

Analysis of the epidemiological profile of pregnant women with syphilis in Paraná, 2010-2020*Análisis del perfil epidemiológico de las gestantes con sífilis en Paraná, 2010-2020**Análise do perfil epidemiológico de gestantes com sífilis no Paraná, 2010-2020***Júlia Fernandes Silva¹**

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Submission: 10-14-2022**Approval:** 11-19-2022**Abstract**

The present study aimed to analyze the epidemiological profile of pregnant women with syphilis in Paraná, between 2010 and 2020, through a quantitative, descriptive study, based on secondary data from the Department of Informatics of the Unified Health System. A total of 18,681 cases of syphilis were notified in pregnant women, within the universe studied, the following variables were evaluated: age, color and race, education, clinical classification and type of diagnosis. Women between 20 and 39 years old, white, with incomplete primary education from the 5th to the 8th grade were the most affected in this sample. As for the diagnosis, 80.5% and 86.1% of the pregnant women had reactive treponemal and non-treponemal tests, respectively. In relation to congenital syphilis, 6,212 cases were registered, having as variables, prenatal care, time of diagnosis, final classification, evolution of live births and performance of treatment by the partner. It was found that, predominantly, mothers performed prenatal care, had their diagnosis during it, evidencing the importance of maternal health care, low adherence of partners to the treatment of infection was also identified, making it necessary to intensify health care pregnancy-puerperium to achieve the ultimate goal of reducing congenital syphilis.

Descriptors: Syphilis; Pregnant; Congenital Syphilis; Prenatal Care; Comprehensive Assistance to Women's Health.

Resumen

El presente estudio tuvo como objetivo analizar el perfil epidemiológico de las gestantes con sífilis en Paraná, entre 2010 y 2020, a través de un estudio cuantitativo, descriptivo, basado en datos secundarios del Departamento de Informática del Sistema Único de Salud. Se reportaron un total de 18.681 casos de sífilis en gestantes, dentro del universo estudiado se evaluaron las siguientes variables: edad, color y raza, escolaridad, clasificación clínica y tipo de diagnóstico. Las mujeres entre 20 y 39 años, blancas, con educación primaria incompleta del 5° al 8° grado fueron las más afectadas en esta muestra. En cuanto al diagnóstico, el 80,5% y el 86,1% de las gestantes presentaron pruebas treponémicas y no treponémicas reactivas, respectivamente. En relación a la sífilis congénita se registraron 6.212 casos, teniendo como variables el control prenatal, momento del diagnóstico, clasificación final, evolución de los nacidos vivos y realización del tratamiento por parte de la pareja. Se constató que, predominantemente, las madres realizaron el control prenatal, tuvieron su diagnóstico durante el mismo, evidenciando la importancia del cuidado de la salud materna embarazo-puerperio para lograr el objetivo final de reducción de la sífilis congénita.

Descriptores: Sífilis; Embarazada; Sífilis Congénita; Atención Prenatal; Atención Integral de Salud.

Resumo

O presente estudo objetivou analisar o perfil epidemiológico das gestantes com sífilis no Paraná, entre 2010 e 2020 através de um estudo quantitativo, descritivo, baseado em dados secundários originários do Departamento de Informática do Sistema Único de Saúde. Notificou-se 18.681 casos de sífilis em gestantes, dentro do universo estudado, avaliou-se as seguintes variáveis, idade, cor e raça, escolaridade, classificação clínica e o tipo de diagnóstico. Mulheres de 20 a 39 anos, brancas, com ensino fundamental de 5ª a 8ª série incompleto foram as mais acometidas nesta amostra. Quanto ao diagnóstico, 80,5% e 86,1% das gestantes tiveram o teste treponêmico e não treponêmico reativos, respectivamente. Já em relação à sífilis congênita, foram registrados 6.212 casos, tendo como variáveis, a realização do pré-natal, momento do diagnóstico, classificação final, evolução dos nascidos vivos e realização do tratamento pelo parceiro. Constatou-se que, predominantemente, as mães realizaram o pré-natal, tiveram seu diagnóstico durante o mesmo, evidenciando a importância da assistência à saúde materna, também foi identificada baixa adesão dos parceiros ao tratamento da infecção, sendo necessário intensificar a atenção à saúde gravídico-puerperal para atingir o objetivo final de reduzir a sífilis congênita.

