health problem, associated with serious outcomes such as miscarriages, stillbirth, and neurological sequelae in newborns, as well as complications for pregnant women, such as cutaneous, cardiovascular, and neurological lesions. Identifying the factors associated with gestational and congenital syphilis infection is essential to understand the specific needs of different Brazilian populations and improve the supply of resources and services. Objective: To

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analyze the evidence available in the literature on factors associated with gestational and congenital syphilis infection in Brazilian municipalities. Materials and methods: This is a scoping review conducted according to the Joanna Briggs Institute and reported based on the PRISMA-ScR checklist. The Population, Concept, and Context (PCC) strategy was used to develop the research question. Electronic searches were performed in the CINAHL, EMBASE, LILACS, MEDLINE, SciELO, Scopus and Web of Science databases, as well as Google Scholar and Networked Digital Library of Theses and Dissertations. Results: Factors associated with infection included pregnant women under 30 years of age, with low schooling, black or brown, single and inactive professionals. Unprotected sexual intercourse, late start of prenatal care, low adherence, fewer consultations and serological tests, in addition to difficulties in managing syphilis in Psychosocial Care Centers for pregnant women with chemical dependency. Conclusion: The studies indicate that the main causes of gestational and congenital syphilis are due to socioeconomic and regional inequalities and inequalities in access to health services, aggravated by late diagnosis and inadequate treatment.

**Keywords:** Congenital Syphilis. Maternal and Child Health. Vertical Transmission of Infectious Diseases.

## INTRODUCTION

Syphilis is an infection of bacterial origin caused by *Treponema pallidum*, which represents a significant public health problem, with direct repercussions for maternal and child health <sup>(1)</sup>. Gestational syphilis, when not diagnosed or inadequately treated, can lead to vertical transmission of the infectious agent to the fetus, resulting in congenital syphilis. It is associated with severe outcomes, such as miscarriages, stillbirth, and neurological sequelae in newborns, as well as complications for the pregnant woman, such as cutaneous, cardiovascular, and neurological lesions <sup>(2)</sup>.

The epidemiology reveals a continuous growth of the infection where in the period from 2010 to 2016, an increase in gestational syphilis from 3.5 to 12.4 cases per thousand live births was registered, while from 2.4 to 6.8 cases per thousand live births of congenital syphilis <sup>(3)</sup> were registered. In 2022, Brazil recorded more than 60 thousand cases of syphilis in pregnant women and more than 4 thousand cases of congenital syphilis, with an incidence rate of 10.7 cases per thousand live births <sup>(4)</sup>. This panorama highlights the persistence of failures in the early diagnosis and appropriate treatment of pregnant women, factors that directly contribute to the increase in vertical transmission <sup>(5)</sup>.

Congenital syphilis is one of the main preventable causes of neonatal morbidity and mortality in developing countries, such as Brazil. Several factors are related to the high prevalence of this infection, including socioeconomic, behavioral, cultural, and structural aspects <sup>(6)</sup>. Lack of access to quality health services, especially in peripheral and hard-to-reach areas, limits the ability to screen and treat effectively <sup>(4,7)</sup>. In many regions of Brazil, access to routine prenatal care is precarious and universal coverage of syphilis testing is still uneven, resulting in pregnant women who are not diagnosed or do not receive adequate treatment in time <sup>(7)</sup>.

Studies reveal that the lack of adequate access to health care, insufficient health education for pregnant women are some of the main social determinants of infection. In addition, the lack of adherence to the recommended treatment and the barriers in accessing adequate prophylactic therapies, such as the use of penicillin, contribute substantially to the spread of the disease and its neonatal complications <sup>(8,9)</sup>.

Identifying and understanding these factors is essential for the improvement of public policies and the implementation of more effective interventions <sup>(9)</sup>. Detailed knowledge about the underlying causes of the high incidence of gestational and congenital syphilis makes it possible to create prevention strategies that are more targeted and

adapted to the specific needs of different populations, especially those in greater social vulnerability <sup>(5,7)</sup>.

