

Gestational and congenital syphilis: maternal, neonatal characteristics and outcome of cases

Larissa Gramazio Soares ¹
Bruna Zarpellon ²
Leticia Gramazio Soares ³
Tatiane Baratieri ⁴
Macon Henrique Lentsck ⁵
Verônica de Azevedo Mazza ⁶

¹⁻⁵ Departamento de Enfermagem. Universidade Estadual do Centro-Oeste. Rua Salvatore Renna, 875. Santa Cruz. Guarapuava, PR, Brasil. CEP: 85.015-334. E-mail: lari_gramazio@hotmail.com

⁶ Departamento de Enfermagem. Universidade Federal do Paraná. Curitiba, PR, Brasil.

Abstract

Objectives: to describe the occurrence of gestational and congenital syphilis in Guarapuava-PR, according to maternal, neonatal characteristics and outcome of cases.

Methods: cross-sectional study, retrospective, held in Guarapuava/PR, with secondary data collected in the laboratory of clinical analyses and information system of Compulsory Notification, collected between October 2015 and August/2016, the variables were described through absolute and relative frequencies.

Results: of the 40 newborn (NB) children of pregnant women with syphilis, 30.0% had congenital syphilis. The variables that were associated with were: gestational quarter of positive examination ($p=0.008$), number of antenatal consultations ($p=0.041$), gestational risk stratification ($p=0.041$) and treatment of partner ($p<0.001$). The variables that were associated with the occurrence of congenital syphilis were: risk classification at birth ($p=0.004$) and examination VDRL in the peripheral blood of the NB ($p=0.004$).

Conclusions: reinforcing prenatal, with the early capture of the pregnant woman by basic care, expansion of the diagnostic coverage and timely and adequate treatment of the pregnant woman and partner, as a prophylactic measure of a possible reinfection.

Key words *Syphilis, pregnancy, sexually transmitted diseases*

Introduction

Even with clinical evidence and epidemiological data, syphilis remains a public health problem worldwide.¹⁻⁴ Worldwide, 1,360,000 of pregnant women were infected, 80% of these were assisted in prenatal programs, 38% showed some adverse result, as fetal and neonatal mortality, prematurity or low birth weight and congenital infection.⁵⁻⁶

The Pan American Health Organization (PAHO) has set the reduction of incidence of congenital syphilis to ≤ 0.5 cases per 1,000 alive until 2015.⁷ This level has not been achieved. On the contrary, the cases feature and configure itself as an epidemic, with an incidence of 1.3/1,000 live births in the Americas⁷ and 6.5/1,000 in Brazil.⁸ In the period from 2005 to 2016, were notified in the Notification Aggravation Information System (SINAN) 169,546 cases of syphilis in pregnant women in Brazil.⁸

Public policies focused on maternal and child health, contributed to increased early diagnosis and notifications in pregnant women, such as the use of rapid test for syphilis.⁸ However, it is considered that underreporting is still an obstacle for epidemiological surveillance.²⁻³ In the State of Paraná, from 1,117 diagnosed pregnant women, 455 cases of congenital syphilis were reported.⁹

Knowing the characteristics of pregnant women and children with syphilis is important because from the epidemiological data, public policies are formulated to control syphilis, and compulsory notification is a fundamental tool.¹⁰

Even with the evidence put in the literature for decades about the problems that syphilis can cause to pregnant women, newborns and the health system, comprehensive studies that relate variables from diagnosis to treatment are scarce on the national scene. Given the importance of the theme, it was plotted as an objective to describe the occurrence of gestational and congenital syphilis in a municipality in second maternal characteristics, neonatal diseases and outcome of cases.

Methods

Retrospective cross-sectional study that investigated the gestational and congenital syphilis cases reported and not reported in the municipality of Guarapuava Paraná State, Brazil, between 2014 and 2015. The municipality boasts an estimated population of 180,000 inhabitants with about of 31.3% of women of reproductive age.¹¹ Health services offered by the unified health system (SUS) consist of a hierarchical network with 37 health facilities, and those that

provide monitoring and assistance to pregnant women during prenatal care, are divided into 32 units of Family Health Strategy (FHS), 2 Center of Family's Health Support units, 1 Women's Clinic, 1 ER unit, 3 Public Maternity Hospitals and 2 Municipal Public Urgent Care units.¹²