Descriptores: Sífilis; Gestantes; Sífilis Congênita; Cuidado Pré-Natal; Assistência Integral à Saúde da Mulher.



Introduction

Sexually transmitted infections (STIs) represent a group of common illnesses, however, they are currently considered a public health problem worldwide, since they can affect reproductive and child health, directly impacting maternal and child health. One of the STIs is syphilis, which is a systemic bacterial infection caused by the spirochete *Treponema pallidum*^{1,2}.

Even with the well-known repercussions of the infection, an average of 12 million cases of the infection are registered annually in the world, mainly in low-income populations, as is the case in some regions of Africa. However, the advancement of the disease in developed countries, such as the United States of America (USA), in which the incidence of syphilis increased by 81% from 2014 to 2018, reaching 5 million cases each year and being treated specifically syphilis in pregnant women, 1.5 to 1.85 million cases are registered annually in the world³⁻⁶.

The high incidence may have, as one of the possible causes, the variety of forms of transmission, vertical, hematogenous and sexual. It can be initially classified into two forms: acquired and congenital. The first is divided into 3 stages: primary, when extragenital painless ulcers are present, popularly known as hard chancre; secondary, when characterized by macular eruptions especially in the palmoplantar region; and tertiary or late that presents epidermal, cardiovascular and neurological lesions caused by the absence of treatment⁷.

The second is characterized by transplacental transmission of *Treponema Pallidum*, thus, every child up to 13 years of age, abortion or stillbirth with a mother reactive for syphilis who did not have or had inadequate treatment, has radiological, laboratory or cerebrospinal fluid evidence of the spirochete in the placenta, umbilical cord or fetal tissue is considered to be a carrier of congenital syphilis. The occurrence is directly linked to the clinical history of the disease in the pregnant woman - primary and secondary stages have a higher circulating treponemal content - and the time the fetus is exposed to the bacteria⁸⁻¹⁰.

The diagnosis is made in two ways, direct examinations of the lesions to identify *Treponema Pallidum*, considering the test positive when the infection is still active and negative when there is not enough *Treponema* (injury close to healing or individual already undergoing treatment), and treponemal (specific antibodies) and non-treponemal (non-specific antibodies) immunological tests, after a positive result, regardless of the type of test, treatment begins and follow-up is preferably done with VDRL since treponemal tests remain reactive after treatment^{8,11}.

After the pregnant women show serological reactivity, treatment with the antibiotic benzathine penicillin is started, as it is the only drug suitable for treating the intrauterine fetus, the necessary doses are phase-dependent, depending on the stage of the disease at the time of diagnosis and, if the infection is recent or late¹².

An important strategy for the prevention and control of syphilis during pregnancy in Brazil is the performance, during prenatal care, of serological tests, the first being carried out in the first prenatal consultation, the

second at the beginning of the third trimester and the third in the third trimester. moment of delivery¹³.

In addition to the exams, prenatal care is a way to promote the reception of the pregnant woman and her partner, with the reduction in the use of contraceptives that do not protect against STIs, this has become even more important, especially with seropositive pregnant women and partners. However, the treatment becomes more difficult, as the treatment of partners is highly vulnerable due to ineffective prenatal care and issues related to men's health and is seen as a factor that contributes and favors negative outcomes, as often the therapy is neglected¹⁴⁻¹⁶.

The absence of gestational follow-up makes diagnosis, follow-up and treatment difficult, thus increasing the probability of transmission to the fetus by 70 to 100%, a fact that can impair not only the formation and development of the conceptus, but also progress to intrauterine death, childbirth preterm or neonatal death in approximately 30% to 50% of affected fetuses^{8,17,18}.

Therefore, it is proven that prenatal care effectively reduces, by up to 97%, the vertical transmission of the disease, therefore, congenital syphilis is considered as a care watchdog, a marker of the absence or low quality of health care provided to the child. pregnant woman, with failure in early diagnosis and effective treatment of the disease^{19,20}.

