

## PROFILE OF NOTIFIED CASES OF CONGENITAL SYPHILIS

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**ABSTRACT:** The present study analyzed the incidence of congenital syphilis, tests for diagnosis, and treatment provided to newborns. This was a retrospective and descriptive epidemiological study with a quantitative approach. Data collection occurred in December 2015 using data from the Notifiable Diseases Information System provided by the Epidemiological and Environmental Surveillance Department of the Municipal Health Department of Porto Velho. The incidence of congenital syphilis increased during the period studied (2009 to 2014), from 0.92 cases to 8.65 per 1,000 live births. Regarding pregnant women, 157 (79.29%) carried out prenatal care, 119 (60.10%) were diagnosed during prenatal care, and 109 (55.1%) underwent inappropriate treatment. With regard to newborns, 99 (50.00%) were female, 126 (63.64%) were brown, 153 (77.27%) were born asymptomatic, and 129 (65.15%) were treated with crystalline penicillin G. Therefore, there are challenges regarding early diagnosis and appropriate treatment of pregnant women, their partners, and newborns in the city of Porto Velho.

**DESCRIPTORS:** Syphilis, Congenital; Prenatal Care; Primary Health Care; Public Health.

### PERFIL DOS CASOS NOTIFICADOS DE SÍFILIS CONGÊNITA

**RESUMO:** Este estudo analisou a incidência de sífilis congênita, os exames para diagnóstico e tratamento fornecido aos recém-nascidos. Estudo epidemiológico descritivo, do tipo levantamento retrospectivo, com abordagem quantitativa. A coleta de dados foi realizada em dezembro de 2015 no Sistema de Informações e Agravos de Notificações, fornecido pelo Departamento de Vigilância Epidemiológica e Ambiental da Secretaria Municipal de Saúde de Porto Velho. A incidência de sífilis congênita foi crescente durante o período estudado (2009 a 2014) de 0,92 casos para 8,65/1.000 nascidos vivos. Em relação às gestantes, 157 (79,29%) realizaram o pré-natal, 119 (60,10%) foram diagnosticadas durante o pré-natal e 109 (55,1%) tratadas inadequadamente. Quanto aos recém-nascidos, 99 (50,00%) eram do sexo feminino, 126 (63,64%) pardas, 153 (77,27%) nasceram assintomáticas e 129 (65,15%) tratadas com penicilina G cristalina. Neste sentido, verificou-se que em Porto Velho há desafios quanto ao diagnóstico precoce e tratamento adequado das gestantes, parceiros e recém-nascidos.

**DESCRIPTORES:** Sífilis congênita; Cuidado pré-natal; Atenção primária à saúde; Saúde pública.

### PERFIL DE CASOS NOTIFICADOS DE SÍFILIS CONGÉNITA

**RESUMEN:** Se analizó la incidencia de sífilis congénita, los análisis para diagnóstico y tratamiento brindado a los recién nacidos. Estudio epidemiológico, descriptivo, tipo relevamiento retrospectivo, con abordaje cuantitativo. Datos recolectados en diciembre de 2015 del Sistema de Informaciones y Enfermedades de Notificación, ofrecido por el Departamento de Vigilancia Epidemiológica y Ambiental de la Secretaría Municipal de Salud de Porto Velho. La incidencia de sífilis congénita fue creciente durante el período estudiado (2009 a 2014), de 0,92 casos a 8,65/1.000 nacidos vivos. Respecto de las gestantes, 157 (79,29%) realizaron el prenatal; 119 (60,10%) fueron diagnosticadas durante el prenatal, y 109 (55,1%) tratadas incorrectamente. En relación a los recién nacidos, 99 (50,00%) eran de sexo femenino, 126 (63,4%) mulatos, 153 (77,27%) nacieron asintomáticos y 129 (65,15%) tratados con penicilina G cristalina. Se verificó que en Porto Velho existen desafíos relativos al diagnóstico precoz y tratamiento adecuado de las gestantes, parejas y recién nacidos.