The study population consisted of pregnant women with syphilis, residents in the city and selected from examinations *Venereal Disease Research Laboratory* (VDRL) nontreponemal positive test (Jan the Dec/2014). It was also considered as population the conceptuses until a year after the birth (Oct/2014 the set/2015). At the same time, the records of compulsory notification for gestational syphilis by the Surveillance Sector Municipal Health were accessed for comparison. For constitution of the cases, the Guide's criteria of health surveillance of the Ministry of Health was followed, which defines the cases of congenital and gestational syphilis.¹³

The data collection was carried out in three stages between October 2015 and August 2016; monthly reports of laboratory examinations from the Municipal Hall of Clinical Analyses and notifications of syphilis in pregnancy at SINAN in the year 2014 were accessed, and subsequently information in the electronic medical records of pregnant women and children for up to one year after the birth was collected (Oct/2014 the set/2015).

The variables studied were categorized as follows: a) laboratory and notification: examinations, collect and positivity for syphilis; b) sociodemographic characteristics of the mother: age, education, marital status and occupation; c) obstetric antecedents: number of children, previous pregnancy, miscarriage, stillbirth, parity and previous treatment for syphilis; d) prenatal care: gestational risk, consultations, early prenatal care and maternal treatment VDRL, and partner; e) characteristics of the NB at birth: sex, weight, gestational age and stillbirth; f) monitoring the NB: risk at birth and current, and number of childcare queries; g) detection of congenital syphilis and treatment: tracking tests and hospitalization.

The variables were described by means of absolute and relative frequencies. For bivariate analysis, these variables were grouped together and considered the treatment outcomes independent of mother and occurrence of syphilis in the fetus, in which the differences of proportions were evaluated by the Chi-square tests of Pearson and Fischer's exact, when indicated. For these analyses a significance level of $<0.05\%$ was assumed. The data were organized and stored by the program *Microsoft*

Office Excel (version 2013), and analyzed by SPSS (version 20.0).

The study protocol was approved by the Research Ethics Committee of Midwestern State University under n° 1,373,249/2015 and the norms established by resolution No. 466/2012 of the National Health Council were followed during the study.

Results

In the year 2014, the laboratory of clinical analyses of the municipality of Guarapuava, performed 4,539 tests to detect gestational syphilis in 2,868 pregnant women during the prenatal. In the same year, this service identified 40 cases of pregnant women with positive serology for the disease, which accounted for 1.39% of the total. In the same period, five cases were reported in SINAN (12.5%) (Table 1).

As for the profile of pregnant women positive for syphilis, the predominant age group (75.0%) was between 20 to 34 years old and most of them (60.0%) had more than 8 years of schooling. About marital status, 80% live with their partner, and 75% deals with household activities. As for obstetric antecedents, most pregnant women had two sons (65.0%) and up to two pregnancies (82.0%), and in those pregnancies, no history of abortion (85.0%) and stillbirth (97.5%). 62.0% of them were multiparous and 80% had not carried out treatment for

syphilis. On prenatal care, 62.5% women were classified as having high-risk pregnancy and more than seven prenatal consultations, which initiated in the first quarter (90.0%). It was during this period of gestation that occurred the first VDRL test (77.5%), being that most pregnant women (55.0%) conducted an examination and 67.5% were treated for syphilis, as their partners, 52.5 percent were not treated.

In relation to newborns (NB), the distribution was as follows: male (52.7%), birth weight > 3,000 grams (67.5%), >37 weeks gestational age (95.05%), survivors (97.5%) and with ideal weight for gestational age (90.0%). Of the total of 15 NB, 37.5% were classified as high risk at birth, and at the end of the follow-up, 90.0% were classified as usual risk, averaging 6.1 childcare queries.

Of the 40 NB children of women with syphilis, 12 (30.0%) had congenital syphilis, and of these, 1 (2.5%) had fetal death, 2 (5%) had malformation and 9 (22.5%) required hospitalization. As for exams, the main tracker of congenital syphilis was the VDRL peripheral blood, held in 11 (27.5%) of NB, followed by titration performed on 8 (20%), and the long bone x-ray was performed in 1 (2.5%) child.