Thus showing that Primary Health Care (PHC), responsible for disease prevention and health promotion programs, has not yet managed to raise awareness of the population regarding disease prevention and treatment measures^{8,16}.

There is also the epidemiological control of syphilis, which is mainly represented by the insertion of both congenital syphilis, in 1986, and gestational syphilis, in 2005, in the national list of compulsory notifiable diseases^{21,22}.

Based on this, data on suspected and actual cases of infection is stored in the Notifiable Diseases Information System (SINAN), which analyzes the incidence and prevalence of syphilis in the three governmental spheres of the country, which provided a reduction of underreporting, a factor seen as partially responsible for the increase in the incidence of the disease^{23,24}.

Thus, from 2010 to 2020, 1,320,467 cases of the disease were registered, in that same period, the infection in pregnant women represented 357,140 cases, with approximately 50,000 pregnant women in the acute phase of the infection each year, succeeding in 196,980 cases of congenital syphilis^{8,16}.

In Paraná, in the same period, 18,681 cases of infection were registered in pregnant women, a fact that resulted in 6,212 cases of congenital syphilis in the state. Syphilis is one of the most prevalent infections in pregnant women in the state of Paraná, so it should be one of the priorities for managers to restructure public policies aimed at controlling the disease. However, without adequate knowledge of what are the vulnerabilities that make some women more susceptible to infection in the state, there is no way for policies to be resolute and equitable^{8,25,26}.

Bearing in mind that congenital syphilis is an avoidable problem, with the necessary information and care,



the present study is necessary as a way to promote better prevention and control strategies for the disease, and consequently, reduce congenital and gestational syphilis. Its objective is to analyze the epidemiological profile of gestational and congenital syphilis in Paraná, from 2010 to 2020.

Methodology

This is a study with a quantitative, descriptive approach, based on secondary data from the Notifiable Diseases Information System (SINAN), which is included in the epidemiological and morbidity health information (TABNET) in the Department of Informatics of the System Health System (DATASUS).

The study consisted of secondary records of pregnant women who developed syphilis during the gestational process in the state of Paraná between January 2010 and December 2020 and who were notified by epidemiological surveillance, and were registered with SINAN. One form was discarded for the study because it had the inconsistent age variable (pregnant woman less than 1 year old), in order not to change the result of the study, this form was eliminated from the “ignored” class of each variable.

In the investigation of syphilis in pregnant women, sociodemographic data (age, schooling, race) and aspects of the diagnosis (treponemal or non-treponemal) were analyzed. As for congenital syphilis, the variables used were whether or not prenatal care was carried out, time of diagnosis of the infection, clinical aspects (final classification and evolution) and whether or not treatment was carried out by the pregnant woman's partner.

The tables were prepared with the absolute number of cases found in DATASUS and the relative number was calculated from the division of the absolute number of each subcategory within each variable by the total number of cases. Regarding the construction of the graphs, the incidence of gestational syphilis was obtained by dividing the number of pregnant women with the infection by the total

number of pregnant women registered in the state each year. While the incidence of congenital syphilis was calculated from the division of cases of congenital syphilis by the number of pregnant women with syphilis in the respective year.

Relative risk was calculated to estimate the magnitude of the association between exposure to the risk factor and the outcome, indicating how many times the occurrence of the outcome in exposed individuals is greater than in non-exposed individuals, dividing the risk of the outcome in exposed individuals by the risk of the outcome in unexposed individuals.

