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## Gestational syphilis at different health care levels: a cross-sectional study

*Sífilis gestacional em diferentes níveis de atenção à saúde: um estudo transversal*

*Sífilis gestacional en diferentes niveles de atención de salud: un estudio transversal*

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### ABSTRACT

**Background and objectives:** Syphilis is a sexually transmitted disease that can cause miscarriage, premature birth, malformations, and neonatal death. When diagnosed and treated in the first months of pregnancy, the neonatal risks are considerably reduced. This work aims to discuss the key points regarding prevention and effective treatment of gestational syphilis at different health care levels. **Methods:** Retrospective cross-sectional study. A survey was carried out about syphilis notifications recorded at a hospital in Porto Alegre, RS, from January to June 2021, considering the variables date of diagnosis and notification and laboratory, treatment, and prenatal care data collected in hospital records and the e-SUS system. **Results:** In the study period, 17 cases of gestational syphilis and 102 cases in newborns were notified. We selected the case of a patient with a history of two pregnancies without prenatal care and use of psychoactive substances. This case illustrates the patient's itinerary in Primary Care, in specialized services such as the Center for Psychosocial Care and High-Risk Prenatal Care, and hospital care, showing the availability of care and, at the same time, the fragmentation of services. **Conclusion:** Multidisciplinary actions are needed at different health care levels to ensure access to testing for pregnant women and their partners, family planning, and adequate syphilis treatment, which interrupts the disease transmission chain and avoids possible complications of neonatal syphilis.

**Keywords:** Syphilis. Syphilis, Congenital. Comprehensive Health Care. Maternal-Child Health Services.

### RESUMO

**Justificativa e objetivos:** A sífilis é uma infecção sexualmente transmissível que pode causar aborto, parto prematuro, malformações e morte neonatal. Quando diagnosticada e tratada nos primeiros meses da gestação, os riscos neonatais são consideravelmente diminuídos. Este trabalho tem como objetivo discutir os pontos-chave na prevenção e no tratamento efetivo da sífilis gestacional no contexto dos diferentes níveis de atenção à saúde. **Métodos:** Estudo transversal retrospectivo. Foi realizado um levantamento das notificações de sífilis em um hospital

de Porto Alegre, RS, de janeiro a junho de 2021, considerando as variáveis data do diagnóstico e da notificação e dados de exames laboratoriais, de tratamento e de atendimento pré-natal, coletadas nos registros hospitalares e no sistema e-SUS. **Resultados:** No período do estudo, foram notificados dezessete casos de sífilis em gestantes e 102 em recém-nascidos. Selecionamos o caso de uma paciente com histórico de duas gestações sem pré-natal e uso de substâncias psicoativas. O caso ilustra o itinerário da paciente na atenção primária, em serviços especializados, como Centro de Atenção Psicossocial e Pré-Natal de Alto Risco, além do atendimento hospitalar, demonstrando a disponibilidade dos atendimentos e, ao mesmo tempo, a fragmentação dos serviços. **Conclusão:** São necessárias ações multidisciplinares nos diferentes níveis de atenção à saúde para garantir acesso à testagem da gestante e seus parceiros, ao planejamento familiar e ao tratamento adequado da sífilis, que interrompa a cadeia de transmissão da doença e evite possíveis complicações da sífilis neonatal.