On bivariate analysis, for the treatment of pregnant women with syphilis, the variables that were associated with were the quarter of realization of the positive test in pregnant women ($p=0.008$), number of antenatal consultations ($p=0.041$), gestational risk

Table 1

Historical series of pregnant women, laboratory tests VDRL and notification for syphilis. Guarapuava PR, 2014.

Month	Number of pregnant women	Tests performed	Positive for syphilis	Sinan Notification	% of notification
January	324	409	9	1	11.1
February	331	405	6	1	16.7
March	268	353	0	2	100.0
April	260	373	0	0	0.0
May	259	417	3	1	33.3
June	182	340	2	0	0.0
July	192	390	6	0	0.0
August	219	361	2	0	0.0
September	224	352	3	0	0.0
October	210	426	4	0	0.0
November	217	379	4	0	0.0
December	182	280	2	0	0.0
Total	2868	4539	40	5	12.5

Source: Clinical Laboratory of the Municipal of Guarapuava, PR and SINAN; VDRL= Venereal Disease Research Laboratory.

Table 2

Association between maternal characteristics and treating gestational syphilis. Guarapuava (PR), 2014-2015.

Characteristics	Treated		Not treated		p
	n	%	n	%	
Age group (years)					0.718 *
15 to 19	5	12.5	2	5.0	
20 to 34	19	47.5	11	27.5	
> 35 years	3	7.5	-	-	
Schooling (years of study)					0.408
≤ 8	12	30.0	4	10.0	
> 8	15	37.5	9	22.5	
Occupation					0.451 *
Of Home	19	47.5	11	27.5	
Other	8	20.0	2	5.0	
Marital status					* 0.086
Lives with partner	24	60.0	8	20.0	
Live alone or with family members	3	7.5	5	12.5	
Partner treatment					< 0.001
Yes	20	50.0	1	2.5	
No	7	17.5	12	30.0	
Previous syphilis treatment					1.000 *
Yes	5	12.8	3	7.5	
No	22	55.0	10	25.0	
Gestational quarter positive					0.008 *
1 st quarter	24	56.0	7	17.5	
2 nd quarter	3	7.5	2	5.0	
3 rd quarter	-	-	4	10.0	
Number of pre-natal consultations					0.041 *
1 to 7	7	17.5	8277	20.0	
7 and more	20	50.0	5	12.5	
Number of children					0.316 *
Up to 2	16	40.0	10	25.0	
More than 2	11	27.5	3	7.5	
Parity					1.000 *
Primipara	10	25.0	5	12.5	
Multipara	17	42.5	8	20.0	
Number of previous pregnancy					1.000 *
Less than 2	22	55.0	11	27.5	
2 and more	5	12.5	2	5.0	
Gestational risk stratification					0.041 *
Usual	7	17.5	8	20.0	
High risk	20	50.0	5	12.5	

* Fischer's exact.

Tabela 3

Associação entre assistência obstétrica e neonatal e sífilis congênita. Guarapuava (PR), 2014-2015.

Characteristics	Infected		Not infected		p
	n	%	n	%	
Number of pre-natal consultations					1.000 *
1 to 6	4	10.0	11	27.5	
7 and more	8	20.0	17	42.5	
Previous syphilis treatment					1.000 *
Yes	2	5.0	6	15.0	
No	10	25.0	22	55.0	
Treatment of pregnant women					0.716 *
Yes	9	22.5	18	45.0	
No	3	7.5	10	25.0	
Partner treatment					0.836
Yes	6	15.0	15	37.5	
No	6	15.0	13	32.5	
VDRL tests performed number					0.781
Less than 2	7	17.5	15	37.5	
2 and more	5	12.5	13	32.5	
Early prenatal care					0.453 *
1 st quarter	2	5.0	1	2.5	
2 and 3 rd quarter	10	25.0	26	65.0	
Not paid	-	-	1	2.5	
Realization of the peripheral blood VDRL ^a					0.004 *
Yes	3	9.7	17	54.8	
No	8	25.8	3	9.7	
Classification of risk at birth					0.004 *
Usual	-	-	13	32.5	
Intermediary	4	10.0	8	20.0	
High	8	20.0	7	17.5	

* Fischer's exact; ^a The total differs from other variables due to exclusion of the dropped data (missing); VDRL= Venereal Disease Research Laboratory.

stratification ($p=0.041$) and treatment of partner ($p<0.001$) (Table 2).