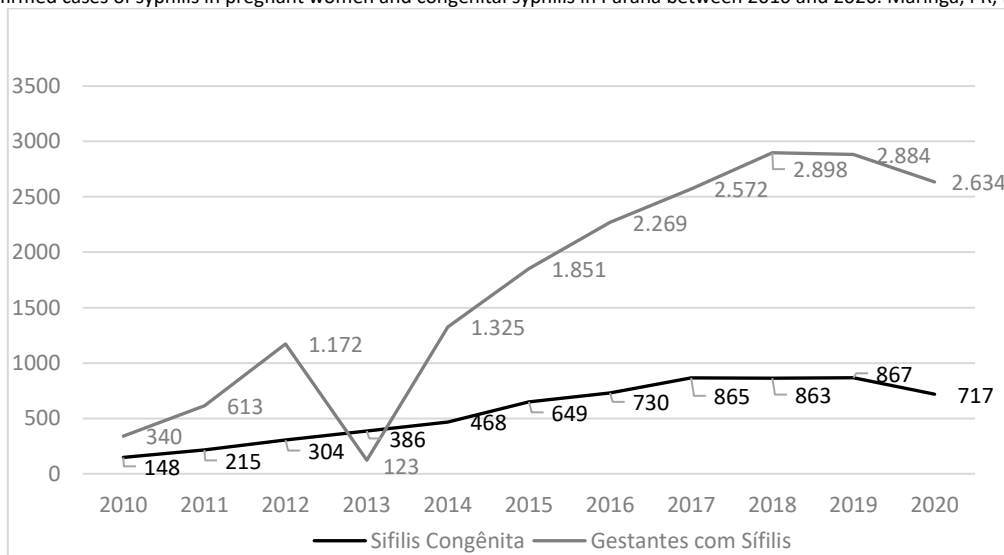
The study was developed in line with the disciplined guidelines of Resolutions n.º 466/12 of the National Health Council regarding research with human beings, but because it is a research with available secondary data, approval by the Permanent Ethics Committee was waived in Research.

Results and Discussion

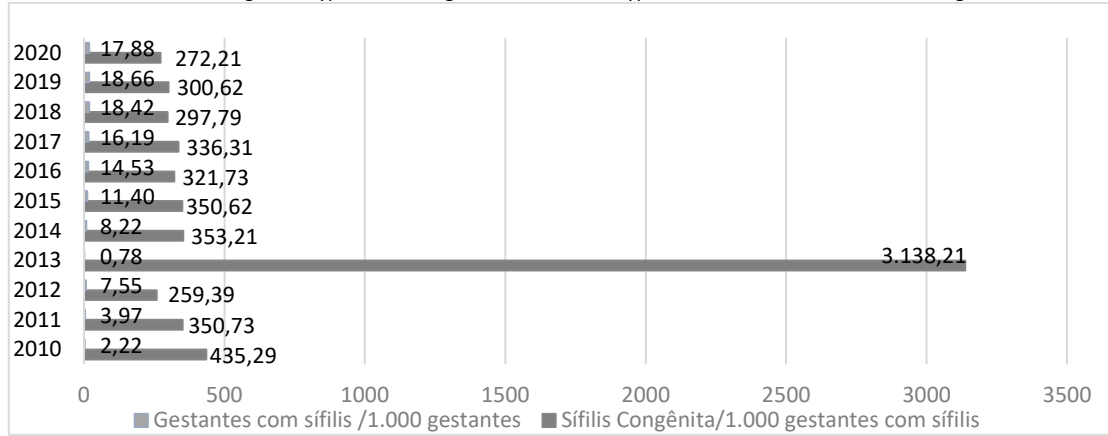
Graph 1 shows the evolution of cases of gestational and congenital syphilis over 10 years, from 2010 to 2020, demonstrating a significant increase in the number of cases of gestational syphilis in the period studied, with a percentage difference of 675%, but the year of 2013 presents a sharp drop and the year 2020 presents a slight drop. While congenital syphilis showed a percentage difference of 412% over the years analyzed, with a slight decrease in the years 2013 and 2020.

In 2013, there were more records of congenital syphilis than gestational syphilis, a fact that probably represents a recording error, since events that allow more than 1 fetus to be generated from the same pregnant woman are not common to the point of expressing the numbers found in the study. For a better presentation of the impact of the year 2013 on the infection records, Graph 2 was prepared based on the incidence rate of gestational syphilis and congenital syphilis considering the infection in pregnant women.

