

## ARTIGO ORIGINAL

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# Analysis of the prevalence of diagnosis of syphilis during pregnancy

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## ABSTRACT

**Background:** Syphilis is a disease transmitted through direct contact with lesions, during childbirth, sexual intercourse, or via the placenta. Despite efficient screening and treatment methods, contamination during pregnancy is increasing. **Objective:** The objective of this study is to assess maternal knowledge regarding congenital syphilis and determine the prevalence of gestational syphilis cases in a pediatric infectious disease outpatient clinic. **Method:** Cross-sectional study conducted using a questionnaire and analysis of medical records of mothers of children in consultations at a pediatric infectious disease clinic in Belo Horizonte. The researchers conducted the analysis themselves using a created table. **Results:** 23 women were interviewed, with an average age of 28.8 years (DP=8.2) and 69.5% having completed high school. 52% had no prior knowledge of congenital syphilis, and 39% received information from their doctor. Among the cases analyzed, 43% were diagnosed with syphilis, including 9 cases of congenital syphilis. 65% of the interviewees had sexual relations with only one partner in the last year. While 87% were aware of how to prevent syphilis, only 30% reported consistent condom use during sexual intercourse. Among the interviewees diagnosed with an STI, 60% acquired the infection from their spouse. Surprisingly, despite receiving treatment, most patients (61%) transmitted the disease to their children. **Conclusion:** The lack of knowledge about sexually transmitted infections, coupled with low maternal education, likely contributes to the high transmission rates and inadequate prevention of congenital syphilis.

**Keywords:** Congenital Syphilis, Sexually Transmitted Infections, Vertical Transmission of Infectious Diseases, Control of Communicable Diseases.

## INTRODUCTION

Syphilis is a chronic infectious disease with systemic involvement that progresses with periods of latency and exacerbation, caused by the gram-negative bacterium *Treponema pallidum*. Its transmission occurs rapidly through direct contact with infected lesions, during childbirth and sexual activities, or transplacentally during pregnancy<sup>1</sup>. The incubation period for acquired syphilis ranges from 10 to 90 days, and its manifestations depend on the stage of disease progression<sup>2</sup>.

Syphilis is classified into stages that guide the treatment and monitoring of the disease. Congenital syphilis (CS) diagnosed within the first two years of age can be characterized as recent. Syphilis may present with primary and

secondary lesions or remain in the stage of early latent syphilis. As the disease progresses, it is classified as late latent syphilis after one year, and eventually as late CS<sup>3</sup>.

According to the Ministry of Health<sup>4</sup>, most children are asymptomatic at birth but may present with mild and nonspecific clinical symptoms. Other manifestations of early CS include low birth weight, systemic involvement, including hematological, musculoskeletal, respiratory, dermatological, ophthalmological, and neural manifestations. Late CS is characterized by dental and skeletal deformities, perioral fissures, corneal inflammation, neurological deafness, and learning challenges<sup>4</sup>.

After the asymptomatic period, the primary phase of the disease is characterized by the development of painless lesions called hard chancres, which can last for up to five weeks and may spontaneously regress. Subsequently, secondary syphilis is marked by skin and mucosal involvement, accompanied by nonspecific symptoms such as fever, myalgia, and headache. The tertiary stage of the disease can manifest up to 30 years after infection, involving the nervous and cardiovascular systems<sup>5</sup>.

Congenital syphilis can occur at any stage of pregnancy, and infants may have visible skin lesions present from birth. Vertical transmission, despite having effective and low-cost prevention measures, represents a significant public health problem. It is considered a mandatory notification, emphasizing the importance of early diagnosis and appropriate treatment for the mother.

As a curable disease, its screening should be performed during prenatal care. Syphilis testing is advocated at the first prenatal visit, ideally in the first trimester, again at the onset of the third trimester (from the 28th week), during labor, or following abortion, risk exposure, and sexual violence. In all cases of pregnant women, treatment should be initiated with just one

reactive test, treponemal or non-treponemal, without waiting for the result of the second test<sup>6</sup>.

Although, inadequate prenatal care and incomplete treatment of syphilis cases lead to an increase in the prevalence of CS. Between 2009 and 2019, Brazil recorded 180,818 CS notifications in infants under one year, marking an almost 400% rise in case numbers. Most notifications occur in maternity wards during the first seven days of the newborn's life, with around 50% of maternal diagnoses occurring postpartum<sup>7</sup>.

This data, combined with the increasing number of infection cases, demonstrates that the prenatal program has not been effective in preventing and screening for syphilis cases, due to low adherence or inadequate treatment by pregnant women, possibly resulting in an underreporting of the infection cases in the country<sup>8</sup>. Another important factor is the lack of treatment for sexual partners, leading to reinfection during pregnancy and an increased risk of vertical transmission<sup>9</sup>. In addition to screening tests, it is recommended to take preventive measures such as using condoms during sexual intercourse.