**Descritores:** *Sífilis. Sífilis Congênita. Assistência Integral à Saúde. Serviços de Saúde Materno-Infantil.*

## RESUMEN

**Justificación y objetivos:** La sífilis es una infección de transmisión sexual que puede causar aborto espontáneo, parto prematuro, malformaciones y muerte neonatal. Su diagnóstico y tratamiento en los primeros meses de embarazo lleva a una considerable reducción en los riesgos neonatales. Este trabajo tiene como objetivo discutir los puntos clave en la prevención y tratamiento efectivo de la sífilis gestacional en el contexto de los diferentes niveles de atención a la salud. **Métodos:** Estudio transversal retrospectivo. Se realizó una encuesta de notificaciones de sífilis en un hospital de Porto Alegre (Brasil), de enero a junio de 2021, considerando las siguientes variables fecha de atención y notificación, y datos de exámenes de laboratorio, de tratamiento y control prenatal, recabadas de los registros hospitalarios y del sistema e-SUS. **Resultados:** Durante el período de estudio se reportaron diecisiete casos de sífilis en embarazadas y 102 en recién nacidos. Seleccionamos el caso de una paciente con antecedentes de dos embarazos sin control prenatal y consumo de sustancias psicoactivas. El caso ilustra el itinerario de la paciente por la atención primaria, por servicios especializados como el Centro de Atención Psicossocial y Atención Prenatal de Alto Riesgo, además de la atención hospitalaria, lo que demostró la disponibilidad de la atención y, al mismo tiempo, la fragmentación de los servicios. **Conclusiones:** Son necesarias acciones multidisciplinares en los diferentes niveles de atención a la salud para garantizar el acceso a la prueba de la embarazada y de sus parejas, a la planificación familiar y al tratamiento adecuado de la sífilis, lo que interrumpa la cadena de transmisión de la enfermedad y evite posibles complicaciones de la sífilis neonatal.

**Palabras clave:** *Sífilis. Sífilis Congénita. Atención Integral de Salud. Servicios de Salud Materno-Infantil.*

## INTRODUCTION

Syphilis is an infectious disease caused by the bacterium *Treponema pallidum*, from the group of spirochetes, which can be transmitted both sexually (acquired syphilis) and vertically in contact during pregnancy (congenital syphilis), and can reach 40% of fetal mortality.<sup>1,2</sup> According to data from the World Health Organization (WHO), most women with syphilis (about 80%) are of reproductive age, a factor that increases the risk of vertical transmission. In Brazil, the incidence is approximately 4% in the general population and 2% in pregnant women, with a higher rate of transmission in the early stages of the disease. In pregnant women, vertical transmission to the fetus can reach 80% intrauterine and can also occur during vaginal delivery if the mother has any injury due to syphilis.<sup>1,3</sup>

The burden of morbidity and mortality due to congenital syphilis is high, and most untreated infections due to syphilis during pregnancy result in adverse outcomes. In 2012, the estimate was 143,000 fetal deaths/stillbirths, 62,000 neonatal deaths, 44,000 premature or low birth weight babies, and 102,000 infected babies. These outcomes can be avoided if the pregnant woman

receives appropriate treatment, preferably during the first trimester of pregnancy.<sup>3</sup> Diagnosis and treatment, even in asymptomatic cases, are important due to the possibility of reinfection, in addition to the possibility of disease progression in the absence of adequate treatment.<sup>4</sup>

About 60% to 90% of newborns with congenital syphilis are asymptomatic at birth. The presence of signs and symptoms at birth depends on the time of intrauterine infection and treatment during pregnancy, thus, serological screening and appropriate treatment of pregnant women and partners from prenatal care are essential. Prematurity and low birth weight are frequent perinatal complications. Frequent manifestations of early congenital syphilis (before 2 years of age) are: hepatomegaly, splenomegaly, jaundice, serosanguineous rhinitis, maculopapular rashes, bone abnormalities, thrombocytopenia, and anemia. The clinical manifestations of late congenital syphilis may involve developmental delay, neurological deafness, short jaw, and seizures, which appear in approximately 40% of infected and untreated children in the first months of life.<sup>5</sup>

Every pregnant woman should be tested for syphilis at least twice during prenatal care, once in the first

trimester of pregnancy and once in the third trimester, the partner should also be tested. A third test should also be performed at the time of admission to the maternity ward, including for other sexually transmitted infections (STIs).<sup>1</sup> Also, investigating syphilis immediately after hospitalization for delivery in the maternity ward, or in case of abortion, is also mandatory.<sup>6</sup>

The diagnosis of syphilis occurs from clinical data, results of diagnostic tests, history of past infections, and investigation of recent exposure.<sup>6</sup> The easiest way to access it is the rapid treponemal test, which is available in Primary Health Care (PHC) and in maternity hospitals, aiming to expedite the diagnosis, since the time between the execution and the result is a maximum of 30 minutes, with sensitivity of 94.5% and specificity of 93%.<sup>6</sup>

To treat congenital syphilis, according to the Clinical Protocol and Therapeutic Guidelines for Integral Care to People with Sexually Transmitted Infections (PCDT-IST),<sup>1</sup> the treatment or not of the mother during pregnancy and the titration of the mother's non-treponemal test compared with that of the child is considered.

