ORIGINAL ARTICLE

KNOWLEDGE AND ATTITUDES OF PREGNANT WOMEN ABOUT PREVENTION AND TRANSMISSION OF SYPHILIS

Luiza Carolinda de Sousa[1], Ana Luiza Vieira Dias [2]
Braulio Vieira de Sousa Borges[3], Jefferson Abraão Caetano Lira[4]
Antonio Filho Alves Rodrigues[5], Gilney Guerra de Medeiros[6]
Verbenia Cipriano Feitosa Silva[7], Rosilane de Lima Brito Magalhães[8]

Highlights: (1) Syphilis prevention and transmission attitudes were associated with greater knowledge. (2) Regular and/or inadequate knowledge about syphilis prevention and transmission was identified. (3) Adequate knowledge and positive/very positive attitudes are protective factors.

http://dx.doi.org/10.21527/2176-7114.2026.51.16254

How to cite:
de Sousa LC, Dias ALV, Borges BV de S, Lira JAC, Rodrigues AFA, de Medeiros GG, et al. Knowledge and attitudes of pregnant women about prevention and transmission of syphilis. Rev. Contexto & Saúde. 2026;26(51):e16254.

[1] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0009-0004-0167-213X
[2] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0009-0003-8576-7170
[3] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0000-0003-4914-1579
[4] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0000-0002-7582-4157
[5] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0000-0001-7714-9901
[6] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0000-0002-3351-2841
[7] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0000-0002-1527-6275
[8] Federal University of Piauí (UFPI). Teresina /PI, Brazil. https://orcid.org/0000-0002-6869-9706

KNOWLEDGE AND ATTITUDES OF PREGNANT WOMEN ABOUT PREVENTION AND TRANSMISSION OF SYPHILIS

ABSTRACT

Objective: to analyze pregnant women's knowledge and attitudes regarding the prevention and transmission of syphilis. **Methods**: an analytical cross-sectional study carried out in two public maternity hospitals in Teresina, Piauí, between November 2023 and January 2024, involving 165 pregnant women. Data were collected through the application of a validated questionnaire covering sociodemographic aspects, sexual behavior, knowledge, and attitudes toward syphilis prevention and transmission. Data were analyzed using Spearman's correlation, Pearson's chi-square test, and binomial logistic regression. The magnitude of association between categorical variables was assessed using the *odds ratio*. **Results**: among the 165 pregnant women, 71.5% were aged 30 years or younger, 69.1% were married or living with a partner, and 70.1% had more than nine years of schooling. Regarding sexual behavior, 58.2% had their first sexual intercourse between ages 15 and 19, 43% reported not using a condom during their first sexual intercourse, and 19.4% had had more than 10 sexual partners over their lifetime. Regarding the prevention and transmission of syphilis, 45.5% had regular knowledge and 37% had inadequate knowledge. Negative attitudes toward prevention and transmission of the disease predominated (40%). Regular and adequate knowledge showed statistical significance with very positive and positive attitudes of pregnant women toward syphilis prevention and transmission ($p<0.05$). **Conclusion**: there was a correlation between pregnant women's knowledge and attitudes regarding syphilis, highlighting that those with greater knowledge had better attitudes toward preventing and understanding the transmission of the disease.

Keywords: Syphilis; Pregnancy; Vertical Transmission of Infectious Diseases; Knowledge; Attitude.

INTRODUCTION

Syphilis is a sexually transmitted infection (STI) with a high incidence worldwide. In pregnant women, when untreated or inadequately treated, it can lead to unfavorable outcomes, considering the possibility of vertical transmission in 70% to 100% of cases, in addition to miscarriage, stillbirth, prematurity, and high fetal mortality[1]. Therefore, gestational syphilis requires immediate intervention to reduce the likelihood of vertical

transmission[2].

In early manifestations, up to two years of age, congenital syphilis may cause hepatomegaly, splenomegaly, jaundice, skin lesions, pneumonia, as well as fetal and neonatal death. Regarding late manifestations, after two years of age, facial, ophthalmologic, auditory, and dental alterations may occur[2].

The Brazilian Ministry of Health recommends that the investigation of gestational syphilis begin with a treponemal test, through a rapid test, and be confirmed by a non-treponemal test, with the *Venereal Disease Research Laboratory* (VDRL) test being the main one, preferably performed at the first prenatal visit, in the third trimester, and at the time of delivery. Syphilis treatment is effective and is carried out with intramuscular benzathine penicillin G, with monthly follow-up through the VDRL test[3].

Despite this, the prevalence of syphilis remains high globally. A study conducted in the Cali region, Colombia, indicated that the rate of gestational syphilis was 17 cases per 1,000 live births (including deaths), 57.1% of patients remained in the subsidized health system, and 16.6% had no coverage. In addition, 90.4% of cases were diagnosed during pregnancy, 47.2% received three doses of penicillin, and 57.6% of contacts received treatment[4].

In the Brazilian scenario, the detection rate of gestational syphilis increased between 2008 and 2018. The South region showed the greatest trend, while the Midwest recorded the lowest. The following variables were significantly correlated with the detection rate: Municipal Human Development Index, illiteracy rate, percentage of primary health care coverage, and the proportion of physicians, nurses, and basic health units per inhabitant[5].

A regional study collected data on the number and distribution of gestational syphilis cases by municipality in a state in northeastern Brazil. The findings of the analyzed historical series showed significant differences in the number of cases, with 246 cases recorded in one municipality, which suggests underreporting in others[6].