Treatment is carried out with the administration of benzathine penicillin G followed by monitoring and control of the VDRL test<sup>10</sup>. Benzathine benzylpenicillin is the sole safe and effective treatment option for pregnant women. It is crucial to ensure follow-up, regardless of the initial assessment results, as pregnant women may develop signs and symptoms of the disease later. The resolution of signs and symptoms after treatment indicates a positive response to therapy. However, disease follow-up after treatment should be done with a non-treponemal test in all patients to determine if an adequate immunological response occurred<sup>11</sup>.

This study aims to evaluate maternal awareness of congenital syphilis and the prevalence of gestational syphilis cases in a pediatric infectious disease clinic

in Belo Horizonte. Furthermore, it seeks to evaluate prophylactic measures, such as prenatal follow-up, complete and appropriate treatment during pregnancy, and partner treatment, as such measures directly impact the prevalence of CS cases in the country.

## METHODS

### Study Design

This is a cross-sectional study divided into two phases, conducted on a convenience sample estimated at around 80 participants.

### Sample

The target population of this study comprised mothers of children attending pediatric infectious disease consultations in a clinic in the city of Belo Horizonte, who agreed to respond to the questionnaires administered post-consultation.

### Inclusion and Exclusion Criteria

Women aged 18 years or older were included in the study. Exclusion criteria applied to male guardians of the child and females younger than 18 years.

### Instrument Used

The research was based on theoretical grounding and data collection through the application and evaluation of questionnaires.

The variables analyzed via the questionnaire included demographic data (gender, age, education level). The number of sexual partners in the last year, condom use, timing of syphilis diagnosis (before, during, or after prenatal care), maternal knowledge level about CS, and the type of therapeutic approach for CS were assessed.

### Implemented Procedures

The evaluated questionnaires were administered in a private waiting room before the pediatric infectious disease consultations in a Clinic in Belo Horizonte.

Risks to participants were minimized during the study by identifying interviews through medical record numbers and organizing data in a secure database.

The first part of the study was conducted through the analysis of self-administered interviews aimed at understanding the level of maternal information about CS, linking it to risk factors, preventive measures, and appropriate treatment. Due to the small sample size, the researchers conducted the statistical analysis of the questionnaires themselves in this phase. They utilized a table created in Excel for this purpose. The table contained the questionnaire data, with each column representing an interview identified by numbers. Charts were also produced to allow better visualization and analysis of the obtained data. The current study presents a recall bias from the participants, due to the extended time since the diagnosis of CS and the administration of the questionnaire.

### Statistical Analysis

After the administration, the second phase of the study was conducted, which involved a comparative analysis of the questionnaire alongside the medical records of these patients. This analysis quantitatively evaluated the prevalence of gestational syphilis and qualitatively through the screening of risk factors for the infection. The researchers correlated the questionnaire results with the prevalence of gestational syphilis and the clinical progression of the disease in children who contracted syphilis during pregnancy, linking it to possible deficiencies in prenatal care and education about sexually transmitted infections. The data were organized into tables, facilitating the interpretation and comparison of the information obtained. This allowed the researchers to suggest new approaches to the study theme and draw conclusions.

The project received ethical approval from the Research Ethics Committee on November 9, 2022. CAAE: 61105422.2.0000.5134.

## RESULTS

23 women who were accompanying children in pediatric infectious disease consultations at an outpatient clinic in Belo Horizonte (MG) were interviewed. The average age of the interviewees was 28.8 years (Standard Deviation–SD=8.2 years), ranging from 18 to 49 years, with 6 (26%) not filling in the “age” field of the questionnaire.

Most of participants had completed secondary education (n=16; 69.5%), 4 (17.3%), primary education 2 (8.6%), higher education (Table 1). One interviewee did not answer this question (4.3%).

When asked whether they had thought about CS, 14 (60%) of the mothers responded “no” and 9 (39%) responded “yes”. When asked about their doubts, the most common concern was whether there was an effective treatment for the disease (n=3; 33.3%). Additionally, 2 (22.2%) of the interviewees who had doubts stated that their uncertainty encompassed all aspects of the disease.

After sampling, 10 (43.4%) women had already been diagnosed with syphilis and 2 (8.6%) did not answer this question. Among the participants who were diagnosed with syphilis, 6 (60%) received the diagnosis during prenatal care, 2 (20%) before prenatal care, 1 (10%) at the time of delivery and 1 (10%) on another occasion (Graph 3). 9 (39.1%) respondents responded that their child had been diagnosed with CS, while 14 (60.8%) claimed to have received this diagnosis.