Children with congenital syphilis should be treated with crystalline benzylpenicillin in a hospital setting, with clinical and laboratory follow-up. In cases of children born to mothers who did not undergo any treatment or underwent inadequate treatment during pregnancy but have normal physical and behavioral examination and non-reactive treponemal test, treatment is performed with benzathine benzylpenicillin in a single dose. The exception of drug treatment occurs when the child is born to a mother who underwent adequate treatment during pregnancy, before the fifth month of gestation and has a non-reactive non-treponemal test. In this case, the child is not notified and follows up with the PHC, with laboratory follow-up for monitoring.<sup>1</sup>

According to data from the Ministry of Health, in 2021, 74,095 cases of syphilis in pregnant women (incidence coefficient of 27.1 per 100,000/inhabitants) and 27,019 cases of congenital syphilis (incidence coefficient of 9.9 per 100,000/inhabitants) were reported in Brazil. In Rio Grande do Sul, the incidence coefficient of syphilis in pregnant women was 38.1 per 100,000/inhabitants, and the incidence coefficient of congenital syphilis was 15.8 cases per thousand live births.<sup>7</sup>

In 2020, 115,371 cases of acquired syphilis (detection rate of 54.5 cases/100,000 inhabitants); 61,441 cases of syphilis in pregnant women (detection rate of 21.6/100,000 live births); 22,065 cases of congenital syphilis (incidence rate of 7.7/100,000 live births); and 186 deaths from congenital syphilis (mortality rate of 6.5/100,000 live births) were reported in the Notifiable Diseases Information System (SINAN).<sup>7</sup>

The underreporting of cases can mean these numbers are even higher and is part of the major problems in the fight against syphilis. In the care of patients with a positive test for syphilis, quality time is needed to clear the patient's doubts, make referrals, record the evolution and, finally, make the notification.<sup>5</sup>

Note that, although syphilis is amenable to preven-

tion, diagnosis, and treatment in PHC, the disease still affects pregnant women and neonates. In this context, this study aimed to discuss the key points in the prevention and effective treatment of gestational syphilis in the context of the different levels of health care.

## METHODS

This is a descriptive, retrospective, and cross-sectional study based on a survey in a public mother-child hospital in Porto Alegre, RS, Brazil, from January to June 2021. The hospital is a state reference in the area, receives referrals from PHC units and has 180 beds, it also treated 1,799 pregnant women in the obstetric center during the study period, according to records of the computerized system. The patients are referred by the primary care network of the municipality, as well those of municipalities in the interior of the state since it is a reference service in the area.

A survey of the notifications of syphilis in pregnant women and congenital syphilis was carried out with the SINAN. The variables date of diagnosis and notification, data from laboratory tests, treatment and prenatal care of the patients attended were consulted in the notifications of the Hospital Infection Control Service, in electronic medical records and in the e-SUS system. This survey seeks to bring complementary and relevant information to the services, since the different systems do not have an interface. Among the reported cases, one was selected since the patient had two records of hospital care at the Obstetric Center. Thus, the case was selected by the researchers to reflect on the role of different levels of health care in the prevention and treatment of syphilis during pregnancy.

This study is part of the matrix project entitled "Ações de Farmácia Clínica no Âmbito da Saúde da Criança e da Mulher" (Clinical Pharmacy Actions in the Scope of Child and Women's Health), which was approved by the Research Ethics Committee of the Hospital Materno Infantil Presidente Vargas (Opinion No. 4,716,657).