In Brazil, even with the availability of diagnosis and treatment through the Unified Health System (SUS), the figures related to this infection remain high. From 2011 to 2022, 190.034 cases of vertical transmission of syphilis were recorded[7]. In a northeastern capital city, between 2007 and 2020, 1.690 cases of congenital syphilis were identified;

of these, 80.5% of pregnant women attended prenatal care, 52.6% were diagnosed during prenatal care, and 71.3% did not receive adequate treatment[8].

Syphilis is a reality among pregnant women, with higher prevalence among women with low education, lower-middle socioeconomic status, maternal age between 20 and 34 years, mixed race, and unemployment[9]. In addition, other factors also contribute to the high rate of vertical transmission, such as multiple sexual partners, poor-quality prenatal care, lack of partner treatment, relaxation of preventive measures by health teams, and deficient and/or mistaken knowledge among pregnant women about the infection, especially regarding the incubation period, transmissibility, and prevention methods[10-11]. Despite the factors described, there are still gaps regarding this serious public health problem, which hinder the reduction or elimination of gestational syphilis.

A study conducted in Rio Grande do Sul, when analyzing the knowledge of women who attended prenatal consultations regarding syphilis, demonstrated restricted knowledge both about syphilis and gestational syphilis, as well as about the interpretation of rapid tests, without mentioning the performance of the non-treponemal test as a diagnostic and confirmatory method for the disease[12]. Authors highlight that lack of knowledge about syphilis, absence of information on prevention, low condom use, the prevalence of syphilis during pregnancy, inadequate treatment, limited knowledge about congenital syphilis, and lack of guidance during prenatal care among pregnant women remain problems in many regions[13].

Based on the above, gestational syphilis is a cause for concern in the context of public health, and there is a need for further studies seeking to understand the factors related to pregnant women's knowledge and attitudes, which hinder prevention and contribute to the increased transmission of this infection.

Therefore, this study aims to analyze pregnant women's knowledge and attitudes regarding the prevention and transmission of syphilis.

METHOD

This is an analytical cross-sectional study, written according to the recommendations of the *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) instrument[14]. The study was conducted in two public maternity

hospitals in Teresina, Piauí, in the Northeast region of Brazil, from November 2023 to January 2024.

The population consisted of all pregnant women who sought prenatal care at the aforementioned maternity hospitals during the data collection period. It is estimated that, on average, 350 pregnant women are seen annually at these units. Inclusion criteria were: pregnant women aged 18 years or older, in any trimester of pregnancy, who sought care at the selected public maternity hospitals. Excluded were those who had difficulty understanding the research proposal, those who had some type of mental disorder, according to medical records or information from the health team, and those who were in labor, presenting rhythmic and intense contractions that would make it impossible to answer the questionnaire. During data collection, three pregnant women were excluded because they were in active labor with strong contractions, which made their participation unfeasible. There were no refusals among participants during data collection.

For the sample size calculation, a syphilis prevalence of 4% in the municipality of Teresina in 2016 and 2017 was considered[15], with a 95% confidence level and a tolerable error of 2%. The present sample comprised 165 participants, according to the following formula: $n = N. Z^2. p. q / (N-1). e^2 + Z^2. p. q$ (n= sample size, Z= confidence level, p= presumed prevalence, q= complementary prevalence, e= tolerable error, and N= total population)[16].

The study's dependent variables were knowledge and attitudes. The independent variables included sociodemographic characteristics (age, education, marital status, race/color, and income) and aspects related to sexual behavior (initiation of sexual life, number of sexual partners, condom use, sexual intercourse under the influence of alcohol or drugs, knowledge about the partner's syphilis serology, diagnosis, and treatment of syphilis during prenatal care). The dependent variables corresponded to knowledge about syphilis and attitudes toward the disease.

Data were collected using a questionnaire adapted by Carvalho and Araújo from the 2013 Survey of Knowledge, Attitudes, and Practices of the Brazilian Population, developed by the Ministry of Health[17], which contains 43 questions related to the characterization of pregnant women regarding sociodemographic profile, sexual behavior, knowledge, and attitudes about syphilis.

Data collection was carried out individually in private areas of the maternity hospitals, before or after a procedure, according to the pregnant women's availability, with an average duration of 30 minutes. Participants were recruited in three maternity sectors: emergency reception, consultation rooms, and wards. Eligible pregnant women were invited to complete the questionnaire.

Before the instrument was administered, the lead researcher provided guidance on the study procedures, the Informed Consent Form, and the topics addressed in the questionnaire. After confirmation of consent, the questionnaire was handed to the participant for exclusive completion, while the researcher remained available to clarify doubts without interfering with the answers. Data collection was conducted by two students in the final semester of the undergraduate program at the institution.

Data were entered into a Microsoft Office Excel 2019 database and exported to Jamovi software, version 2.3. Descriptive and inferential statistics were used in the analysis. In the descriptive analysis, absolute and percentage frequencies were used for categorical variables, and mean and standard deviation for quantitative variables. In the inferential analysis, bivariate and multivariate statistical tests were applied.

To investigate the association between the knowledge and attitudes blocks, the chi-square test was used, adopting a significance level of $p<0.05$. The magnitude of association was evaluated by the *odds ratio* (OR), with precision of the effect analyzed by the 95% confidence interval (95% CI). Correlations between correct answers in the knowledge and attitudes blocks were analyzed using Spearman's and Kendall's Tau coefficients. Variables with $p<0.10$ in the bivariate analyses were included in a multivariate model and examined by binomial logistic regression[18].

The results presented refer to the adjusted *odds ratio* (aOR), 95% confidence interval (95% CI), variance inflation factor (VIF), and Akaike information criterion (AIC), adopting a significance level of $p<0.05$.