Graphic 1. Confirmed cases of syphilis in pregnant women and congenital syphilis in Paraná between 2010 and 2020. Maringá, PR, Brazil, 2010-2020



Graphic 2. Incidence Rate of Congenital Syphilis and Pregnant Women with Syphilis in Paraná, 2010 to 2020. Maringá, PR, Brazil, 2010-2020



Graphic 3. Incidence rate of congenital syphilis and pregnant women with syphilis in Paraná. 2010 to 2020, except 2013. Maringá, PR, Brazil, 2010-2020

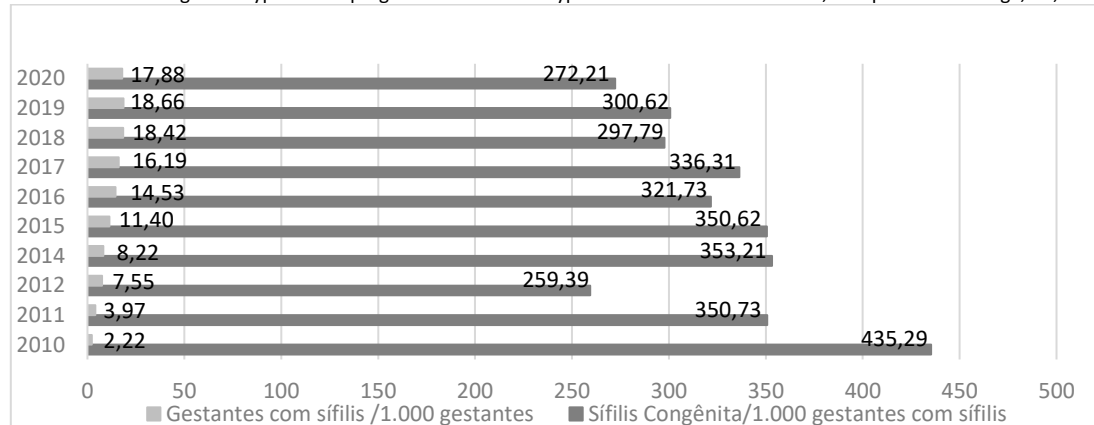


Table 1. Sociodemographic and clinical characteristics of seropositive pregnant women for syphilis in Paraná, 2010 to 2020. Maringá, PR, Brazil, 2010-2020

Variáveis (n= 18.681)	Número absoluto	Número relativo
Dados sociodemográficos		
Faixa etária (em anos)		
10-14 anos	200	0,011
15-19 anos	4528	0,242
20-39 anos	13524	0,724
40-59 anos	429	0,023
Raça/cor		
Branca	12461	0,667
Preta	1034	0,055
Amarela	134	0,007
Parda	4450	0,238
Indígena	146	0,008
Ignorado	456	0,024
Escolaridade		
Analfabeto	55	0,003
1ª a 4ª série incompleta do EF	883	0,047
4ª série completa do EF	715	0,038
5ª a 8ª série incompleta do EF	4149	0,222
Ensino fundamental completo	2120	0,113
Ensino médio incompleto	3188	0,171
Ensino médio completo	3558	0,19
Educação superior incompleta	391	0,021
Educação superior completa	287	0,015
Não se aplica	1	0
Ignorado	3335	0,179
Diagnóstico		
Realizou teste treponêmico		
Reativo	15046	0,805
Não reativo	659	0,035
Ignorado	441	0,024
Não realizado	2535	0,136
Realizou teste não treponêmico		
Reativo	16081	0,861
Não reativo	1298	0,069
Ignorado	313	0,017
Não realizado	989	0,053



For a more precise analysis, Graph 3 was developed excluding the year 2013, in which it is possible to verify that in the first year analyzed, 2010, for every 1,000 pregnant women with syphilis, approximately 435 fetuses acquired the congenital infection. While in 2020, for every 1,000 pregnant women with syphilis, approximately 272 fetuses acquired the congenital infection, demonstrating that there has been a reduction in vertical transmission over the years, but it still represents a high rate of contamination, since it is an avoidable problem. Table 1 presents the clinical and sociodemographic variables of pregnant women with syphilis in Paraná registered at SINAN between 2010 and 2020.

As shown in Table 1, 18,681 cases of syphilis in pregnant women were registered, most of them (72.4%) affected women aged 20 to 39 years and self-declared white

(66.7%). Schooling ranged from illiteracy to complete higher education, the predominance of cases in the year and period analyzed was taken over by women with incomplete primary education from 5th to 8th grade (22%).