**DESCRIPTORES:** Sífilis Congénita; Atención Prenatal; Atención Primaria de Salud; Salud Pública.

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## ● INTRODUCTION

Syphilis is a sexually transmitted infection (STI) caused by the bacterium *Treponema pallidum*<sup>(1)</sup>. When this infection strikes pregnant women who do not seek or undergo appropriate treatment, it may be transmitted to the conceptus and is called congenital syphilis (CS)<sup>(2)</sup>. The vertical transmission of syphilis may occur during pregnancy or childbirth<sup>(2-3)</sup>.

Congenital syphilis has been included among the mandatory notifiable diseases in Brazil since 1986. However, observing the national outlook over time, little has changed, which is worrying, because syphilis is a treatable/curable disease with a low-cost treatment in the absence of complications<sup>(1,4)</sup>.

Until 2015, the Pan American Health Organization (PAHO) had as a goal the reduction in the incidence of CS to 0.5 cases per 1,000 live births, in addition to providing early diagnosis and appropriate treatment to at least 95% of the pregnant women and their partners<sup>(5)</sup>.

Understanding CS as a public health problem and the need to achieve the goals established by the PAHO, the Brazilian Ministry of Health launched the *Rede Cegonha* (Stork Network), with the aim of humanizing and ensuring follow-up of pregnant women and their children during the prenatal, childbirth, and puerperium phases in the Unified Health System (SUS, as per its acronym in Portuguese). Therefore, the undertaking of rapid tests, a syphilis test among them, would ensure early diagnosis and treatment for the infection<sup>(1-2,4)</sup>.

The diagnosis of syphilis is established by means of the Venereal Disease Research Laboratory (VDRL) test or syphilis rapid test during pregnancy, at the first prenatal appointment and at the 28<sup>th</sup> week of pregnancy<sup>(2)</sup>. When the VDRL is positive, the treatment choice for pregnant women and their partners is adopted to prevent the conceptus from contracting CS<sup>(1)</sup>.

The treatment for syphilis may be outpatient or hospital, depending on the general condition of the pregnant woman. To be considered appropriate, drug treatment and follow-up of pregnant women and their partners, a negative or reduced VDRL test from four to eight times in up to six weeks, and the end of the drug treatment 30 days before childbirth are required<sup>(6)</sup>.

The treatment is undertaken preferably with benzathine penicillin, because it can cross the transplacental barrier and treat mother and fetus at the same time, with a standard intramuscular dose of 2,400 IU distributed in the two gluteus. The quantity of doses, both in pregnant women and their partners, ranges according to the staging of syphilis or in the case of prophylaxis. The use of intramuscular or intravenous ceftriaxone 1,000 mg is an alternative for pregnant or non-pregnant women, and it is administered daily for up to 10 days<sup>(1-2,6)</sup>.

Based on the epidemiological outlook of syphilis in all states in the country, with a lack of raw material for the production of penicillin to supply international shortages<sup>(7)</sup>, inappropriate treatment<sup>(8)</sup>, and consequent resistance to medications<sup>(9)</sup>, there is a high rate of vertical transmission in the country (6.5 cases of CS per 1,000 live births)<sup>(10)</sup>. These result in serious repercussions on morbidity and mortality due to this infection. Thus describing the epidemiological profile of cases of CS in the city of Porto Velho in the state of Rondônia from 2009 to 2014 is of utmost importance to identify the challenges still remaining to interrupt the disease's transmissibility.

## ● METHOD

This was a retrospective and descriptive epidemiological study. The study was carried out in Porto Velho, capital city of the state of Rondônia, located in the North region of Brazil.

For assistance and follow-up of cases of CS, the city of Porto Velho has 38 primary healthcare units (UBS, as per its acronym in Portuguese), one Women's Health Reference Center, in addition to the Mãe Esperança Municipal Maternity Hospital that assists pregnant and parturient women, and the Ary Pinheiro Base Hospital that assists high-risk pregnant and parturient women.

Data collection corresponded to cases of CS in newborns of mothers who lived and carried out

prenatal care in Porto Velho, notified in the Notifiable Diseases Information System (SINAN, as per its acronym in Portuguese), from 2009 to 2014. The data were provided by the Epidemiological and Environmental Surveillance Department (DVEA, as per its acronym in Portuguese) of the Municipal Health Department of Porto Velho-RO (SEMUSA, as per its acronym in Portuguese) in December 2015.