For the classification of pregnant women's knowledge, eight questions from the instrument were analyzed. Participants received points if they answered affirmatively to the following items: (1) had already heard about syphilis; (2) knew how syphilis is transmitted from one person to another; (3) syphilis cannot be transmitted through contaminated water and food; (4) it cannot be transmitted by using public restrooms; (5)

it cannot be transmitted by sharing toothbrushes; (6) it can be transmitted when condoms are not used during sexual intercourse; (7) it can be transmitted from mother to baby; (8) a nodule or lump on the genital organ is the main characteristic sign of syphilis infection. Thus, taking the study by Carvalho and Araújo as reference[17], knowledge was classified into three ranges according to the percentage of correct answers: less than 50% was considered inadequate; 50% to 74%, regular; and 75% to 100%, adequate.

Regarding the determination of attitudes, the questionnaire consisted of six statements about syphilis, considered positive when the participant: (1) agreed that the risk of transmission can be reduced if a person has sexual relations only with a faithful and uninfected partner; (2) agreed that a person with a healthy appearance may be infected; (3) agreed that condom use is the best way to avoid transmission; (4) agreed that there is a cure for syphilis; (5) agreed that a cured person can be reinfected; (6) agreed that a pregnant woman adequately treated does not transmit the disease to her child. Subsequently, attitudes were classified according to the percentage of correct answers: less than 50%, negative attitudes; 50% to 74%, positive attitudes; and 75% to 100%, very positive attitudes[17].

This study complied with the ethical principles of Resolution No. 466 of 2012 of the National Health Council and was approved by the Ethics Committee of the Federal University of Piauí under Certificate of Presentation for Ethical Consideration (CAAE) 54993521.0.0000.5214 and opinion No. 5705998. All participants signed the Informed Consent Form and received a copy of the document.

RESULTS

Most pregnant women were aged 30 years or younger (71.5%), were married or living with a partner (69.1%), lived with family or a partner (92.7%), and had more than nine years of schooling (70.1%). Regarding parental education, 37.6% reported that their father had nine years of schooling or less, and 43% reported that their mother also had nine years of schooling or less. In relation to race/color, 90.2% self-identified as mixed-race. More than half reported having a source of income (57%), of which 60.3% came from work and 39.7% from the Bolsa Família Program. The most prevalent family income was three minimum wages or less (72.2%) in relation to the total sample (Table 1).

Table 1 – Sociodemographic characteristics of pregnant women (n=165). Teresina, Piauí, 2024

Variables	N	%
How old are you?		
≤ 30 years	118	71.5
> 30 years	47	28.5
What is your marital status?		
Married/Living with a partner	114	69.1
Single/Widowed	51	30.9
Who do you live with?		
Alone	12	7.3
Family/partner	153	92.7
What is your level of education?		
No formal education	7	4.3
≤9 years	43	25.6
>9 years	115	70.1
What is your father's level of education?		
No formal education	37	22.4
≤9 years	62	37.6
>9 years	31	18.7
Don't know	35	21.3
What is your mother's level of education?		
No formal education	31	18.8
≤9 years	71	43
>9 years	43	26
Don't know	20	12.2
How do you identify in terms of your skin color or race?		
White	16	9.8
Not white (Black, Brown, Indigenous, Other)	149	90.2
Do you have any source of income?		
Yes	94	57.0
No	71	43.0
If you answered YES to the previous question, what is your source of income?		
Bolsa Família	37	39.7
Work	56	60.3
What is the family's total income?		
≤ 3 minimum wages	119	72.2
> 3 minimum wages	17	10.3
Don't know	29	17.5

Source: Research data (2024).

Regarding knowledge about syphilis transmission and prevention, 81.2% of those interviewed reported that they had already heard about the disease, with the main sources of information being health services (36.4%) and school (20.6%). A significant number stated that they knew how syphilis is transmitted from one person to another (64.6%), while 46.7% declared that they did not know whether it can be transmitted through contaminated water and food. A total of 49.1% did not know whether the infection can occur through the use of public restrooms. For the question "Can a person become infected with syphilis by sharing a toothbrush?", 46.6% of participants reported not knowing the correct answer.

Regarding prevention, 75.2% indicated that a person can become infected with syphilis if condoms are not used during sexual intercourse. Concerning vertical transmission, 70.3% of pregnant women believed that syphilis can be transmitted from mother to baby. Regarding the characteristic signs that may appear on the genital organ of an infected person, 47.3% stated that they did not know the answer. Among those who mentioned any sign, the most frequently cited were "nodule or lump" (18.8%), followed by yellowish discharge with a bad odor (13.9%) and warts (10.9%) (Table 2).

Table 2 – Knowledge about the transmission and prevention of syphilis (n=165). Teresina, Piauí, 2024

Variables	N	%
Have you ever heard of syphilis?		
Yes	134	81.2
No	31	18.8
If you answered YES to the previous question, how did you hear about it? (You may select more than one option)		
TV	31	15.9
Internet	35	17.9
School	40	20.6
Friends	9	4.6
Family	9	4.6
Health Services	71	36.4
Do you know how syphilis is transmitted from one person to another?		
Yes	106	64.6
No	57	35.4

Can syphilis be transmitted through contaminated water and food?		
Yes	19	11.5
No	69	41.8
Don't know	77	46.7
Can a person get syphilis from using public restrooms?		
Yes	41	24.8
No	43	26.1
Don’t know	81	49.1
Can a person get syphilis from sharing a toothbrush?		
Yes	46	27.9
No	42	25.5
Don’t know	77	46.6
Can a person become infected with syphilis by not using a condom during sex?		
Yes	124	75.2
No	6	3.6
Don’t know	35	21.2
Can syphilis be transmitted from mother to baby?		
Yes	116	70.3
No	6	3.6
Don’t know	43	26.1
What characteristic symptom of syphilis might a person infected with the disease develop in their genitals?		
Lump or bump	31	18.8
Yellowish, foul-smelling discharge	23	13.9
Itching	10	6.1
Warts	18	10.9
Pain when urinating	5	3.0
Don’t know	78	47.3

Source: Research data (2024).