By bringing together the main factors related to gestational and congenital syphilis, this review will contribute to a more comprehensive understanding of the underlying causes of this infection in Brazil and will contribute to reflections on the implementation of more effective public health strategies targeted to the needs of Brazilian municipalities. The identification of these factors and the improvement in diagnostic and treatment approaches are essential to reduce vertical transmission of syphilis, reduce inequalities in access to health, and improve maternal and child health in Brazil and in other countries with similar epidemiological contexts <sup>(4)</sup>.

Thus, the objective of this study was to analyze the evidence available in the literature on the factors associated with gestational and congenital syphilis infection in Brazilian municipalities. The critical analysis of the available evidence will allow the identification of gaps in current knowledge, in addition to providing subsidies to improve public policies aimed at reducing the burden of this infection.

## **MATERIALS AND METHODS**

This is a scoping review that was conducted in accordance with the guidelines of the *Joanna Briggs Institute and described according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)*<sup>(10,11)</sup> checklist.

To prepare the research question, the Population, Concept, and Context (PCC) strategy was used for scoping review <sup>(11,12)</sup>. The population (P) of this study was composed of pregnant women with syphilis and babies with congenital syphilis. Concept (C) was syphilis infection, and context (C) was aspects associated with gestational and congenital syphilis infection in Brazilian municipalities. Composing the key topics of the PCC and relating them to the objective of this study, the research question was: "what are the associated factors for gestational and congenital syphilis infection in Brazilian municipalities?".

The electronic search of the published scientific production took place from February to September 2024 based on the search strategies presented in Figure 1, using the descriptors (DeCS and MeSH) and alternative terms combined with the Boolean operators AND and OR. The following sources were explored: CINAHL (via EBSCOhost);

EMBASE; Latin American and Caribbean Literature in Health Sciences – LILACS (via Virtual Health Library – VHL); MEDLINE (via PubMed); Scientific Electronic Library Online – SciELO; Scopus and Web of Science (Core Collection). For unpublished studies and gray literature, the following sources were considered: Google Scholar and Networked Digital Library of Theses and Dissertations – NDLTD (via Global ETD Search). In these sources, different search strategies were used according to the specificity of each site.

Chart 1 - Search strategy in the database.

Databases	Search strategy
CINAHL	( MH "Syphilis" OR "Syphilis, Congenital" OR "Disease Transmission, Infectious" OR "Treponemal Infections" ) AND ( MH "Pregnant Women" OR "Disease Prevention" OR "Preventive Health Services" OR "Health Policy" OR "Maternal Health" OR "Maternal Health Services" )
EMBASE	('syphilis' OR 'syphilis, congenital' OR 'disease transmission, infectious'/exp OR 'treponemal infections') AND ('pregnant women'/exp OR 'disease prevention' OR 'preventive health services' OR 'health policy' OR 'maternal health' OR 'maternal health services') AND [embase]/lim
LILACS	((syphilis) OR ('syphilis, congenital') OR ('disease transmission, infectious') OR (treponemal infections)) AND ((pregnant women) OR ('disease prevention')) OR (preventive health services) OR (health policy) OR (maternal health) OR (maternal health services)) AND (db:("LILACS"))
MEDLINE (PubMed)	("Syphilis"[Mesh] OR " Syphilis, Congenital" OR "Disease Transmission, Infectious" OR "Treponemal Infections") AND ("Pregnant Women"[Mesh] OR " Disease Prevention" OR "Preventive Health Services" OR " Health Policy" OR " Maternal Health" OR "Maternal Health Services")
SciELO	((Syphilis) OR (Syphilis, Congenital) OR (Disease Transmission, Infectious) OR (Treponemal Infections)) AND ((Pregnant Women) OR (Disease Prevention) OR (Preventive Health Services) OR (Health Policy) OR (Maternal Health) OR (Maternal Health Services))
Scopus	( TITLE-ABS-KEY ( 'syphilis' OR 'syphilis AND congenital' OR 'disease AND transmission AND infectious' OR 'treponemal AND infections' ) AND ALL ( 'pregnanta AND women' OR 'disease AND prevention' OR 'preventive AND health AND services' OR 'health AND policy' OR 'maternal AND health' OR 'maternal AND health AND services' ) )
Web of Science	(ALL=("Syphilis" OR "Syphilis, Congenital" OR "Disease Transmission, Infectious" OR "Treponemal Infections")) AND ALL=(" Pregnant Women" OR "Disease Prevention" OR "Preventive Health Services" OR "Health Policy" OR "Maternal Health" OR "Maternal Health Services")
Google Scholar	("Syphilis" OR "Syphilis, Congenital" OR "Disease Transmission, Infectious" OR "Treponemal Infections") AND ("Pregnant Women" OR "Disease Prevention" OR "Preventive Health Services" OR "Health Policy" OR "Maternal Health" OR "Maternal Health Services Maternal Health")