## RESULTS

A total of 1,799 pregnant women were treated at the Obstetric Center of the study site, from January to June 2021, among which 17 cases of syphilis in pregnant women and 102 cases of congenital syphilis were reported. Among them, one case was selected as follows:

A 28-year-old patient, smoker, user of marijuana and cocaine for about eleven years, with no other comorbidities. She has had a steady partner for about five years and denies that he uses substances except alcohol. In her third pregnancy, her first daughter is 3 years old and lives with the patient's sister. She was admitted to the obstetric center on February 23, 2021, without information of gestational age, and informed that she did not undergo prenatal care. During the obstetric examination, a gestational age of 38 weeks and 2 days was verified, and a positive result for syphilis. The live baby was referred to the



intensive care unit (ICU) for follow-up and necessary care.

Throughout the hospitalization, the patient reported recent psychiatric hospitalization and follow-up in the Psychosocial Care Center (CAPS), but without adherence to drug and behavioral treatment. In an interview with the Social Service, she showed interest in performing follow-up, affirming the birth of her child as a great motivator. Contradictorily, on the same day, the patient fled. The maternity hospital sent reports to the competent sectors and requested protective measures for the newborn (NB), who was discharged with institutional care and is still under outpatient health follow-up.

Records were found in the e-SUS as of January 14, 2020, confirming that the patient did not undergo prenatal care and, consequently, was not referred to the High-Risk Prenatal Service (PNAR) available at the study hospital, or another reference service.

During the review of the medical record data, a new admission of the same patient was found on January 13, 2022, taken in by the Mobile Emergency Care Service for evaluation in the same obstetric center due to the ruptured sac and twin pregnancy. The patient reported not having undergone prenatal care and provided the same information regarding social issues, she also indicated her last use of cocaine on January 12, 2021. Upon admission, blood typing tests and serology were performed, with a new test for reactive syphilis (laboratory test with VDRL result 1:8).

To start treatment for syphilis, the patient received a dose of benzylpenicillin 2,400,000 IU and was referred for hospitalization. The first twin was born in bed, a live birth, and the second was born in the delivery room, a live birth, both female, and were referred to the neonatal ICU for treatment of congenital syphilis and microcephaly investigation. Both were discharged with institutional care, with no record of outpatient follow-up at the service.

Followed-up by the psychiatry service, the patient was open to talking, but when approached about substance use, she became uncollaborative. In addition, the patient presented good health status and was discharged from the hospital with referral to primary care for follow-up of syphilis treatment, with prescription of benzylpenicillin, initiation of medroxyprogesterone, as a contraceptive method, and family planning guidance, with indication for placement of contraceptive implant, she was also referred to the CAPS for follow-up.

According to the evolution in the e-SUS system, it was found that the patient belongs to the territory of another health unit, so she was instructed to seek her referral unit to continue the follow-up. There is no information about the follow-up.

The case presented illustrates the patient's itinerary in PHC and in specialized services, such as CAPS and PNAR, in addition to hospital care, demonstrating the availability of care and, at the same time, the fragmentation of services. Management of syphilis is ineffective, even if prevention and treatment at the PHC level are possible.

## DISCUSSION

During the study period, 17 cases of syphilis in pregnant women and 102 cases of congenital syphilis were reported. Such discrepancy may have occurred due to previous notification of pregnant women in PHC, or due to underreporting in the hospital environment.

Syphilis is a notifiable disease for all countries that are members of the WHO, and each case need to be investigated. In Brazil, the compulsory notification of congenital syphilis throughout the national territory was established by Ordinance No. 542, of December 22, 1986; syphilis in pregnant women, by Ordinance No. 33, of July 14, 2005; and that of acquired syphilis, by Ordinance No. 2,472, of August 31, 2010. The current ordinance that defines the Brazilian National List of Mandatory Notification of Diseases, Injuries, and Public Health Events in public and private health services throughout the national territory is Ordinance No. 264, of February 17, 2020.<sup>7</sup>

The underreporting of syphilis cases makes it difficult to combat the disease. The gap in the transfer of information can impair the integrality of care and longitudinal care from the point of primary and/or secondary care.