Regarding attitudes toward syphilis transmission and prevention, most of the women interviewed agreed with the following statements: “The risk of syphilis transmission can be reduced if a person has sexual relations only with a faithful and uninfected partner” (45.6%); “A person with a healthy appearance may be infected with

syphilis" (69.1%); "Condom use is the best way to prevent the transmission of syphilis during sexual intercourse" (84.2%); "There is a cure for syphilis" (51.5%); "A person who received treatment for syphilis and was cured can be reinfected" (48.5%); and "A pregnant woman with syphilis who received adequate treatment during pregnancy does not transmit the disease to her child" (44.8%) (Table 3).

Table 3 - Attitudes toward the transmission and prevention of syphilis (n=165). Teresina, Piauí, 2024

Variables	N	%
Can the risk of syphilis transmission be reduced if a person has sex only with a faithful, uninfected partner?		
Agree	75	45.6
Disagree	32	19.8
Don't know	58	34.6
Can someone who looks healthy be infected with syphilis?		
Agree	114	69.1
Disagree	8	4.8
Don't know	43	26.1
Is using a condom the best way to prevent syphilis from being transmitted during sex?		
Agree	139	84.2
Disagree	4	2.4
Don't know	22	13.4
Is there a cure for syphilis?		
Agree	85	51.5
Disagree	15	9.1
Don't know	65	39.4
Can someone who has been treated for syphilis and has been cured get sick again?		
Agree	80	48.5
Disagree	9	5.5
Don't know	76	46.0
If a pregnant woman with syphilis receives proper treatment during her pregnancy, won't she pass the disease on to her child?		
Agree	74	44.8
Disagree	20	12.1
Don't know	71	43.0

Source: Research data (2024).

Regarding practices related to syphilis transmission and prevention, it was found that most pregnant women had their first sexual intercourse between 15 and 19 years of age (58.2%), 43% reported not using a condom at that time, 19.4% reported having had more than 10 sexual partners over their lifetime, and 94.6% stated that they had sexual relations only with men. A total of 84.8% stated that they had not had more than one sexual partner in the previous 12 months, and 90.9% reported maintaining sexual relations with a steady partner (Table 4).

When asked about condom use in all sexual relations, most stated that they did not use this method (75.8%). Regarding sexual intercourse with more than five casual partners in the previous 12 months, 5.5% responded affirmatively; of these, more than half (62.3%) stated that they did not use condoms in all sexual relations. Still regarding condom use, 81.8% stated that they had not used one in their last sexual intercourse. Concerning sexual intercourse under the influence of alcohol, 43% reported having had this experience, while 9.1% indicated having had sexual relations under the influence of some drug (Table 4).

In questions involving the partner, 40.6% stated that he had already undergone testing to investigate syphilis; however, 19.4% did not know how to respond. In addition, 60.6% reported not knowing whether the partner had the infection. A total of 9.7% were diagnosed with syphilis during prenatal care, most of them in the second trimester (62.5%). Among the pregnant women diagnosed, more than half (56.2%) stated that they had not undergone treatment, and the same percentage reported having had monthly VDRL tests (Table 4).

Table 4 - Practices regarding syphilis transmission and prevention. Teresina, Piauí, 2024

Variables	N	%
How old were you when you had sex for the first time?		
Under 15 years old	37	22.5
Ages 15 to 19	96	58.2
Ages 20 to 30	23	13.9
More than 30 years	1	0.6
Don't remember	8	4.8
Did you use a condom the first time you had sex?		
Yes	90	54.6
No	71	43.0
Don't know/don't want to answer	4	2.4
Have you had more than 10 sexual partners in your entire life?		
Yes	32	19.4
No	126	76.4
Don't know/don't want to answer	7	4.2
Currently, in general, you have sex with:		
Women Only	2	1.2
Men Only	156	94.6
With men and women	7	4.2
Have you had sex with more than one sexual partner in the past 12 months?		
Yes	22	13.4
No	140	84.8
Don't know/don't want to answer	3	1.8
Currently, you are having sex with:		
Long-term partner (boyfriend, girlfriend, fiancé, fiancée, husband, wife, partner, etc.)	149	90.9
Casual partners (hookups, flings, one-night stands, etc.)	7	3.7
Regular and casual partners	9	5.4
Do you currently use a condom every time you have sex?		
Yes	36	21.8
No	125	75.8
Don't know/don't want to answer	4	2.4

Have you had sex with more than five casual partners in the past 12 months?		
Yes	9	5.5
No	154	93.3
Don't know/don't want to answer	2	1.2
If so, did you use a condom during every sexual encounter you had with those partners?		
Yes	13	24.5
No	33	62.3
Don't know/don't want to answer	7	13.2
Did you use a condom the last time you had sex?		
Yes	26	15.8
No	135	81.8
Don't know/don't want to answer	4	2.4
Have you ever had sex with someone while under the influence of alcohol?		
Yes	71	43.0
No	91	55.2
Don't know/don't want to answer	3	1.8
Have you ever had sex with someone while under the influence of drugs?		
Yes	15	9.1
No	145	87.9
Don't know/don't want to answer	5	3.0
Has your partner been tested for syphilis?		
Yes	67	40.6
No	66	40.0
Don’t know	32	19.4
Do you know if your partner has syphilis?		
Yes	42	25.5
No	100	60.6
Don’t know	23	13.9
Were you diagnosed with syphilis during your prenatal care?		
Yes	16	9.7
No	144	87.3
Waiting for test results	4	2.4
Don’t know	1	0.6
If your previous answer was “yes,” the diagnosis was:		
In the first quarter	5	31.2