<p>NDLTD (Global ETD Search)</p>	<p>("Syphilis" OR " Syphilis, Congenital" OR "Disease Transmission, Infectious" OR "Treponemal Infections") AND ALL=("Pregnant Women Quality" OR "Disease Prevention" OR "Preventive Health Services" OR "Health Policy" OR "Maternal Health" OR "Maternal Health Services Maternal Health")</p>
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Source: Prepared by the authors, 2024.

The following inclusion criteria were established: i) original, Brazilian studies (as it was an analysis in Brazil) with no restriction on language and date of publication; ii) available in full that addressed the factors associated with gestational and congenital syphilis, and iii) studies with pregnant women positive for syphilis and congenital babies of this infection, regardless of whether they were cured. This is justified to map in Brazilian municipalities how access to treatment of the disease was, the availability of medication, pre and post treatment diagnostic tests and health programs involved in the scenario. For the exclusion criteria, i) studies that included participants who tested positive for syphilis before pregnancy; ii) duplicates, and iii) integrative reviews, protocols, narratives, editorial letters, and abstracts.

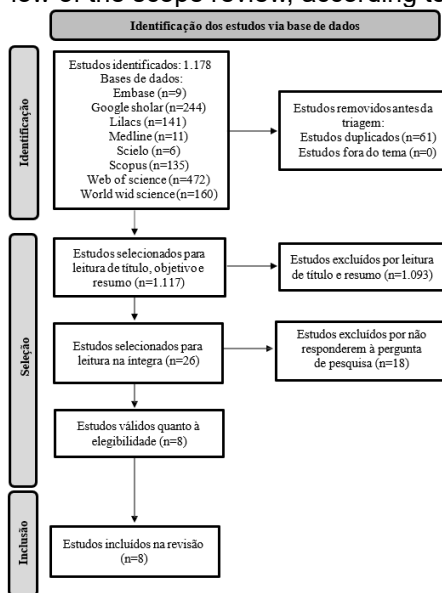
The studies located according to the criteria described were sent for data summarization according to the guidelines of Pollock et al., 2023<sup>(13)</sup>. In this step, the studies were exported from each database to the *Endnote program*. Subsequently, they were organized in a Microsoft Excel spreadsheet designed by the researchers themselves, containing: title of the article, year of publication, study design, objective, and results (Chart 2). The extraction process was carried out by two reviewers, in a situation of disagreement, a third reviewer was involved to evaluate and discuss the points of divergence.

In addition, in the data extraction stage, a full and careful reading was carried out for the extraction of the variables that present the associated aspects for gestational and congenital syphilis infection in Brazilian municipalities.

## RESULTS

The methodological path of the steps taken to reach the final sample was outlined in Figure 1, in a PRISMA 2020 flowchart, adapted for Scoping Review<sup>(14)</sup>.