As for the diagnosis, 15,046 pregnant women had the reactive treponemal test, that is, 80.5%, and 16,081 the non-treponemal reactive test, 86.1%. It was also observed that, on average, 13.6% of the pregnant women did not undergo the treponemal test, while only approximately 5.3% did not perform the non-treponemal test, demonstrating that in the place and period analyzed, the diagnosis was more often made with non-treponemal tests.

Given the direct relationship between gestational and congenital syphilis, Table 2 presents the characterization of the maternal-fetal profile of congenital syphilis in Paraná registered at SINAN between 2010 and 2020.

Table 2. Distribution of maternal and fetal characteristics of reported cases of congenital syphilis, between 2010 and 2020, in Paraná. Maringá, PR, Brazil, 2010-2020

Variáveis (n= 6212)	Número absoluto	Número relativo
Realizou o pré-natal		
Sim	5508	0,887
Não	637	0,103
Ignorado	67	0,011
Momento do diagnóstico		
Durante o pré-natal	4477	0,721
No momento do parto/curetagem	1222	0,197
Após o parto	399	0,064
Não realizado	48	0,008
Ignorado	66	0,011
Aspectos clínicos		
Classificação final		
Sífilis congênita recente	5822	0,937
Sífilis congênita tardia	8	0,001
Descartado	163	0,026
Natimorto/aborto por sífilis	219	0,035
Evolução dos nascidos vivos		
Vivo	5602	0,902
Óbito por sífilis	94	0,015
Óbito por outra causa	62	0,010
Ignorado	72	0,012
Parceiro realizou o tratamento		
Sim	1160	0,187
Não	4297	0,692
Ignorado	755	0,122

According to Table 2, it appears that 6,212 cases of congenital syphilis were registered, in 5,508 of the cases (88.7%), the mother received prenatal care, consequently there was a predominance (72.1%) of diagnosis during the prenatal.

Regarding the conceptus classification, it is possible to verify that 93.7% were classified as recent congenital syphilis and approximately 3.5% of the cases were stillbirths/abortions.

In the evolution of live births, it is possible to verify the prevalence of live babies, while 94 of the cases (1.5%) evolved to death from the disease. With reference to partner treatment, 1160 of the partners (18.7%) underwent treatment compared to 4297 (69.1%) who did not.

Table 3 proposes the analysis of the association between the risk factor (partners' treatment) and the outcome (prenatal care), summarizing that in the group of treated partners there is a 13% increase in the probability of the pregnant woman having prenatal care affirming the importance of treating the partners for the end of the infection.

Table 4 analyzed the possible association between the treatment of the partners and the probability of negative outcomes for the fetus, identifying a 3% increase in the probability of the conceptus being born alive in the group of treated partners.



Table 3. Incidence of prenatal care in Paraná between 2010 and 2020, according to the treatment of the pregnant woman's partner with syphilis. Maringá, PR, Brazil, 2010-2020

Tratamento dos parceiros	Pré-natal		Total	Probabilidade de realização de pré-natal
	Sim	Não		
Sim	1.138	18	1.156	0,98
Não	3.732	545	4.277	0,87
Total	4.870	563	5.433	1,13

Table 4. Incidence of live births in Paraná between 2010 and 2020, according to the treatment of the pregnant woman's partner with syphilis. Maringá, PR, Brazil, 2010-2020

Tratamento dos parceiros	Nascidos vivos		Total	Probabilidade de feto nascer vivo
	Sim	Não		
Sim	1.119	21	1.140	0,98
Não	3.984	187	4.171	0,96
Total	5.103	208	5.311	1,03

The increase in the incidence of the disease can be explained by difficulties in early diagnosis and, consequently, in the treatment of pregnant women and their partners, which represents a serious public health problem in the country, since both diagnosis and treatment are offered by the Unified System of Health (SUS)^{16,24}.

The result identified by the present study may be directly related to the greater vulnerability of this group, as young women have more intense sexual practices, difficulty accessing information and lack of understanding of the importance of STI prevention measures during pregnancy and possible consequences, mainly for the concept^{24,27}.