The case presented here represents several aspects involved in health care in cases of gestational and congenital syphilis. Extreme social vulnerability and the use of psychoactive substances stand out as factors that led to the lack of adequate prenatal care, as described by different professionals in the records analyzed. The fragmentation of the care process and the difficulty of access to continuity of care is also noticeable. After hospital discharge, the patient was referred to PHC for syphilis treatment follow-up, family planning guidance, and mental health follow-up, but no follow-up demonstrated the effective performance of subsequent care. However, establishing an integrated care network, with knowledge of the patients' itinerary and monitoring of the weak points of follow-up in the local reality is essential, considering that access and quality of care available to pregnant women, especially in PHC, are fundamental for the prevention, diagnosis, and treatment of gestational syphilis.<sup>8-10</sup>

We also found the absence of data recorded in the medical records of the hospital and of detailed description of the care provided in the PHC and recorded in the e-SUS, which does not make it clear whether the case of syphilis was notified. The lack of integration of computerized systems hinders the adequate follow-up of patients who access different levels of health care. In cases such as the one presented, professionals base their decisions on information provided by the patient, susceptible to memory bias, difficulties in expressing and understanding previous care, or even intentional omission of information.

The survey of notifications at the study site showed that, in 17 cases, the notification was made at the time of hospital care, that is, the diagnosis occurred in prepartum care, despite the fact that syphilis is a condition that can be prevented and treated in PHC. In this context, the Ministry of Health has adopted strategies to improve

syphilis surveillance in pregnant women, including the use of rapid tests, which can optimize the routine in health services and ensure testing for syphilis in prenatal programs, according to the guidelines applied in Brazil, especially in areas of difficult access to an effective laboratory network. The decentralization of rapid testing in PHC and maternity services can provide prompt diagnosis and appropriate treatment, especially when it comes to pregnant women and populations with greater vulnerability to syphilis.<sup>10,11</sup>

After treatment, the control of cure of syphilis in pregnant women should occur monthly by monitoring the fall of the titers of the venereal disease research laboratory (VDRL) test, which did not happen in the presented case. Non-treponemal tests are useful to investigate active syphilis and monitor treatment, by comparing the titer of the diagnosis with the titers of the post-treatment.<sup>11</sup>

Prenatal care is indispensable for the possible diagnosis of various diseases in pregnant women that can affect the baby. The prenatal care process indicators were determined considering the first visit up to the 12th week of gestation, minimum of six consultations, laboratory tests (blood count, serology for syphilis-VDRL, anti-HIV testing, and urinalysis), clinical-obstetric evaluation (blood pressure measurement, weight measurement, fundal height measurement, evaluation of fetal heart rate, and clinical breast exam), counseling related to the use of tobacco, alcohol and hair dye, absence from consultations, healthy eating and guidance regarding signs of labor and obstetric risk, instructions on breastfeeding and on the reference maternity for childbirth care. Referrals to specialized services when necessary are also possible.<sup>12</sup>

In Brazil, prenatal care is offered by the Unified Health System (SUS); however, adherence is still low, and the factors are the most diverse. A survey of the quality of prenatal care in Brazil, under the National Program for the Improvement of Access and Quality of Primary Care (PMAQ-AB), showed that only 15% of the 6,125 pregnant women interviewed received adequate prenatal care, considering all the actions recommended by the Ministry of Health. The proportion of complete care in pregnant women was significantly higher among those with older age, higher income, in the Southeast region, and in municipalities with more than 300,000 inhabitants and whose Human Development Index (HDI) is in the top quartile.<sup>12</sup> The findings of the second cycle of the PMAQ-AB indicate the need to expand the offer of diagnosis and treatment of syphilis to avoid and reduce vertical transmission.<sup>13</sup>

Other Brazilian studies point to flaws in prenatal care and inadequate treatment of syphilis cases.<sup>14,15</sup> An epidemiological study with 268 pregnant women with syphilis in a hospital in Minas Gerais, between 2007 and 2016, showed a diagnosis of congenital infection in 74.2% of the cases, which was significantly associated with inadequate prenatal care, absent/incomplete treatment, prematurity, and low birth weight.<sup>16</sup> Thus, new strategies are needed to reduce the transmission of syphilis during pregnancy, such as sexual education that contemplates the contagion and transmission of the disease, access to

treatment, monitoring the treatment of the pregnant woman and her partner, presenting of the consequences of congenital syphilis and its relationship with inadequate treatment.<sup>14</sup>