Flowchart 1 – Flow of the scope review, according to PRISMA 2020.



Source: Prepared by the authors, 2024.

The final analysis comprised 8 articles, Chart 2, of which 3 (37.5%) had a retrospective descriptive design, 3 (37.5%) were cross-sectional, 1 (12.5%) was descriptive and exploratory, and 1 (12.5%) was descriptive and retrospective. These studies covered the performance between the years 2019 and 2023, with 4 (50%) in 2022, 1 (12.5%) in 2023, 1 (12.5%) in 2021, 1 (12.5%) in 2020 and 1 (12.5%) in 2019.

Regarding the Brazilian municipalities, those in which gestational and congenital syphilis showed more studies involved were in the states of São Paulo with 2 (25.0%) and the South Region of Brazil also with 2 (25.0%) articles. The other municipalities were Belo Horizonte, Minas Gerais with 1 (12.5%), Imperatriz, Maranhão 1 (12.5%), Cabo Frio, Rio de Janeiro 1 (12.5%) and the Northeast Region of Brazil 1 (12.5%).

Chart 2 – List of articles included in the final sample according to author, year, study design, objective, and results.

Author, year	Study design	Objective	Results
Belusso et al., 2022	Retrospective cross-sectional study	Discuss the key points in prevention and effective treatment of gestational syphilis in the context of different levels of health care	In the period from January to June 2021, 17 cases of syphilis were reported in pregnant women and 102 in newborns. The case of a patient with a history of two pregnancies without prenatal care and use of psychoactive substances was selected.
Gilenco, Uliana, Moreira, 2022	This is a descriptive, retrospective study with a quantitative approach	Check the number of cases of diagnosed congenital syphilis in children up to one year of age in Brazil, with emphasis on the state and the twin city with the highest number of cases and investigate the socio-demographic and clinical aspects	The border state with the highest number of cases was Rio Grande do Sul (14,617) and its twin city, Uruguaiana (167). There was a predominance of pregnant women aged 20 to 29 years 53.2%, low education level 28.1% ( $p < 0.05$ ), skin color, white 58.1%, prenatal care 92.8% ( $p > 0.05$ ), diagnosed with syphilis during prenatal care 69.4% and with inadequate treatment 39.5% ( $p < 0.05$ ). The Track
			The age of children with congenital syphilis was younger than seven days old.
Reis et al., 2022	Quantitative cross-sectional study	To identify the rate of treponemal and non-treponemal reactive tests in pregnant women during childbirth and to analyze the factors associated with this seroreactivity.	The seropositivity rate for syphilis among pregnant women in this series was 2.74%. Among the groups with positive and non-reactive tests, marital status, occupation, place of residence, and use of legal drugs indicated significant differences, but, in the end, only the Single marital status was associated with reactive testing.



Santos et al., 2022	Cross-sectional, descriptive and quantitative study	To trace the epidemiological profile of cases of maternal and congenital syphilis.	A total of 232 reported cases of congenital syphilis were identified in this period and the prevalence of the disease was 4.3%. Among pregnant women, 69% are between 20 and 34 years old, 14.65% completed elementary school and 43.1% were brown. As for cases of vertical transmission, 87.5% performed prenatal care, 23.3% were diagnosed with syphilis at the time of delivery and 15.1% had concomitant treatment of the partner.
Silva, Carvalho, Chaves, 2020	Clinical-epidemiological and cross-sectional study	To analyze socioeconomic characteristics, adherence to prenatal care, diagnosis, treatment, repercussions for the fetus, notification, co-infection with other STIs, and reproductive history of women with gestational syphilis in a reference maternity hospital, with a view to stimulating effective health policies.	The mean age of the women was 23.6 years, and most were brown, with incomplete elementary education, family income of up to one minimum wage, and single. Regarding prenatal care, 76.1% performed it adequately; Among these, 46% had the appropriate treatment. The diagnosis was predominantly made in the prenatal period, with 91.4% of the women diagnosed in the latent phase of the disease. Regarding treatment, 62 (41%) interviewees and 61
			(40.4%) sexual partners were considered adequately treated. As for the fetuses, 92.7% were born with probable congenital syphilis.

