

# SYPHILIS, HIV AND HEPATITIS B AND C SEROLOGICAL SCREENING AMONG PARTURIENT ADMITTED IN THE OBSTETRICS CENTER OF A HOSPITAL IN SOUTHERN BRAZIL, 2014–2016

*TRIAGEM SOROLÓGICA PARA SÍFILIS, HIV E HEPATITES B E C ENTRE PARTURIENTES ATENDIDAS NO CENTRO OBSTÉTRICO DE UM HOSPITAL NO SUL DO BRASIL, 2014–2016*

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## ABSTRACT

**Introduction:** Maternal-infant morbidity and mortality can be avoided through the provision of adequate prenatal care. **Objective:** To estimate the seroprevalence of syphilis, human immunodeficiency virus (HIV) and hepatitis B and C amongst pregnant women submitted to a rapid testing in the obstetrics center of a hospital in Southern Brazil, 2014–2016. **Methods:** Cross-sectional study. The study englobed parturient patients who did not receive prenatal care, or those ones who had received incomplete prenatal care, with emphasis on the third trimester, and specifically those ones who underwent rapid testing during labor. The study included all rapid testing records from 2014 to 2016, as well as electronic medical records review. **Results:** Of a total of 1,281 pregnant women who underwent serological screening, 1,204 were tested for HIV with two reactive cases (0.2%), 232 for hepatitis B with three reactive cases (1.3%), 243 for hepatitis C with two reactive cases (0.8%) and 234 for syphilis with 18 reactive cases (7.7%). A pregnant woman presented syphilis and hepatitis C coinfection. The average age was 26.3 (SD±6.7) years old, in the 14–47 age range. The type of delivery with the highest prevalence was the cesarean section, with 738 cases (57.6%). **Conclusion:** Based on data from the study, it was possible to conclude that sexually transmitted infections are present in the population, and that successful prenatal care can prevent vertical transmission with adequate monitoring of the newborn.

**Keywords:** pregnant women; prenatal care; sexually transmitted infections; syphilis; HIV; hepatitis B; hepatitis C.

## RESUMO

**Introdução:** Com o pré-natal, morbidades e mortalidade materno-infantil podem ser evitadas. **Objetivo:** Estimar a soroprevalência de sífilis, vírus da imunodeficiência humana (HIV) e hepatites B e C entre parturientes submetidas a teste rápido no centro obstétrico de um hospital no Sul do Brasil de 2014 a 2016. **Métodos:** Estudo com delineamento transversal. Foram estudadas parturientes que não haviam realizado pré-natal ou realizado o pré-natal incompleto, com ênfase no terceiro trimestre, e que foram submetidas à realização de testes rápidos durante o trabalho de parto. O estudo é do tipo censo, incluindo todos os registros de testes rápidos entre 2014 e 2016, além da revisão do prontuário eletrônico. **Resultados:** Das 1.281 gestantes submetidas à triagem sorológica, 1.204 realizaram teste para HIV com dois casos reagentes (0,2%), 232 para hepatite B com três casos reagentes (1,3%), 243 para hepatite C com dois casos reagentes (0,8%) e 234 para sífilis com 18 casos reagentes (7,7%). Houve uma gestante que apresentou coinfeção entre sífilis e hepatite C. A média de idade foi de 26,3 (DP±6,7) anos, variando de 14 a 47 anos, e o tipo de parto de maior prevalência foi a cesariana, com 738 casos (57,6%). **Conclusão:** Com base nos dados do estudo, foi possível concluir que as infecções sexualmente transmissíveis estão presentes na população e que um pré-natal bem realizado pode evitar a transmissão vertical com o monitoramento adequado do neonato.

**Palavras-chave:** gestantes; cuidado pré-natal; doenças sexualmente transmissíveis; sífilis; HIV; hepatite B; hepatite C.