In the second quarter	10	62.5
In the third quarter	1	6.3
Have you been treated for syphilis?		
Yes, full treatment	5	31.3
Yes, incomplete treatment	2	12.5
I didn't undergo the treatment	9	56.2
He underwent monthly VDRL tests		
Yes	9	56.2
No	7	43.8

Source: Research data (2024).

The analysis of knowledge about syphilis transmission and prevention showed that the second largest proportion of participants (37%) had inadequate knowledge. Regarding attitudes, a predominance of negative attitudes was observed (46.1%). The analysis of practices demonstrated that, for 97.6% of participants, practice was classified as inadequate (Table 5).

Table 5 – Overall assessment of knowledge, attitudes, and practices regarding the transmission and prevention of syphilis. Teresina, Piauí, 2023

Variables	N	%
Knowledge		
Appropriate	29	17.5
Regular	75	45.5
Inappropriate	61	37.0
Attitude		
Very positive	61	37.0
Positive	41	24.8
Negative	76	46.1
Practice		
Appropriate	4	2.4
Inappropriate	161	97.6

Source: Research data (2024).

Binomial regression analysis of the association between the classification of the knowledge and attitudes blocks confirmed statistical significance between the variables ($p<0.001$), showing that adequate knowledge and positive or very positive attitudes constituted protective factors against congenital syphilis (Table 6).

Table 6 – Regression analysis of the association between the knowledge cluster classification and attitudes toward the prevention and transmission of syphilis. Teresina, PI, Brazil, 2024

Variables	Adjusted OR *	95% confidence interval (CI)	Value of p**	VIF***	AIC****
Knowledge					
Inadequate/Fair vs. Adequate	0.126	0.05-0.29	< 0.001	198	202

Source: Survey data (2024).*Odds ratio.**Binomial logistic regression. ***Variance Inflation Factor.****Akaike Information Criterion.

DISCUSSION

The findings of this study highlight important sociodemographic, behavioral, and clinical aspects related to pregnant women diagnosed with syphilis in Teresina. Most participants were aged 30 years or younger and showed adequate knowledge and very positive attitudes, factors that provide protection against the transmissibility of congenital syphilis. Another protective factor identified was income: more than half of the participants reported having a source of income, which, according to an ecological study carried out in northeastern Brazil, is associated with the incidence rate of congenital syphilis. This reinforces that living conditions directly interfere in the population's health-disease process, as exemplified by syphilis[19].

It is noteworthy that almost half of the participants reported not having a source of income, and many of those who do depend on the government benefit Bolsa Família. A systematic review conducted in China found that, in low-income countries, the prevalence of syphilis infection in pregnant women is higher. Among the possible reasons for this scenario are chronic poverty, restricted access to health services, lower awareness of sexual health, inadequate screening, and low adherence to treatment[20].

In this study, participants who self-identified as mixed-race predominated, in contrast to research carried out in a municipality in the state of São Paulo, in which 63.2% of pregnant women were white. However, in the final multivariate logistic regression model, skin color was not associated with congenital syphilis, but rather with the

occurrence of syphilis in the third trimester of pregnancy and in the latent tertiary clinical phase, emphasizing that prenatal care still needs to advance in order to reduce congenital syphilis[21]. Despite the high prenatal care coverage in this study, the need for individual and/or collective guidance on syphilis for all pregnant women is highlighted.

More than half of the pregnant women with syphilis in this study had low educational attainment, a factor that may negatively affect appropriate attitudes toward disease prevention. A case-control study identified that pregnant women with lower schooling had five times greater odds of having newborns with congenital syphilis. In addition, it was found that adequate care, with prior diagnosis of syphilis, combined with health education and the provision of better information about STIs, contributes to the prevention of congenital syphilis, reinforcing the importance of effective prenatal care[22].

In this study, a large proportion of pregnant women reported having a partner and not using condoms in all sexual relations within that partnership. An epidemiological study points out that stable relationships may contribute to unprotected sexual practices, reducing preventive measures against STIs and pregnancy, and also shows that condom use is still often associated with symbols of infidelity or distrust[23]. There is a need to intensify health education actions on the importance of condom use during sexual relations, to be carried out continuously by health professionals, with the aim of encouraging the population to adopt safe sexual practices and, consequently, reduce syphilis transmission.

Early sexual initiation, the practice of unprotected sexual intercourse, and a high number of lifetime partners were aspects identified in this study. This picture corroborates national research that showed a mean age of sexual initiation of 17.3 years and a prevalence of consistent condom use of only 22.8%, even lower among women (20.9%). In addition, 59% of the population reported not having used a condom at all in the previous 12 months, with the main reason for non-use being trust in the partner (73.4%)[24]. It is therefore necessary to disseminate STI prevention measures—such as condom use and guidance on risky sexual behaviors—in the various spaces in which pregnant women are inserted, in order to reduce or eliminate the condition and vertical transmission.

A significant proportion of participants reported having had sexual intercourse under the influence of alcohol or drugs. Alcohol and illicit substance use is identified in

the literature as one of the risk factors for the occurrence of STIs among young women, including syphilis[25]. Thus, the adoption of risky sexual practices may contribute significantly to the high prevalence of syphilis in this population.