Felipe et al., 2019	Descriptive and exploratory study	<p><b>OBJECTIVE:</b> To identify the epidemiological profile of postpartum women with congenital syphilis hospitalized in a maternity hospital in the city of Cabo Frio-RJ.</p>	<p>The subjects were 24 puerperal women of newborns with congenital syphilis. Most of the interviewees are between 18 and 24 years old (66.7%), have completed high school (54.2%), are single (75%), declare themselves black (54.2%) and have a family income of one minimum wage (45.8%). Most do not have a steady partner (66.7%) and do not use condoms (50%) during sexual intercourse. The largest number reported having had prenatal care (75%), with a diagnosis of syphilis between 3 and 6 months of age. pregnancy (54.2%). Most of the partners did not receive treatment (62.5%) and there was no nursing guidance in the prenatal period (62.5%).</p>
Amaral et al., 2021	Retrospective, descriptive study	<p><b>OBJECTIVE:</b> To describe the epidemiological profile of congenital syphilis in northeastern Brazil.</p>	<p>Pernambuco had the highest number of cases (25.2%), with a gradual increase in incidence. There was a predominance of pregnant women aged between 20 and 29 years (52.0%), with low schooling (31.3%) and brown (77.1%). Most of the infected pregnant women underwent prenatal care (79.8%), but with an inadequate treatment scheme (59.2%), as well as and without the partner's treatment (59.5%).</p>

Alves et al., 2023	Descriptive and retrospective study	OBJECTIVE: To identify the epidemiological profile of pregnant women and newborns with syphilis in a neighborhood of São José do Rio Preto/SP.	In 2019, 268 pregnant women underwent prenatal care and 21 of them were notified with a diagnosis of gestational syphilis, only four babies with congenital syphilis tested positive in the treponemal/non-treponemal test at delivery/curettage and two of them evolved to abortion. In 2020, 275 pregnant women underwent prenatal care and seven were diagnosed and notified with gestational syphilis and only one baby with congenital syphilis tested positive in the treponemal/non-treponemal test at birth.
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Source: Prepared by the authors, 2024.

For a better understanding of the associated factors, they were divided into sociodemographic and clinical factors, Chart 3. In the analysis of sociodemographic factors, pregnant women aged between 20 and 30 years, black and brown, single and inactive in 7 (87.5%) articles stood out. Low education was found in all studies 8 (100.0%).

In relation to clinical factors, the use of psychoactive substances appears in 3 (37.5%) of the articles. Underreporting in 1 (12.5%), late diagnosis in 5 (62.5%), and difficulty in accessing health services were mentioned in 2 (25.0%) studies.

Inadequate treatment of syphilis during prenatal care was presented in 3 (37.5%) articles, inadequate adherence to prenatal care, abandonment and low quality of care were evidenced in 1 (12.5%) article. Pregnant women with syphilis who had antenatal visits <5 or no antenatal care were identified in 2 (25.0%) studies.

Other factors also related to infection were presented, such as unprotected sexual intercourse in 2 (25.0%) studies, discontinuation of the pregnant woman to syphilis treatment, and late treatment of the babies in 1 (12.5%). The absence of treatment for pregnant women's partners was reported in 3 (37.5%) articles. And, in 1 (12.5%) of the articles, it revealed the inefficiency in the management of syphilis in the Psychosocial Care Centers (CAPS) for pregnant women with chemical dependency, social vulnerability, pregnant women living in border regions, women with a history of more than two

pregnancies and more than two abortions, and the COVID-19 pandemic period are associated with gestational and congenital syphilis infection.