A survey of sociocultural and clinical variables of pregnant women was carried out: age categorized with intervals of 10 years; race/skin color; education level; occupation; time of diagnosis of maternal syphilis; and treatment of pregnant women and their partners. Variables for newborns were: gender; race/skin color; presence of signs and symptoms; laboratory and image tests; and drug treatment used. Cases notified in other cities were excluded, in addition to those who did not live and did not carry out prenatal care in the city of Porto Velho.

For calculation of the estimated incidence rate of CS, the numerator used was the number of children aged under one year, abortions, and stillbirths notified by the SINAN/SEMUSA/Porto Velho among residents in the city of Porto Velho with a diagnosis of CS. The denominator used was the number of live births recorded by the Brazilian Live Births Information System (SINASC, as per its acronym in Portuguese) of the SEMUSA/Porto Velho for the year in question multiplied by 1,000. The data were analyzed by means of descriptive statistics in Microsoft Excel.

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## ● RESULTS

In the state of Rondônia, 326 cases of CS were notified from 2009 to 2014. Of these, 198 patients lived and carried out prenatal care in the city of Porto Velho. During the period studied, increasing behavior of cases in all years was observed. In addition, the incidence in Porto Velho was twice that of the state of Rondônia (Table 1).

Table 1 - Comparison between state and city incidence of congenital syphilis per 1,000 live births from 2009 to 2014. Porto Velho, Rondônia, Brazil, 2015

| Year  | Rondônia |                |           | Porto Velho |                |           |
|-------|----------|----------------|-----------|-------------|----------------|-----------|
|       | LB*      | Notified Cases | Incidence | LB*         | Notified Cases | Incidence |
| 2009  | 26,083   | 13             | 0.50      | 7,649       | 7              | 0.92      |
| 2010  | 25,835   | 25             | 0.97      | 8,089       | 9              | 1.11      |
| 2011  | 27,658   | 52             | 1.88      | 8,742       | 32             | 3.66      |
| 2012  | 26,513   | 51             | 1.92      | 8,941       | 29             | 3.24      |
| 2013  | 27,097   | 69             | 2.55      | 8,927       | 42             | 4.70      |
| 2014  | 27,555   | 116            | 4.21      | 9,129       | 79             | 8.65      |
| Total | 160,741  | 326            | 2.03      | 51,477      | 198            | 3.85      |

\*Live births

Source: SINAN/SEMUSA/2015

In 2009, the state incidence of cases was 0.50 per 1,000 live births and the city incidence was 0.92 cases per 1,000 live births. In 2014, there was a significant increase, with 4.21 cases per 1,000 live births in the state level and 8.65 cases per 1,000 live births at the city level.

Table 2 presents maternal social and assistance characteristics of the cases notified with CS.

Table 2 – Distribution of maternal characteristics of the cases of congenital syphilis notified from 2009 to 2014. Porto Velho, Rondônia, Brazil, 2015

| Characteristics                         | N = 198 | %     |
|---|---------|-------|
| Age (in years)                          |         |       |
| 10 to 19                                | 55      | 27.78 |
| 20 to 29                                | 98      | 49.49 |
| 30 to 39                                | 35      | 17.68 |
| 40 or more                              | 7       | 3.53  |
| Ignored                                 | 3       | 1.52  |
| Race/Skin color                         |         |       |
| Brown                                   | 140     | 70.71 |
| White                                   | 18      | 9.09  |
| Black                                   | 13      | 6.56  |
| Ignored                                 | 27      | 13.64 |
| Education level                         |         |       |
| Elementary school                       | 107     | 54.04 |
| High school                             | 53      | 26.77 |
| Higher education                        | 3       | 1.51  |
| Ignored                                 | 35      | 17.68 |
| Occupation                              |         |       |
| Housewife                               | 147     | 74.24 |
| Student                                 | 11      | 5.56  |
| Self-employed                           | 4       | 2.02  |
| Employed                                | 25      | 12.62 |
| Ignored                                 | 11      | 5.56  |
| Carried out prenatal                    |         |       |
| Yes                                     | 157     | 79.29 |
| No                                      | 31      | 15.66 |
| Ignored                                 | 10      | 5.05  |
| Time of diagnosis of maternal syphilis  |         |       |
| During prenatal                         | 119     | 60.10 |
| During childbirth/curettage             | 56      | 28.28 |
| After childbirth                        | 19      | 9.60  |
| Not carried out                         | 2       | 1.01  |
| Ignored                                 | 2       | 1.01  |
| Treatment of pregnant women             |         |       |
| Appropriate                             | 37      | 18.69 |
| Inappropriate                           | 109     | 55.05 |
| Not carried out                         | 38      | 19.19 |
| Ignored                                 | 14      | 7.07  |
| Treatment of partners of pregnant women |         |       |
| Yes                                     | 49      | 24.75 |
| No                                      | 119     | 60.10 |
| Ignored                                 | 30      | 15.15 |