## INTRODUCTION

The knowledge of the seroprevalence of the main infectious diseases transmitted from mother-to-child during pregnancy, childbirth or breastfeeding has a great importance in the formulation of health policies of obstetrics centers<sup>(1,2)</sup>. In Brazil, the infectious diseases transmission during pregnancy and childbirth, such as syphilis, infection by the human immunodeficiency virus (HIV) and hepatitis B and C, are relatively frequent<sup>(3,4)</sup>. Such a situation is quite a challenge faced by public health, concerning strategies planning for these diseases screening in an extensive and practical way to favor the clinical monitoring of pregnant women with the early infections' diagnosis<sup>(1,2)</sup>.

Prenatal care, which is the medical assistance to pregnant women during the entire gestational period, can avoid mother-child morbidities and mortality<sup>(5)</sup>. According to the Ministry of Health, there is a minimum number of six appointments recommended during pregnancy, with monthly intervals until the 28<sup>th</sup> week, biweekly from 28 to 36<sup>th</sup> weeks, and weekly from the 36 to 41<sup>st</sup> gestational weeks. Serological screening tests for syphilis, hepatitis B and HIV need to be done, besides serology for toxoplasmosis and rubella, when there are suggestive symptoms or endemicity relationship<sup>(5)</sup>.

The World Health Organization (WHO) estimates the occurrence of approximately 357 million new sexually transmitted infections (STIs) per year, emphasizing that the presence of an STI such as syphilis increases the risk of acquiring or transmitting HIV<sup>(6)</sup>. In relation to laboratory tests, the recommendation of the Ministry of Health is that the following exams are required in the first quarter: syphilis rapid testing and Venereal Disease Research Laboratory (VDRL) testing, as well as anti-HIV diagnosis rapid testing. Tests must be repeated in the third quarter including serology for hepatitis B (HBsAg).

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It should be noted there is no recommendation for serological compulsory hepatitis C screening during pregnancy<sup>(7)</sup>.

According to the prevention protocol for the vertical transmission of HIV, syphilis, and viral hepatitis, as soon as a parturient is admitted to the maternity hospital, the rapid testing on these mentioned diseases should be carried out to verify whether their investigation occurred during the prenatal period, especially in the third quarter, or in case the result is not available. In case of syphilis specifically, the test should be proposed to all pregnant women on the labor occasion<sup>(8)</sup>.

## OBJECTIVE

To investigate the results of serological screening with rapid testing for syphilis, HIV and hepatitis B and C in parturient women admitted in the obstetrics center of a hospital located in the state of Santa Catarina, Brazil, from May 2014 to April 2016.

## METHODS

A cross-sectional delineation epidemiological study was carried out. Tubarão is a city in the state of Santa Catarina with a population about 102,883 inhabitants in 2015. According to data from the Departamento de Informática do Sistema Único de Saúde (Department of Informatics of the Public Health System — DATASUS), around 2,800 children are born every year in the city (average of the last 10 years).

The hospital under study is the largest hospital in number of beds in the state of Santa Catarina; there are the total of 410 beds. In 2014, there were almost 20,000 hospitalizations, 3,278 at the obstetrics center, totalizing 2,442 births.

Following the Ministry of Health's protocol, since May 2014 the hospital obstetrics center uses rapid testing on viral infectious diseases of greatest impact among parturients who failed tests for syphilis, HIV and hepatitis B during the prenatal period. The tests are applied separately, according to the information obtained by the prenatal portfolio presented by the parturient. The tests are the following:

- Alere Syphilis® (Standard Diagnostic Inc., Republic of Korea), immunochromatographic assay;
- HIV Tri Line® (Bioclin, Minas Gerais, Brazil) — third generation for HIV 1 and 2 type screening;
- Vikia HBsAg® (bioMérieux, Rio de Janeiro, Brazil);
- Anti-HCV — Alere® (Standard Diagnostic Inc., Republic of Korea).

The study approached parturients who have failed prenatal care or held an incomplete prenatal, with emphasis in the third quarter, and that have undergone rapid testing during labor. This is a census type study including all records of the rapid testing of the mentioned hospital between 2014 and 2016. Through these records, it was possible to quantify the seroprevalence of these diseases in this group. Added to that, the electronic health portfolio has been revised, so the other sociodemographic, clinical and laboratory data necessary to the study objectives could be accessed.