Chart 3 – Brazilian municipality and factors related to gestational and congenital infection of syphilis in Brazilian municipalities.

Article	Brazilian municipality and state	Associated sociodemographic factor(s)	Associated Clinical Factor(s)
Belusso et al., 2022	Porto Alegre - RS	Pregnant women with syphilis: Age group between 20 and 30 years; Low education; Brown and black.	Use of psychoactive substances, monitored by the Psychosocial Care Center (CAPS); Inadequate adherence to prenatal care; Inefficiency for the management of syphilis in the CAPS and High-Risk Prenatal Program and hospitals; Social vulnerability; Underreporting of positive cases; Late diagnosis.
Gilenco, Uliana, Moreira, 2022	Border Areas of Brazil: Roraima, Acre, Rondônia, Amapá, Mato Grosso, Grosso do Sul, Santa Catarina, Amazonas, Paraná, Pará and Rio Grande do Sul	Pregnant women with syphilis: Age group between 20 and 30 years; Low education; Brown and black.	Inadequate treatment of syphilis during prenatal care; City located in geographic border regions (higher risk of disease transmission due to the large flow of people); Unprotected sexual intercourse; Low quality of prenatal care; Failures of health services to carry out primary prevention in relation to sexually transmitted infections.
Reis et al., 2022	São Paulo - interior	Pregnant women with syphilis: Age group between 20 and 30 years; Low education;	Use of illicit drugs; Number of prenatal consultations <

		Brown and black; Single; Inactive; Low socioeconomic status.	5 or did not have prenatal care; Inadequate treatment of syphilis during prenatal care; Late diagnosis.
Santos et al., 2022	Belo Horizonte, MG	Pregnant women with syphilis: Age group between 20 and 30 years; Low education; Brown and black. Babies under 10 days old.	Number of prenatal consultations < 5 or did not have prenatal care; Absence of syphilis treatment for the partner; Discontinuation of the pregnant woman for the treatment of syphilis; Abandonment of prenatal care; Late diagnosis; Delayed treatment of babies.
Silva, Carvalho, Chaves, 2020	Imperatriz- MA	Pregnant women with syphilis: Age group between 20 and 30 years; Low education; White. Babies under 10 days old.	Absence of syphilis treatment for the partner; During the COVID-19 Pandemic period, there was a lower demand for prenatal consultations.
Felipe et al., 2019	Cabo Frio, RJ	Pregnant women with syphilis: Age group between 20 and 30 years; Low education; Brown.	Inadequate treatment of syphilis during prenatal care; Absence of syphilis treatment for the partner; Absence of public policies for the effective control of syphilis.
Amaral et al., 2021	Northeast Region of Brazil	Pregnant women with syphilis: Age group between 20 and 30 years; Low education; Low socioeconomic status; Brown; Single; Inactive.	Difficulty in accessing health services; Late diagnosis performed in the prepartum period; Women with a history of more than 2 pregnancies and more than 2 miscarriages.

Alves et al., 2023	Pinheirinho Region of São José do Rio Preto -SP	Pregnant women with syphilis: Age group between 18 and 24 years; Low education; Low socioeconomic status; Black.	Late diagnosis; Difficulty in accessing treatment; Unprotected sexual intercourse.
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Source: Prepared by the authors, 2024.

## DISCUSSION

Infection by gestational and congenital syphilis is closely linked to sociodemographic factors, such as low education, age under 30 years, single marital status, and lack of professional occupation. This scenario reflects barriers in access to information on sexual health, which increase the risk of infection, especially due to the practice of unprotected sexual intercourse<sup>(15)</sup>.

Despite advances in investment in public health for women, challenges persist in prenatal care and childbirth. The lack of adequate guidance and limited access to health services compromise the quality of interventions, making it difficult to cope with gestational and congenital syphilis. Overcoming these barriers is essential to ensure more effective and comprehensive care for pregnant women<sup>(16)</sup>.