Source: SINAN/SEMUSA/2015

In the variable maternal age, the minimum found was 13 years and the maximum was 44 years, with a mean of 23.97 years. For age group, 98 women (49.49%) were aged between 20 and 29 years, followed by 55 women (27.78%) aged between 10 and 19 years. For the variable race/skin color, 140 (70.71%) reported being brown and in 27 (13.64%), this variable was presented as ignored.

In terms of education level, 107 women (54.04%) had completed elementary school, followed by 53 (26.77%) who had completed high school. In the variable occupation, 147 (79.80%) did not have paid jobs and only 27 (14.64%) had paid jobs.

Among the 198 notified cases, 157 (79.29%) pregnant women carried out prenatal care; however, it was not possible to check in which trimester the diagnosis was given, nor the number of appointments carried out during prenatal care.

Maternal treatment was considered inappropriate in 109 cases (55.05%) and 37 (18.69%) had access to appropriate treatment. In addition, 119 partners (60.10%) did not undergo treatment for syphilis, and access to classification of the treatment was not obtained, only whether it was carried out or not. The diagnosis of maternal syphilis was established during prenatal care in 119 cases (60.10%), followed by 56 cases (28.28%) during childbirth/curettage.

Table 3 shows 99 cases of CS in female children (50%), followed by 92 cases in male children (46.46%). For race/skin color, 126 children (63.64%) were brown.

Table 3 – Distribution of social, assistance, and diagnostic characteristics regarding children's cases notified between 2009 and 2014. Porto Velho, Rondônia, Brazil, 2015 (continues)

| Characteristics                      | N   | %     |
|--------------------------------------|-----|-------|
| Gender                               |     |       |
| Male                                 | 92  | 46.46 |
| Female                               | 99  | 50    |
| Ignored                              | 7   | 3.54  |
| Race/skin color                      |     |       |
| Brown                                | 126 | 63.64 |
| White                                | 32  | 16.16 |
| Black                                | 7   | 3.54  |
| Ignored                              | 33  | 16.67 |
| Presence of signs and symptoms       |     |       |
| Asymptomatic                         | 153 | 77.27 |
| Symptomatic                          | 4   | 2.02  |
| Not applicable                       | 1   | 0.51  |
| Ignored                              | 40  | 20.20 |
| Non-treponemal test—Peripheral blood |     |       |
| Reagent                              | 161 | 81.31 |
| Non-reagent                          | 22  | 11.11 |
| Not carried out                      | 7   | 3.54  |
| Ignored                              | 8   | 4.04  |
| Non-treponemal test—Liquor           |     |       |
| Non-reagent                          | 6   | 3.03  |
| Not carried out                      | 157 | 79.29 |
| Ignored                              | 35  | 17.68 |
| Long bone radiograph                 |     |       |
| With alterations                     | 2   | 1.01  |
| Without alterations                  | 98  | 49.49 |
| Not carried out                      | 57  | 28.79 |
| Ignored                              | 41  | 20.71 |



| Treatment used  |     |       |
|---|-----|-------|
| Crystalline Penicillin G 100,000 to 150,000 IU/Kg/day—10 days | 129 | 65.15 |
| Procaine Penicillin G 50,000 IU/Kg/day—10 days                | 5   | 2.53  |
| Benzathine Penicillin G 50,000 IU/Kg/day                      | 4   | 2.02  |
| Another treatment   | 33  | 16.66 |
| Not carried out   | 9   | 4.55  |
| Ignored   | 18  | 9.09  |

Source: SINAN/SEMUSA/2015

Regarding clinical aspects, 153 cases (72.27%) were asymptomatic and 33 (20.20%) were ignored. With regard to laboratory and image tests, the non-treponemal test in peripheral blood was reagent in 161 (81.31%) cases. The non-treponemal test in liquor was not carried out in 157 (79.29%) cases. The long bone radiograph did not show alterations in 98 cases (49.49%) and was not carried out in 57 cases (28.79%).