Without asking about the sexual partner’s diagnosis of syphilis, 26% responded that the sexual partner had the diagnosis, while 69.5% claimed that the partner had never received this diagnosis, one of them abstained from the question. When asked about the necessity of their partner receiving proper treatment for syphilis, 70% of respondents confirmed their aware-

ness of this information, 26% claimed to be unaware, and 4% did not answer the question.

Regarding the use of condoms during sexual intercourse, 7 (30%) of the interviewees said they used the method, while twice as many patients, 14 (60%), claimed not to use it. The remaining respondents indicated that they were unsure whether to use it or chose not to respond. The final question asked whether patients knew the source from which they contracted syphilis. Among the interviewees who had already received a diagnosis of the STI, 60% reported acquiring it through sexual involvement, 30% were uncertain about the source, and 10% claimed to have contracted it within their family.

**Table 1 – Sociodemographic and health characteristics related to congenital syphilis of the study participants.**

Variable	N	Frequency
<b>Education</b>		
Secondary Education	16	70%
Primary Education	4	17%
University education	2	9%
Abstentions	1	4%
<b>Previous Knowledge about CS</b>		
No knowledge	12	52%
Some knowledge	9	39%
Advanced knowledge	2	9%
<b>Place of knowledge about CS</b>		
Doctor	9	39%
Nobody	5	22%
School	4	17%
Others	5	22%
<b>Do you have any doubt about CS?</b>		
Yes	9	39%
No	14	61%
<b>Have you ever been diagnosed with syphilis?</b>		
Yes	10	43%
No	11	48%
Abstentions	2	9%

<b>Time of diagnosed</b>		
Before prenatal	2	9%
During prenatal	6	26%
During childbirth	1	4%
Another moment	1	4%
Never	11	48%
Abstentions	2	9%
<b>Have your children ever been diagnosed with syphilis?</b>		
Yes	9	39%
No	14	61%
<b>Treatment – for those who have already had syphilis (N=10)</b>		
Benzetacil for 3 weeks	8	80%
Other treatment	2	20%
<b>Number of sexual partners in the last year</b>		
One partner	15	65%
Three partners	1	4%
Nine partners	1	4%
No knowledge	1	4%
Abstentions	5	22%
<b>Do the interviewed know how to prevent themselves from syphilis?</b>		
Yes	20	87%
No	3	13%
<b>Has the sexual partner ever been diagnosed with syphilis?</b>		
Yes	6	26%
No	16	70%
Abstenções	1	4%
<b>Use of condom in sexual relation</b>		
Yes	7	30%
No	14	61%
Abstentions	2	9%
<b>Who transmitted syphilis to the interviewed who had already contracted the disease? (N=10)</b>		
Husband	6	60%
Family	1	10%
No knowledge	3	30%
<b>Total:</b>	<b>23</b>	<b>100%</b>

## DISCUSSION

It is essential to emphasize the social importance of increasing the population's knowledge about syphilis and its control during pregnancy, regarding CS. According to the Ministry of Health of Brazil, most of children

are asymptomatic at birth and may exhibit mild and nonspecific clinical symptoms. When pregnant women are aware of their own state of health and perform prenatal care properly, it is possible to investigate whether the baby will be exposed to CS and carry out early VDRL tests for both, as well as early treatment, preventing the disease from developing more serious consequences for the child's state of health<sup>12</sup>.

Therefore, the population's awareness of syphilis transmission, prevention, and symptoms is a crucial public health concern. It is particularly important for pregnant women to understand the significance of adequate prenatal care and, if they are exposed to syphilis during pregnancy, to recognize that investigating this disease in newborns is a priority.

When analyzing the data from this study, around 39% of the mothers answered that they were first approached about CS during a medical consultation, followed by 22% of the mothers who answered that they obtained information through other means of communication, such as TV, the internet, information from the Ministry of Health of Brazil, or through relatives. In addition, 22% of the women interviewed said that they had not received any information about the disease and only 17% said that they had been taught about congenital syphilis at school.

Most of the participants had no previous knowledge of CS (n=12; 52.1%). Of these participants, 9 (39.1%) knew that syphilis was a sexually transmitted infection and 2 (8.6%) knew about the seriousness of the disease and its potential damage to the fetus. However, one of these women expressed the belief that CS was incurable, and one participant did not respond to this question.

On the topic of where the interviewees received explanations about CS (Graph 2), 9 (39.1%) answered "doctor", and for 6 (66.6%) of them this information

was passed on during prenatal consultations, for 1 (11.1%), during the birth of the child with CS and, for 1 (11.1%), only during the consultation with the pediatrician. Other answers to this question were “no-body” (n=5; 21.7%), “school” (n=4; 17.3%), as well as other sources of information, such as TV, the internet, the Ministry of Health of Brazil, relatives (n=5; 21.7%).