The variables that were associated with the occurrence of congenital syphilis were: risk classification at birth ($p=0.004$) and VDRL test in the NB's peripheral blood ($p=0.004$) (Table 3).

Discussion

The profile of pregnant women with syphilis in this study meets the results found in the literature, both nationally and internationally, and reiterates the behavior of the disease in young adults, at the apex of the reproductive phase and with low educational level.^{1,8,10,14-16}

The identified proportion of gestational syphilis (1.39%) is also above the national prevalence (1.02%), as well as southern Brazil prevalence (1.10%),¹⁷ which reinforces the need to strengthen epidemiological surveillance in all points of the network, actions that add up to the national agenda, as already determined by the Health Pact in 2006.¹⁰

Even with the acknowledged efficacy of diagnosis, treatment and prevention of transmission,⁵ the proportion of pregnant women infected with syphilis without therapeutic actions and intervention on risk factors remains high, resulting in abortion, prematurity, neonatal death and congenital malformations.^{4,10} As presented in this study, only 67.5% of pregnant women have made treatment.

Recent research points to flaws in prenatal care and stimulate health services to carry out new strategies for reducing mother-to-child transmission.^{8-18,19} In this regard, it was found that the majority of pregnant women (55%) studied did only one VDRL test, indicating non-compliance with the Protocol of attention to prenatal care.

Thus, it is affirmed that the quality of prenatal assistance is an important and decisive factor regarding the occurrence of syphilis, and even with the increased prenatal coverage held by the teams of FHS in Brazil, there is a low effectiveness of these actions for the prevention of congenital syphilis.^{5,19} It is imperative to strengthen the primary care, so that the syphilis is diagnosed and treated early, yet in prenatal period, preventing the occurrence of congenital syphilis.

Despite the analyzed cases have been detected, the underreporting was evident. This occurrence prevents the epidemiological control of the aggravation, going against the grain of current public policies, in particular, especially Rede Cegonha (stork network), which besides the qualification obstetric health-neonatal, contributes to the improvement of

the epidemiological surveillance system, by means of expansion of the distribution of rapid tests for syphilis, tool that allows tracking the aggravation.⁵

The notification of cases in pregnant women or children is an important tool for epidemiological surveillance, however, as verified in the parsed data, underreporting is still a challenge. This result is not only found in the studied region, for in another study conducted in the City of Montes Claros-MG, only 6.5% of cases of syphilis in pregnant women and 24.1% of congenital syphilis were reported, highlighting the fragility of the national public health system policy and the absence of policies of control of syphilis.²

In the present study, maternal prenatal related characteristics, such as number of queries, gestational quarter of positive examination, treatment of partner and risk stratification showed significant association with gestational treatment of pregnant women for syphilis.

Although most women in the study have started prenatal care in the first trimester, only 62.5% held more than seven queries. It should be noted that the early initiation of prenatal care and the guarantee of the minimum number of queries are associated with greater suitability of control actions regarding syphilis,²¹ and conversely are factors associated with the occurrence of vertical transmission.^{15,17}

Cohort study conducted in China pointed out that when the treatment occurs between the 13 to 24 weeks, only 1.6% of infants are infected, and that every week of delay in the treatment increases the risk of congenital syphilis in 12.7%,¹ being that a favorable aspect to women in this study, once 73.5% of them were diagnosed in the first trimester of pregnancy. In addition to the timely detection of syphilis, the access to treatment for pregnant women and their partners is imperative.²⁰

Even in that context, in 90% of pregnant women who began prenatal care in the first trimester, 77.5% held the VDRL test in this period and only 45% held two or more tests. Other studies also point out lack of follow-up on the VDRL test during pregnancy.^{15,17,21}

According to PAHO, 94% of pregnant women in the Americas had at least one prenatal consultation during pregnancy and 80% received testing for syphilis at some point in pregnancy.⁷ In Brazil, a study with 23,894 postpartum women identified that 98.7% held at least one prenatal consultation and 89% had at least one test records of syphilis, but only 41% conducted the second serological test,¹⁴ data that corroborate the present study findings and imply actions aimed at early detection of syphilis

during pregnancy by means of carrying out the examinations in the correct frequency.