The study highlighted pregnant women's lack of knowledge about their partners' syphilis serological status. Authors point out that the approach to the partner is deficient, marked by the absence of data on sociodemographic profile, testing, and treatment. Within primary health care, there is a scarcity of studies exploring factors related to the vulnerability context of sexual partners in confronting syphilis[26].

From this perspective, the importance of expanding the general population's knowledge about syphilis is emphasized, as well as the need for effective actions for the early identification of pregnant women's partners, aiming at guidance, screening, treatment, and case monitoring.

A large proportion of pregnant women in this study received the diagnosis of syphilis in the second trimester, and not all underwent adequate treatment. These data point to the need to improve the quality of prenatal care, considering that pregnant women who receive correct treatment contribute to reducing vertical transmission of the disease. This finding is comparable to that of a Brazilian observational study which confirmed that, in 2016, 57% of pregnant women who attended prenatal care in the country were diagnosed with syphilis during pregnancy and, of this total, only 4.1% received satisfactory treatment, while in 62.2% of cases the partners were not treated[27].

Most participants stated that they had already heard about syphilis, mainly through health services and school. These findings are compatible with research carried out in Rio Grande do Sul on pregnant women's knowledge regarding the disease, in which they reported that their main sources of information were television, posters in primary health care units, and school[12]. Given this scenario, it is suggested that health professionals provide guidance during consultations and through other educational actions throughout the entire gestational period, taking into account the sociodemographic and individual characteristics of pregnant women.

Lack of knowledge about the means of transmission and about the characteristic sign of syphilis on the genital organ was also observed in this study. This knowledge gap is similar to the results of a national study, which revealed that pregnant women are

unaware of the forms of contagion of the infection, its complications for the mother and fetus, as well as diagnostic methods and the possibility of treatment[28].

In addition, the study showed that although most pregnant women recognize the importance of condom use for syphilis prevention, they do not use it because they maintain steady partnerships, which increases the risk of infection transmission[23]. Thus, it is essential to demystify condom use, which can be achieved through educational actions in health services, schools, and social media.

In addition, a high number of women reported not knowing whether, even after receiving adequate treatment during pregnancy, they could transmit the disease to their child. This finding is compatible with a study carried out in Minas Gerais, which identified insufficient knowledge among pregnant and postpartum women about gestational syphilis, relating this level of knowledge to low educational attainment and failures in prenatal consultations, especially regarding health promotion actions and the quality of individual and collective care offered to this population[29].

Regarding attitudes toward syphilis prevention and transmission, it was observed that most pregnant women did not know or disagreed that a person who received treatment and was cured could become ill again. In addition, a considerable proportion did not know that there is a cure for syphilis or that adequate treatment during pregnancy prevents vertical transmission. These factors contribute to risky sexual behavior, delayed diagnosis, and difficulty in early treatment, resulting in increased congenital syphilis.

This finding corroborates the results of a qualitative study carried out in Rio Grande do Sul in 2018, which evaluated pregnant women's knowledge about the disease and showed that women receive incomplete information during consultations in health units. The study found that, although they recognized condoms as a preventive method, they had limited knowledge about the infection and its routes of transmission[30].

Thus, pregnant women's knowledge about the prevention and transmission of syphilis was considered regular or inadequate in most participants, and negative attitudes predominated. This finding reaffirms data already described in the literature, such as in a study that identified vulnerability-related behaviors associated with a higher risk of gestational syphilis, such as early sexual initiation, low adherence to condom use, low educational attainment, insufficient knowledge about STIs, cultural factors, family

conditions, violence, and drug use[31].

This reinforces the importance of effective action by primary health care regarding the social determinants and conditions associated with syphilis transmission in order to reduce congenital syphilis, considering that this study showed that the greater the knowledge, the better the attitudes toward prevention and transmission of the infection among pregnant women.

In addition, the study identified an association between knowledge and attitudes, showing that these variables constitute protective factors for syphilis prevention and transmission. Thus, adequate instruction about the disease may directly affect behaviors and promote safer practices, contributing to the reduction of the transmission chain. This process may also contribute to reducing congenital syphilis, which highlights the relevance of health education carried out by professionals as a tool for awareness regarding prevention, early diagnosis, treatment of pregnant women, and inclusion of the partner in care.

As a limitation, the cross-sectional design of the study is highlighted, which makes it impossible to draw cause-and-effect conclusions about the analyzed variables, evidencing the need for more robust intervention research addressing this issue.

CONCLUSION

This study identified that pregnant women's knowledge about the prevention and transmission of syphilis was considered regular or inadequate in most participants, and negative attitudes predominated. In addition, a significant correlation was found between the number of correct answers in the knowledge block and those in the attitudes block, showing that adequate knowledge and positive or very positive attitudes are protective factors in relation to syphilis and may contribute to the prevention of congenital syphilis.

In view of the above, the urgency of greater investment in health education actions in the various settings in which pregnant women are inserted is emphasized, especially in prenatal care, with the objective of expanding information on syphilis prevention, strengthening case screening, and reducing vertical transmission.