Since many of these mothers lacked access to information about congenital syphilis during their school years, it is evident that government investment in promoting greater knowledge about syphilis and CS in secondary schools is crucial. This is particularly significant as it is the school period when adolescents of childbearing age have the highest prevalence. In addition, it is important to pass on this knowledge during consultations with pregnant women or women of childbearing age, as well as in local health campaigns<sup>13</sup>.

It was observed that most of the mothers (69%) had completed high school, highlighting the significance of educating young people of reproductive age on this subject. It is crucial for them to understand how to prevent syphilis, recognize when to seek healthcare, and appreciate the importance of proper treatment. Bearing in mind that less access to information interferes with understanding the importance of health care, especially preventive measures, low schooling and not being educated about certain subjects during school are related to health risks<sup>14</sup>.

In addition, 43% of the participants answered that they had already been positively diagnosed with syphilis, 48% had been negatively diagnosed with syphilis and 8% did not answer. This emphasizes that, in the population group under analysis, the incidence of gestational syphilis is increasing and prevalent nowadays, a fact that is reinforced when compared to the study by Conceição, H. N.<sup>13</sup> in 2019, which also portrayed a significant increase in gestational syphilis, mainly in young pregnant women with low schooling.

When assessing the timing of syphilis diagnosis, it was found that over half of the participants were diagnosed during prenatal care. This underscores the significance of adhering to established protocols for syphilis testing during prenatal care. Early detection of syphilis during pregnancy is the greatest indicator of effectiveness in solving the problem because the sooner treatment is started, the lower the risk of developing congenital syphilis<sup>15</sup>.

When the interviewees were asked if their sons or daughters had been diagnosed with syphilis, 40% said yes, and it can be concluded that only 1 of those diagnosed had not transmitted the disease to their child congenitally. This further emphasizes the importance of early diagnosis and treatment, as well as the notable rate of vertical transmission of syphilis, which ranges from 70 to 100% in the primary and secondary phases of the disease, and 30% in the latent and tertiary phases<sup>16</sup>. It is estimated that contamination of the fetus may lead to miscarriage, fetal death, and neonatal death in 40% of contaminated fetuses or babies<sup>17</sup>.

All diagnosed women reported undergoing some form of syphilis treatment when asked. The most prevalent treatment was a three-week course of benzyl penicillin injection, received by 80% of the surveyed participants who had previously had syphilis. The remaining 20% reported receiving alternative treatments, such as a 10-day course of penicillin or a recent double application of an unspecified drug. Immediate treatment with benzathine benzylpenicillin is recommended after a reactive test for syphilis in the following situations: pregnant women; victims of sexual violence; people who may have to give up their jobs; individuals with signs and symptoms of primary or secondary syphilis; and people with no previous diagnosis of syphilis<sup>18</sup>.

Furthermore, among the women interviewed, 65% reported having only one sexual partner in the last year. 4.3% mentioned having three partners, while another

4.3% reported having nine partners. One respondent, who identified as a sex worker, was uncertain about the exact number of partners in the last year. Additionally, 21.7% of participants did not provide a response to this question. Among the women interviewed, over half (65%) reported having only one sexual partner in the past year. Interestingly, 33.3% of these women had previously disclosed a syphilis diagnosis. Analyzing this data demystifies a societal stigma that says that only those who lead promiscuous lives and have sex with different partners can contract an STI, reinforcing the importance of always taking precautions and getting tested for sexually transmitted infections on a regular basis.

Regarding the questions about participants' knowledge of syphilis prevention and treatment for their partners, it was found that the participants are well-informed on these matters. 87% and 70% of the respondents claimed to have knowledge about syphilis prevention and treatment for their partners, respectively. Only 30% of those interviewed said that they used barrier condoms during sexual intercourse, which leads us to conclude that they are now well informed about how the disease is infected and prevented, however, they do not apply them in their lives. This low rate of condom use can be explained by the widespread use of the contraceptive pill, which has led to a drastic increase in the number of cases, since women feel protected from unwanted pregnancies and leave protection against STIs to one side<sup>19</sup>.

At last, 60% of those surveyed who had already been diagnosed with the STI reported that they had contracted syphilis from their spouse, which further reinforces the importance of using condoms even in stable relationships. It is important to highlight that most individuals with syphilis are asymptomatic, which contributes to maintaining the chain of transmission, since initially they do not appear to be ill, making sexual partners trust to perform the act without a condom<sup>20</sup>.

## CONCLUSION

By analyzing the data presented in the survey, it is essential for schools to get involved in disseminating knowledge about sexually transmitted infections, as well as preventing them for young people with an active sex life. Health agencies should try to bring up these issues in health consultations and campaigns to enhance public awareness of the severity of syphilis for those infected and for children, considering the high prevalence of congenital syphilis in society, especially among pregnant women as observed in the analyzed population group.

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THE AUTHORS DECLARE THAT THERE IS NO CONFLICT OF INTERESTS IN RELATION TO THIS ARTICLE.