As for the treatment of pregnant women with syphilis, 67.5% have been treated in this study. Similar results were found in a study in Palmas-TO, in which 171 cases of syphilis 54.4% received no gestational treatment and 40.7% received inadequate treatment.¹⁶ Despite regional differences, cultural and health service contexts, it is reiterated the importance of following correct treatment, configuring itself as a critical node in assistance to pregnant women.

Still on the treatment, we found that 47% of partners were treated, despite being a higher than expected statement for Brazil, where it is estimated that 12% of the partners receive treatment,³ it alerts to the risk of reinfection for women.¹⁷ This data warns about the importance of controlling the transmission of syphilis in community through the treatment of the partner.³

The literature points out that syphilis-infected partners increases by five times the risk of congenital syphilis infection,¹ and the grounds for non-treatment are: low adherence to health services; justified by employment issues and lack of knowledge about the importance of treatment for child health and partner; lack of reference site for treatment; and the absence of indication of treatment by the service.²¹⁻²² Strategies such as participation in pre-natal, feature positive actions to establish partnerships with companies that encourage the prevention and treatment of syphilis in its employees.²⁰

It is known that all pregnant women with syphilis should be stratified as high risk, because they require more frequent queries,^{23,24} however, in this study it was possible to notice that 62.5% were properly laminated. However, in another study that evaluated the adequacy of the process of prenatal care in the municipality of Vitória, State of Espírito Santo, Brazil, there was proper management of gestational risk in more than 90% of surveyed, however, the number of queries is more related to the technical procedures rather than the recommended for the content of queries.²⁴

The measures and interventions for syphilis converge in a single gestational sense: prevent congenital syphilis. After a year of child monitoring, 12 cases of congenital syphilis were identified, which corroborates with other studies,^{8,18,25} who consider unsatisfactory quality of prenatal care as responsible for the direct vertical transmission.

The weight, gestational age and the survival of the children infected had favorable results on the conditions of birth. Given the good condition of birth

presented by the majority of the cases, it was found that only 37.5% of newborns were classified as high-risk. The risk of these children after one year showed change in classification and 90% were at risk.

Successful experiences in Cuba²⁶ and United Kingdom,²⁷ are examples to be followed by Brazil especially at this time of an epidemic of syphilis, and portray the investment in quality of services and strengthening in infection prevention strategies regarding sexually transmitted diseases and HIV/AIDS in the general population, and promoting attention to the newborn, family and community.

In bivariate analysis, the risk classification at birth and VDRL test in peripheral blood were associated with the occurrence of congenital syphilis. This predictability is confirmed by literature, which states that the non-realization of tests in newborns with congenital syphilis is detrimental to the effective follow-up of the cases.¹⁶

However, the findings in this study reveal the small number of tests carried out at birth and low follow-up after one year. Therefore, negative contexts as the lack of reference to the basic attention in the maternity ward after giving birth,³ and inefficiency of follow-up after treatment,¹ still being common.

Some authors point out positive examples of follow-up of children, as the clinical and laboratory monitoring of Colombian newborns with congenital syphilis for six months with a decrease of VDRL,²⁸ beyond the scheduled query on discharge of maternity hospital, in the reference to childcare in Londrina-PR.²⁰

This study identified high proportion of gestational and congenital syphilis, and showed significant associations of treatment of syphilis infection for pregnant women with the quarter of the number of prenatal consultations, prenatal, maternal risk stratification and treatment of partner, and congenital syphilis infection with VDRL peripheral blood and risk stratification of the newborn. It was also found the need to expand efforts in the notification of this aggravation in order to express the real magnitude of the problem.

The parsed data reflect the need for strengthening the pre-natal, with the early capture of the pregnant woman by basic care, expansion of the diagnostic coverage and timely and adequate treatment of the pregnant woman and partner, as a prophylactic measure for a re-infection. In this sense, intersectoral actions can strengthen the fight against this growing epidemic.

Despite the study have limitations, related to the quality of the records, to the population comprised

only by SUS users and to only local data, besides being a transversal study and it was not possible to establish cause and effect relationships, the research has reached the goal proposed to be important to promote the expansion and implementation of public policies to combat this aggravation.

We suggest the implementation of follow-up studies of pregnant women and children with

syphilis in order to identify risk factors and consequences of injury, increasing the scope of actions for this population, in addition to studies regarding quality of information systems, qualification of health professionals, availability of resources, such as the rapid tests, condoms, among other medicines that can affect prevention and treatment.

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