Social and individual inequalities persist that can be the object of actions to qualify the work processes of the teams,<sup>15</sup> since there is a failure in the communication and articulation between health services at the three levels of care, disqualifying the concept of integrality of maternal and child care.<sup>16</sup> In this context, longitudinal care allows adequate follow-up, from pregnancy to the puerperium, in addition to providing subsidies for early identification of complications and increased satisfaction and adherence to postpartum consultations.<sup>17</sup>

Pregnant women exposed to social vulnerability and who are users of drugs and other substances make up the profile that most needs health support and, generally, are the ones who least adhere to prenatal care, as shown in the case reported in this study. Detecting pregnant women at higher risk of drug use during prenatal care may allow early intervention, reduction of health risk behaviors, and improvement of the quality of maternal and child care.<sup>18</sup>

The reported case puts us in front of several aspects of social vulnerability, which can impact access to health services. In this case, we can highlight the lack of assistance in the treatment of mental health and the lack of active search strategies for prenatal care in the Family Health Strategy (FHS), for guidance on family planning, and for referral to a specialized care service in high-risk pregnancies. In addition, the bond between patients and professionals brings more comfort and confidence, improving the care process. Care models that use indicators based on an absolute number of visits may hinder the patient's bond with professionals and directly reflect on the decrease in the quality of care.

For adequate treatment, part of the cases requires frequent consultations with health services, which may represent costs with travel and absences due to work activities. Thus, in addition to geographical accessibility, considering aspects related to functional accessibility, such as the functioning hours of the Basic Health Unit (BHU) and the organization of the flow of care for users so that they feel welcomed is necessary.<sup>13</sup>

Many pregnant women in situations of extreme vulnerability may have difficulty, or feel intimidated, to report to their partner the condition of an STI. Such aspects may be important elements for the low adherence and the large number of therapeutic failures regarding syphilis.<sup>4</sup> In the presented case, although the patient reported that she had had a steady partner for five years, no records were found regarding his testing or treatment.<sup>6</sup>

The pharmaceutical assistance of each municipality is responsible for the programming, acquisition, and distribution of the drug used, which is provided by the Ministry of Health via programs to combat and control STIs. The pharmacist must be integrated with the epidemiological data of the disease in his territory to avoid gaps in supply. The pharmacist is part of the multidisci-

plinary PHC team and can act both in the logistical part of the pharmaceutical care cycle and in the clinical part, performing orientation actions in drug dispensing, health education in groups of pregnant women, and testing actions. Thus, the pharmacist should be inserted in a multidisciplinary team, to promote comprehensive care for mothers and babies.

Pharmaceutical care is the practice model that guides the provision of different pharmaceutical services directly aimed at the patient, the family, and the community, aiming at prevention and resolution of pharmacotherapy problems, rational and optimal use of medicines, and promotion, protection and recovery of health, as well as the prevention of diseases and other health problems.<sup>19</sup>

This study had some limitations, such as the lack of data in the records or the low quality of the data. For these reasons, data collection in different data sources (notification forms and medical records) was included to minimize these problems. On the other hand, this case illustrates the complexity of attending to a condition considered sensitive to PHC.

Moreover, this study demonstrates the fundamental role of health care networks in the prevention and treatment of syphilis during pregnancy. The control of mother-to-child transmission of syphilis is a condition sensitive to PHC, and improving access to and quality of prenatal care, promoting syphilis testing, and ensuring adequate and immediate treatment of the pregnant woman and her partner is necessary, in addition to training health professionals to perform screening and early identification of cases.<sup>20</sup>

In addition, involving the different levels of health care in joint actions with a multidisciplinary character, aiming at interrupting the chain of transmission and preventing possible complications of congenital syphilis, is essential.

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## AUTHORS' CONTRIBUTIONS

**Janaína Vieira Belusso, Gabriela Bottan, and Karin Hepp Schwambach** contributed to the conception, design, analysis, and writing of the article; **Janaína Vieira Belusso, Matheus William Becker, Gabriela Bottan, and Karin Hepp Schwambach** contributed to the review and final approval of the article. All authors have approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and integrity.