The most used drug treatment was crystalline penicillin G 100,000 to 150,000 IU/Kg/day during 10 days in 129 individuals (65.15%). In 33 cases (16.67%), a different drug treatment from that determined in the notification sheet was used, but without information in the database as to which treatment choice was used.

## ● DISCUSSION

The detection rate of CS in the city of Porto Velho showed an increasing behavior over the course of the study. In any of the five years studied, the city achieved the maximum incidence of 0.5 cases per 1,000 live births as proposed by the PAHO. The increase in incidence may be associated with the improvement in notification and research of cases, in addition to a higher quality of detection of gestational syphilis in prenatal care<sup>(11)</sup>.

One of the possible reasons for the doubling of incidence of CS in 2014 may be explained by the lack of raw material for the production of penicillin, as announced at the national level, for the treatment of syphilis. Therefore, supplies of penicillin were reduced drastically, and many Brazilian states could not treat mothers, their partners, and children<sup>(6)</sup>.

Regarding the increasing incidence, a study carried out in the state of Ceará also showed an increasing notification of CS during the 10 years studied. In 2000, 0.56 cases per 10,000 live births were found, and 49.32 cases per 10,000 live births were found in 2010<sup>(12)</sup>.

Similarly to the present study, national studies regarding CS show most pregnant women to be in the age group of 20 to 29 years, in addition to being brown<sup>(13-15)</sup>. CS is not a disease that chooses population groups; however, young women are more susceptible to *Treponema pallidum* due to their social behavior. According to data from two Brazilian regional studies, most young women have several partners and do not make use of condoms during sexual intercourse<sup>(15-16)</sup>. Regarding race/skin color, brown skin color follows the national standard of a mixed population, with most of the population made up of people who report being brown or black<sup>(15,17)</sup>.

The low education level of 107 women (54.04%) in this study becomes a challenge for public health, since an appropriate understanding of the pathology, treatment, and prevention is of utmost importance for appropriate follow-up of pregnant women diagnosed with syphilis. It is expected that the higher the education level of the population, the better the attitude to remain healthy<sup>(18)</sup>.

A study conducted in the city of Brasília, in the Federal District, evaluated 67 pregnant/puerperal women with CS. Among them, 64.2% had an elementary school education<sup>(19)</sup>, which is similar to the present study.

Among pregnant women with syphilis in this study, 158 (79.80%) did not have paid jobs, significantly higher than those who had paid jobs. This high percentage may be associated with the low education

level, because the lower the education level, the lower the chances of getting a job with good remuneration and better work quality<sup>(3)</sup>.

Similarly, a study conducted in the city of Rio de Janeiro analyzed prenatal care to prevent the vertical transmission of *Treponema pallidum* and found that most women (63.17%) did not have paid jobs<sup>(19)</sup>.

Regarding prenatal care, this is the time for women and their children to be cared for to ensure a safe pregnancy. Although this is a strategy for early diagnosis of maternal syphilis and treatment, for the prevention of vertical transmission for newborns, 157 pregnant women (79.29%) in this study carried out prenatal care, 119 (60.10%) were diagnosed with gestational syphilis, and treatment was considered appropriate in only 37 women (18.69%).

Between 2008 and 2013, in the city of Belém, state of Pará, most women (78.49%) who were mothers of children diagnosed with congenital syphilis, carried out prenatal care<sup>(20)</sup>. In a study conducted in the city of Monte Claros from 2007 to 2013, treatment for syphilis in pregnant women was considered inappropriate or incomplete in 64.8% of the cases<sup>(21)</sup>.

The treatment for syphilis considered appropriate when penicillin, which prevents the vertical transmission of *Treponema pallidum*, is used to treat pregnant women and their partners. The treatment must end 30 days before childbirth and the VDRL test must be low from four to eight times between three and six months<sup>(1)</sup>.