REFERÊNCIAS

1. Lara LLP, Soares L de A, Winter ML, Tosi MC, da Silva LC, Rocha LLV. Análise do perfil epidemiológico da Sífilis em gestantes utilizando sistemas de informação em saúde do DATASUS. Braz. J. Health. Rev. 2022;5(1):3148-64. DOI: https://doi.org/10.34119/bjhrv5n1-275

2. Rocha AFB, Araújo MAL, Barros VL de, Américo CF, Silva Júnior GB da. Complications, clinical manifestations of congenital syphilis, and aspects related to its prevention: an integrative review. Rev. Bras. Enferm. 2021;74(4):e20190318. DOI: https://doi.org/10.1590/0034-7167-2019-0318

3. Ministério da Saúde (BR). Atenção integral às pessoas com infecções sexualmente transmissíveis (IST) [Internet], 2022. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/protocolo_clinico_atecao_integral_ist.pdf

4. Benítez J, Yépez MA, Hernández-Carrillo M, Martínez DM, Cubides-Munevar Ángela, Holguín-Ruiz JA, et al. Características sociodemográficas e clínicas da sífilis gestacional em Cali, 2018. Biomédica. 2021;41(Sp.2):140-52. DOI: https://doi.org/10.7705/biomedica.6003

5. Dantas, J. D. C., Marinho, C. D. S. R., Pinheiro, Y. T., & Silva, R. A. R. D. (2022). Temporal Trend of Gestational Syphilis between 2008 and 2018 in Brazil: Association with Socioeconomic and Health Care Factors. Int. J. Environ. Res. Public Health. 2022; 19(24), 16456. DOI: https://doi.org/10.3390/ijerph192416456

6. Sousa Leal AL de, Roberta Maciano F, Scarparo Navarro R, Alencar Luz AL de, Portela Leal M da C, Francisco de Deus W. Sífilis em gestantes: uma análise espacial. Rev Recien. 2021;11(36):65-73. DOI: 10.24276/rrecien2021.11.36.65-73

7. Solidade JS, Leitão FNC, Lopez AGP, Pereira POB, Jastrow JMB, Morais MJ de D, de Sousa OF. Tendência temporal de sífilis congênita e sífilis em gestantes no município de Rio Branco Acre, 2014 – 2020. RESP. 2023;1(3). DOI: https://doi.org/10.59788/resp.v1i3.38

8. Miranda CCS, Torres DSB, Falcão ESN, Barros LSR, Costa LC, Tavares AC, et al. Análise epidemiológica das notificações de Sífilis Congênita em Teresina-PI. Rev. Casos Consult. 2021;12(1):e27451–1. Disponível em: https://periodicos.ufrn.br/casoseconsultoria/article/view/27451/15099

9. Almeida AS, Andrade J, Fermiano R, Jamas MT, Carvalhaes MABL, Parada CMGL. Sífilis na gestação, fatores associados à sífilis congênita e condições do recém-nascido ao nascer. Texto Contexto Enferm. 2021;30:e20200423. DOI: https://doi.org/10.1590/1980-265X-TCE-2020-0423

10. Lima TJA, Queiroz JM, Oliveira KKD, Lima MVC, Rodrigues PS. Atenção à sífilis no pré-natal: percurso do diagnóstico ao encaminhamento. Rev. Cient. Enferm. Recien. 2023;13(41):738–46. DOI: https://doi.org/10.24276/rrecien2023.13.41.738-746

11. Palhares RF, Coelho CM, Anjos LD, Fonseca LT, Fonseca FR, Ferreira DB, et al. Conhecimento das gestantes acerca da Sífilis e a importância da educação em saúde. Braz. J. Hea. Rev. 2020;3(3):7073–80. DOI: https://doi.org/10.34119/bjhrv3n3-238

12. Gomes NS, Prates LA, Wilhelm LA, Lipinski JM, Velozo KDS, Pilger CH, et al. "Só sei que é uma doença": conhecimento de gestantes sobre sífilis. Rev. bras. promoç. saúde. 2021;34:10964. DOI: 10.5020/18061230.2021.10964

13. Oliveira LR, Câmara MMGC da; Valle Mgdo, Alves FC, Assis FCM de, Takatsu E, et al. Autoconhecimento das gestantes sobre a sífilis congênita. Braz. J. Health Rev. 2024; 7(2): e68011. DOI: 10.34119/bjhrv7n2-087.

14. Elm EV, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. BMJ. 2007;335(7624):806-8. doi: 10.1136/bmj.39335.541782.

15. Borges BVS, Gir E, Galvão MTG, Moura MEB, Brito GMI, Magalhães RDLB. Adesão ao seguimento clínico de mulheres profissionais do sexo com sífilis. Cogit. Enferm. 2020;25: e65456. DOI: http://dx.doi.org/10.5380/ce.v25i0.65456

16. Medronho RA. Epidemiologia. 2. ed. São Paulo: Atheneu; 2009. Disponível em: https://edisciplinas.usp.br/pluginfile.php/5062663/mod_resource/content/3/Cap_Epidemiologia%20Medronho%20Sec.%202.pdf

17. Carvalho RXC, Araújo TME. Knowledge, attitudes and practices of university adolescents about syphilis: a cross-sectional study in the Northeast. Rev. Saúde Pública. 2020;54:120. DOI: https://doi.org/10.11606/s1518-8787.2020054002381

18. Fox J, Weisberg S. Car**:** Companion to Applied Regression. The Jamovi Project. Jamovi (version 2.3). Computer Software, 2020. Disponível em: https://www.jamovi.org/

19. Araujo GAS, Maranhão TA, Sousa GJB, Silva TL, Silva IG, Vasconcelos MN. Distribución espacio-temporal y factores relacionados con la sífilis congénita en el nordeste brasileño. Enferm. glob. 2023;22(69):337-383. DOI: https://dx.doi.org/10.6018/eglobal.524931