The seriousness of the situation is accentuated by the high rates of underreporting of cases of congenital syphilis<sup>(19)</sup>. A study conducted by Domingues and authors (2021) reports that underreporting is evidenced by failures in the registration and notification systems. This directly impacts early diagnosis and treatment, making it essential to expand the use of rapid tests for syphilis in Primary Care<sup>(20)</sup>. Another related factor is the use of psychoactive substances, which increases exposure to unprotected sexual practices<sup>(17)</sup>. Drug use during pregnancy is often underdiagnosed, either due to poor adherence to prenatal care or fear of stigmatization<sup>(17)</sup>. Specialized services, such as Psychosocial Care Centers (CAPS), play a fundamental role in the care of pregnant women in this condition, by offering support and integrated treatment<sup>(18)</sup>. Public policies that integrate the prevention and treatment of chemical dependency into maternal and child health care are urgent.

The results also revealed the absence of adequate treatment that is directly associated with adverse gestational outcomes, as well as low birth weight, prematurity, congenital infections and perinatal death. A study showed that, in order for these

outcomes to be avoided, it is necessary that the care offered meets minimum requirements, which has traditionally been attributed only to the minimum number of consultations and the time of the beginning of follow-up<sup>(21)</sup>. Ensuring timely access to and adherence to treatment with benzathine penicillin, in accordance with the guidelines of the Ministry of Health, is essential to reduce the negative impacts of gestational syphilis and prevent vertical transmission of the infection<sup>(21)</sup>.

Prenatal care is indispensable, as it promotes a set of clinical, psychosocial and educational actions with the purpose of preventing and early detection of maternal and fetal pathologies and complications. And yet, it aims to obtain better outcomes for the newborn and reduce the risks for the mother<sup>(6,22)</sup>. As demonstrated by Soares and Aquino (2021), early initiation of treatment during prenatal care significantly reduces the risk of gestational complications and vertical transmission of the infection, reinforcing the importance of continuous and effective follow-up<sup>(23)</sup>.

However, adherence to prenatal care is a challenge closely related to the level of information and support received by pregnant women. Regular visits and tests, such as VDRL, are often insufficient, resulting in late identification of the disease and an increased risk of vertical transmission. Araújo et al. (2006) point out that, although 78.3% of mothers with syphilis had access to the health system, only 55.6% had undergone the VDRL test, revealing gaps in care<sup>(24)</sup>.

Lack of awareness about sexually transmitted infections (STIs) and socioeconomic difficulties limit access to testing and treatment, including that of pregnant women's sexual partners, the absence of which increases the risk of reinfection and vertical transmission. It is essential to promote the participation of partners in prenatal care and to carry out educational actions in primary care to facilitate diagnosis and appropriate treatment, which are crucial to interrupt the chain of transmission of syphilis infection<sup>(25-28)</sup>.

Despite the advances achieved, barriers to access and quality of prenatal care reinforce the need for a more structured approach. Estimates show that the absence of prenatal care, which affects 8.7% of pregnant women, is associated with the late start of care<sup>(16)</sup>. The discrepancy between the records of exams and the information reported by the pregnant women points to failures in communication between the levels of health care, hindering the coordination of care and the effectiveness of the treatment<sup>(29)</sup>. To face these issues, it is essential to structure the flows of care and promote the training of health teams<sup>(30)</sup>. The lack of adequate diagnosis and treatment in the Unified Health System

(SUS) network continues to perpetuate infection as a public health problem, reflecting marked regional and social inequalities <sup>(25,26)</sup>.