A treatment is considered inappropriate when: it is carried out with any medication but penicillin; treatment is incomplete even with the use of penicillin; treatment is inappropriate for the clinical phase of the disease; treatment is administered in the period up to 30 days before childbirth; or partners with syphilis are either not treated or treated inappropriately<sup>(8)</sup>.

In a study of CS cases carried out in the state of Amazonas, 67.1% of the partners of pregnant women with gestational syphilis did not receive treatment during the prenatal period<sup>(22)</sup>, similar to the findings of the present study. For a reduction in the incidence of maternal syphilis, treating pregnant women and their partners concomitantly is fundamental to reduce or prevent reinfections.

In a study carried out in the city of São Luís, in the state of Maranhão, 286 newborns with CS (78.8%) were brown<sup>(23)</sup>, which corresponds to the population in the state of Rondônia, reported as brown (68.0%)<sup>(24)</sup>. A study carried out in the Federal District showed that 26 newborns with CS (52%) were male<sup>(19)</sup>, which corresponds to the male population who live in the state of Rondônia (50.4%)<sup>(24)</sup>.

With regard to clinical manifestations, 153 children (77.27%) were asymptomatic. A study conducted in the city of Porto Alegre evaluated the recurrence of syphilis during pregnancy and showed that 68.8% of newborns were asymptomatic<sup>(25)</sup>. At birth, most newborns are asymptomatic; however, early clinical manifestations in children aged under two years may appear, and even late manifestations after this age<sup>(11)</sup>.

The main clinical signs of CS are hepatic and splenic alterations manifested by hepatosplenomegaly, alterations in skin colors such as jaundice due to anemia, problems in bone structure, detected by misshapen teeth, elevation of the palatal arch, orofacial fissure or short mandible, sabre shin, frontal bossing. Other alterations may appear in lungs, eyes, kidneys, and the nervous system<sup>(25-26)</sup>.

In this study, the non-treponemal test of peripheral blood, when carried out, was reagent in 161 (81.31%) individuals; the liquor test was not carried out in 157 (79.29%) of the cases, because it was considered invasive and because the peripheral blood test had already been carried out. Alterations in long bone radiograph were unaltered in 98 (49.49%) individuals. A study carried out in the city of Montes Claros showed that 27.9% of newborns presented positive VDRL. With regard to other complementary tests (long bone radiograph, liquor test, and blood count test), 42 children (45.2%) were not given any of these tests<sup>(21)</sup>, either for asymptomatic or late clinical manifestation of CS<sup>(11,25)</sup>.

In the present study, 129 (65.15%) newborns with CS received treatment with crystalline penicillin G 100,000 IU/Kg/day for 10 days, which is considered an inappropriate treatment. The Brazilian Health Surveillance Secretariat recommends treatment with crystalline penicillin G 50,000 IU/Kg/dose<sup>(2)</sup>. Another study showed that 16 newborns with CS (32.00%) received treatment with benzathine penicillin G; however, 18 children (36%) did not receive any type of treatment. In addition, this attitude shows the

lack of training of health teams to meet the recommendations established by the Ministry of Health<sup>(19)</sup>.

The limitation of the present study was the number of variables that presented ignored fields, a fact that makes it difficult to examine a more refined analysis of the data presented. The complete filling in of notification sheets is of extreme importance, so that the city, state, and country are able to know the true social and epidemiological profile of the population and, based on it, plan strategies and actions to ensure appropriate treatment and prevention for each population's need.

## ● CONCLUSION

The analysis of CS data in the city of Porto Velho found possible problems regarding early diagnosis and appropriate treatment for pregnant women and newborns. Although prenatal care was carried out by most women, diagnoses during prenatal care were not established in the same proportion, showing failures in early diagnosis of cases of syphilis during pregnancy. In addition, most women and their partners did not receive appropriate treatment.

Another worrying factor was the drug treatment used for cases of CS, with doses twice or three times higher than those recommended. Therefore, there is still a long way to go so that CS rates achieve those recommended by the PAHO and the Ministry of Health. However, it is also clear that the lack of raw material for the production of penicillin contributed to the significant increase in these cases.

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