This reality corroborates what was identified in other studies carried out in São Paulo, Minas Gerais, Mato Grosso do Sul and Tocantins^{24,28-30}. Regarding the race/color variable, this study agreed with the result of a study carried out in 2019, as the work concluded that white women were present in 66% of cases²⁴.

In contrast, in Mato Grosso do Sul, pregnant women with black or brown skin represented approximately 62%, thus demonstrating that the predominance of skin color varies with the state being analyzed, reaffirming the need for individual analysis of each location³⁰.

Low education was also identified in a study carried out between 2008 and 2018, in Mato Grosso do Sul, in which women with 1 to 9 years of study, in 44.8% of the reported cases, thus portraying that this variable is a determining factor for the greater occurrence of the disease³⁰.

Even though low education has a consolidated relationship with the development of the infection, this study found that in Paraná there are a higher number of pregnant women infected with higher education compared to illiterate pregnant women.

Regarding the diagnosis, the ideal is to perform a treponemal test associated with a non-treponemal test, the order in which the tests are carried out is up to the decision of the health service, the association occurs to avoid false-negative results, especially in pregnant women in the early stages of pregnancy. illness^{8,11}.

The results of the present study demonstrated that the association between the tests did not occur in full, since in the period and place analyzed there was a higher prevalence of non-treponemal tests.

Regarding congenital syphilis, the characterization of the maternal profile indicated that most women received prenatal care, which has as its central objective the prevention of vertical transmission, a fact that did not fully occur in the place and period analyzed, suggesting that high coverage does not mean that care was provided effectively^{19,20}.

Thus, the high incidence of congenital syphilis in newborns whose mothers primarily received prenatal care reflects the fragmentation of primary care, thus resulting in late diagnosis of the infection, lack of acceptance, lack of treatment by partners and development of infection in the fetus, which with proper follow-up could have been avoided³¹.

For the therapy in the pregnant woman to be seen as effective, it needs to be completed 30 days before delivery and the partner needs to be treated concomitantly, with the correct medication to reduce vertical transmission and stop the chain of transmission^{8,14,32}.

However, there is low assent to the treatment by the partners and this is multifactorial, such as non-acceptance of the diagnosis and treatment, ignorance of the disease, fear of revealing extramarital partners and fear of domestic violence, which can cause reinfection and, consequently, increase transmissibility to the fetus^{14,15,33}.

There are factors linked to women, studies have shown that having 3 or more annual sexual partners increases the probability of developing syphilis, and when you have a steady partner there is a fear of telling your partner the diagnosis for fear of reprimand and separation^{34,35}.

There are also factors related to the work process in the PHC, as nursing professionals are often overloaded and are unable to provide adequate attention to pregnant women, which is seriously harmful to care, after all, nurses

have a large role in the effective performance of care. prenatal^{32,33,36,37}.

In a study carried out in 2017 in a municipality in the state of Rio de Janeiro, it was found that 79% of professionals were duly trained to provide adequate care for syphilis, however, only 24% of nurses sought out partners for testing and carried out welcoming the couple, representing a failure in the PHC work process, since in addition to prenatal care, the active search and health education are also essential to increase the partner's adherence to treatment^{38,39}.

Thus, proper preparation of professionals who participate in prenatal care is essential, with a focus on monitoring, guidance, testing and drug therapy⁴⁰.

Final Considerations

The Unified Health System advocates prevention, diagnosis, treatment of gestational syphilis and prevention of vertical transmission through prenatal care, however, from the present study it was identified that the situation of

gestational and congenital syphilis in Paraná is far from the ideal, because, despite the reduction in incidence, the results showed a prevalence of infection in pregnant women with persistence of vertical transmission, suggesting that even with prenatal care being performed by most pregnant women, it is not being carried out properly.

The scenario found by the study is represented by the reduction in the incidence of syphilis in pregnant women in Paraná, demonstrating the importance of prenatal care provided. As a way of achieving the ultimate goal of reducing mother-child transmission of the infection, it is necessary to perpetuate the qualification of professionals, guarantee the rights to health, education and citizenship in order to progress with the strengthening of the Maternal and Child Health Network.

Thus, the results of this study are relevant as a contribution, both for improving the assistance already provided to women during the pregnancy-puerperal cycle and for intensifying Health Planning.

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