Health policies that integrate multidisciplinary care and comprehensive sexuality education for pregnant women and partners are essential to enable them to make informed decisions about their health <sup>(31)</sup>. Adverse events in pregnant women with untreated syphilis can reach 66.5%, compared to 14.3% in healthy pregnant women <sup>(32)</sup>. This scenario reveals an ethical dilemma: while pregnant women have the right to autonomy, the well-being of the fetus and public health cannot be disregarded. In regions with greater access to health, there are still major failures in prenatal care, diagnosis, and treatment. Although 70% of newborns are asymptomatic at birth, congenital syphilis can manifest in the first few days or even at birth <sup>(33)</sup>. In 2015, 78.4% of mothers with syphilis had prenatal care, but the failure rates reflect the low quality of care, underlining the urgency of strategies that ensure effective follow-up for both mother and baby <sup>(34)</sup>.

Although there are recognized advances, the quality and equity in access to prenatal care are still insufficient <sup>(35)</sup>. Regional inequality in Brazil aggravates the situation, according to data obtained through the Notifiable Diseases Information System in the period from 2011 to 2020 and in international border regions of the country, 190,034 cases of congenital syphilis were reported in Brazil, where 43,016 cases were in states with international borders. The border state with the highest number of cases was Rio Grande do Sul (14,617) and its twin city, Uruguaiana (167), with an average annual incidence rate of 13.2 and 12.3 cases/1,000 live births <sup>(35)</sup>. Border regions require special attention due to the intense flow of people, which makes them more vulnerable. Historically, this population has faced difficulties in accessing health services, increasing the demands related to diseases <sup>(36)</sup>.

The COVID-19 pandemic has brought additional challenges, redirecting public health resources and negatively impacting prenatal services <sup>(37,38)</sup>. The increase in the number of people sick and infected by the coronavirus caused an overload on the health system, and, consequently, the number of notifications of congenital syphilis tended to decrease, especially due to the lack of search for the health system <sup>(38)</sup>. In regions such as Ceará, there was a significant drop in the diagnoses of acquired syphilis, but a worrying increase in cases of congenital and gestational syphilis <sup>(39)</sup>. This underscores the importance of ensuring continuity of care, even in contexts of health crisis.



Given this context, reducing the continuous growth of gestational and congenital syphilis depends on protective factors that strengthen maternal and child health care, with emphasis on health education, access to prenatal care, and training of health professionals <sup>(7,23)</sup>. The effectiveness of these actions depends on an integrated implementation and the strengthening of the bond between users and health teams. Health education is an essential tool to expand the knowledge of pregnant women and their families about sexually transmitted infections, promoting prevention practices and adherence to treatment <sup>(27)</sup>.

Access to quality prenatal care, with regular consultations and tests such as the rapid test for syphilis, is essential for early diagnosis and timely intervention, preventing complications and vertical transmission <sup>(6,16)</sup>. In addition, the continuous training of health professionals is essential to ensure the appropriate approach during care, strengthening the identification of cases, clinical management, and the awareness of pregnant women about the importance of comprehensive care <sup>(24,26)</sup>. These factors, when integrated with municipal health policies, favor the reduction of inequalities in care and increase the effectiveness in the prevention of gestational and congenital syphilis <sup>(27,38)</sup>.

This study has as a limitation the choice of specific descriptors that may have left some study out of the research result, few studies that met the inclusion criteria and, furthermore, this study may not address all regional specificities in Brazil, limiting the applicability of the results in local contexts.

## **FINAL CONSIDERATIONS**

Gestational and congenital syphilis is closely related to socioeconomic and demographic conditions and the inequality of access and supply of resources for diagnosis and treatment in health services, especially during prenatal care. Factors such as late diagnosis and inadequate treatment are the most comprehensive causes of the high incidence rates of the disease in Brazil.

This evidence reinforces the need to implement targeted and equitable approaches to Brazilian municipalities, considering regional and social inequalities in access to and supply of health services. Establishing health education programs aimed at pregnant women for the prevention of syphilis, in addition to training professionals involved in prenatal care, are essential actions. Investing in preventive health programs, improving

infrastructure, and ensuring diagnosis and treatment in health services are crucial steps to reduce vertical transmission of syphilis.

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