20. Wu SY, Wuang J, Guo Q, Zhang JJ, Chen Y, Li G. Prevalência de infecções pelo vírus da imunodeficiência humana, sífilis e vírus das hepatites B e C em gestantes: uma revisão sistemática e meta-análise. Clin. Microbiol. Infect. 2023; 29(8):1000-1007. DOI: https://doi.org/10.1016/j.cmi.2023.03.002

21. Santana NCS, Lino CM, Silva ATC, Batista MJ. Fatores associados à transmissão vertical de sífilis em um município do Estado de São Paulo. Rev. Epidemiol. Controle Infecç. Revista de Epidemiologia e Controle de Infecção. 2023;13(2). DOI: https://doi.org/10.17058/reci.v13i2.18097

22. Rigo FL, Romanelli RMC, Oliveira IP, Anchieta LM. Assistance and educational factors associated to congenital syphilis in a referral maternity: a case-control study. Rev. Bras. Saúde Mater. Infant. 2021; 21(1): 127–137. DOI: https://doi.org/10.1590/1806-93042021000100007

23. Mendes LMC, Takada HP, Siqueira SB, Mendes LC, Lino LA, Aguiar Júnior RC, Sobrinha NP do R, Lopes FR. Estudo epidemiológico avaliando a manutenção dos casos de sífilis adquirida de 2017 a 2021 no Brasil. Braz. J. Dev. 2022; 8(7):52386-98. DOI: https://doi.org/10.34117/bjdv8n7-247

24. Felisbino-Mendes MS, Araújo FG, Oliveira LVA, Vasconcelos NM, Vieira MLFP, Malta DC. Comportamentos sexuais e uso de preservativo na população brasileira: análise da Pesquisa Nacional de Saúde, 2019. Rev. Bras. epidemiol. 2021;24:e210018. DOI: https://doi.org/10.1590/1980-549720210018.supl.2

25. Lopes Pereira A, Ribeiro Da Silva L, Palma L, Coutinho L, Moura L, Assis Moura M, et al. Impacto do grau de escolaridade e idade no diagnóstico tardio de sífilis em gestantes. Femina. 2020; 48(9):563–70. Disponível em: https://docs.bvsalud.org/biblioref/2020/10/1122585/femina-2020-489-563-567

26. Laurentino ACN, Ramos BA, Lira CS, Lessa IF, Taquette SR. Atenção à saúde dos parceiros sexuais de adolescentes com sífilis gestacional e seus filhos: uma revisão integrativa. Ciênc. Saúde Colet. 2024;29:e12162023 DOI: 10.1590/1413-81232024295.12162023

27. Favero MLDC, Ribas KAW, Costa MCD, Bonafe SM. Sífilis congênita e gestacional: notificação e assistência pré-natal. Arch. Health. Sci. 2022;26(1):2-8. DOI: 10.17696/2318-3691.26.1.2019.1137

28. Rodrigues JP, Chaves LS, Martins AGA, Santos EM, Cravo LCC, Melo AB, et al. Conhecimento das gestantes acerca da sífilis congênita em unidade de Atenção Primária à Saúde de Belém, Pará. Concilium. 2023;23(10):21-9. DOI: https://doi.org/10.53660/CLM-1324-23K45

29. Attanasio JCO, Andrade MEO, Tanure SS, Schacht V, Oliveira YE, Bello CMM, et al. Avaliação do conhecimento de gestantes e puérperas frente ao cenário da sífilis gestacional em município de Minas Gerais. Rev. Méd. Minas Gerais. 2021; 31(0):67–73. Disponível em: https://rmmg.org/artigo/detalhes/3813

30. Borba KB, Silva RM. Sociodemographic risk factors for gestational syphilis in a maternity hospital in Santa Catarina, Brazil. Rev. Ciênc. Saúde. 2022;12(4):42-47. DOI: https://doi.org/10.21876/rcshci.v12i4.1326.

31. Ozelame JÉEP, Frota OP, Ferreira Júnior MA, Teston EF. Vulnerabilidade à sífilis gestacional e congênita: uma análise de 11 anos. Rev. Enferm. UERJ. 2020;28:e50487. DOI: https://doi.org/10.12957/reuerj.2020.50487

KNOWLEDGE AND ATTITUDES OF PREGNANT WOMEN ABOUT PREVENTION AND TRANSMISSION OF SYPHILIS

Submitted: August 8, 2024
Accepted: March 30, 2026
Published: July 15, 2026

Authors' contributions	
Luiza Carolinda de Sousa:	Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing.
Ana Luiza Vieira Dias:	Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – review & editing
Braulio Vieira de Sousa Borges:	Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing..
Jefferson Abraão Caetano Lira:	Conceptualization, Writing – original draft, Writing – review & editing.
Antonio Filho Alves Rodrigues:	Resources, Writing – original draft, Writing – review & editing.
Gilney Guerra de Medeiros:	Writing – original draft, Writing – review & editing.
Verbenia Cipriano Feitosa Silva:	Writing – original draft, Writing – review & editing.
Rosilane de Lima Brito Magalhães:	Conceptualization, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing.
All authors approved the final version of the text.	
Conflict of interest:	There is no conflict of interest.
Funding:	This research received no external funding.

KNOWLEDGE AND ATTITUDES OF PREGNANT WOMEN ABOUT PREVENTION AND TRANSMISSION OF SYPHILIS

Corresponding author: Luiza Carolinda de Sousa
Universidade Federal do Piauí – UFPI
Centro de Ciências da Saúde – CCS
Bairro Ininga, Teresina – PI, Brasil
CEP: 64049-550
luizacarolindaa@gmail.com

Editor: Zélia Ferreira Caçador Anastácio. Ph.D