The variables of interest included in the study were the diagnosis results of rapid testing on syphilis, hepatitis B and C, and HIV, date, city of residence, prenatal data, age of parturient, mother's

education, ethnicity, occupation, marital status, number of children, type of delivery, gestational age and weight of the child.

The collected data were typed in Microsoft Office Excel 2007 (Microsoft Corporation, Washington, D.C., United States), and the statistical analyses were performed in Statistical Package for the Social Sciences (SPSS) software v. 21 (IBM, Armonk, New York, United States). The quantitative variables were described with measures of central tendency and dispersion. Qualitative variables are described in absolute numbers and proportions.

This study was approved by the Research Ethics Committee, under registry of opinion 1,957,591 on March 9, 2017.

## RESULTS

During the analyzed period, 1,317 rapid testing were carried out on HIV, and 240 on syphilis and hepatitis B and C in the birth centre at the hospital studied. The difference between the numbers of tests is justified as the implementation of rapid testing for HIV occurred earlier in the service, and only recently for other serologies. Added to that, there is a great concern with HIV prophylactic measures that must be adopted in case of maternal seropositivity to prevent vertical transmission.

From the total of the sample, 3% were excluded, four concerning sexual violence and 36 referring to accidents related to sharp objects, resulting in the final sample of 1,281 pregnant women subject to serological screening included in this study. The result was as follows: 1,240 pregnant women tested for HIV, 232 for hepatitis B, 243 for hepatitis C, and 234 for syphilis.

The average age of pregnant women was 26.3 (SD±6.7) years old, ranging from 14 to 47 years of age. **Table 1** presents the socio-demographic characteristics and origin of the women studied.

**Table 2** shows the obstetrics data of the studied sample.

In 2014, 414 (32.3%) rapid testing were performed; in 2015, 670 (52.3%); and in 2016, 197 (15.4%). **Figure 1** describes the results of rapid testing for HIV, hepatitis B and C and syphilis among pregnant women included in the study.

The results of serological screening through rapid testing of 1,281 pregnant women were as follows: HIV=1, 204 testing, two reagent cases (0.2%); hepatitis B=232 testing, three reagent cases (1.3%); hepatitis C=243 testing, two reagent cases (0.8%); syphilis=234 testing, 18 reagent cases (7.7%). A syphilis and hepatitis C co-infection was identified in one woman.

There was no statistically significant difference between seropositive pregnant women for diseases tested by rapid testing concerning maternal age, marital status, ethnicity and education. There was no difference in birth weight and gestational age either. It was observed that the two cases of HIV-positive pregnant women had caesarean section and a higher average on the number of children ( $p=0.032$ ).

## DISCUSSION

The main objective of the present study was to analyze parturients' rapid testing seroprevalence for syphilis, HIV, and hepatitis B and C in the obstetrics center of a hospital in Southern Brazil, from May 2014 to April 2016. In this study, all cases comprised pregnant women who failed prenatal care or it was incomplete, and therefore

there is no serological screening for the investigated diseases, revealing the risk of vertical transmission of the infections and causing individual and general consequences, higher costs and impacts on the health service. According to the hospital's Information Technology Department, during the research period, from May 2014 and April 2016, 5,223 live births were registered. The research detected that 1,221 pregnant women had incomplete prenatal care (23.4%) and 60 failed it (1.1%). Nevertheless, these values are lower than the ones found by Anjos and Boing in national surveys, that indicate 2.7% of absence of prenatal care and 63.1% of incomplete prenatal of Brazilian pregnant women<sup>(9)</sup>.

Among the infections investigated in the present study, syphilis was the most frequent. These data confirm the scenario found in Santa Catarina in 2015, with 3,021 records of acquired syphilis, 1,235 of syphilis in pregnant women and 453 of congenital syphilis<sup>(10)</sup>. Penicillin is the drug of choice to treat syphilis, and for allergic pregnant women desensitization is recommended<sup>(8)</sup>. Diagnosis and treatment at the proper time are highly effective

**Table 1** – Sociodemographic characteristics and origin of pregnant women subject to rapid testing for HIV, syphilis and Hepatitis B and C from 2014 to 2016 (n=1,281).

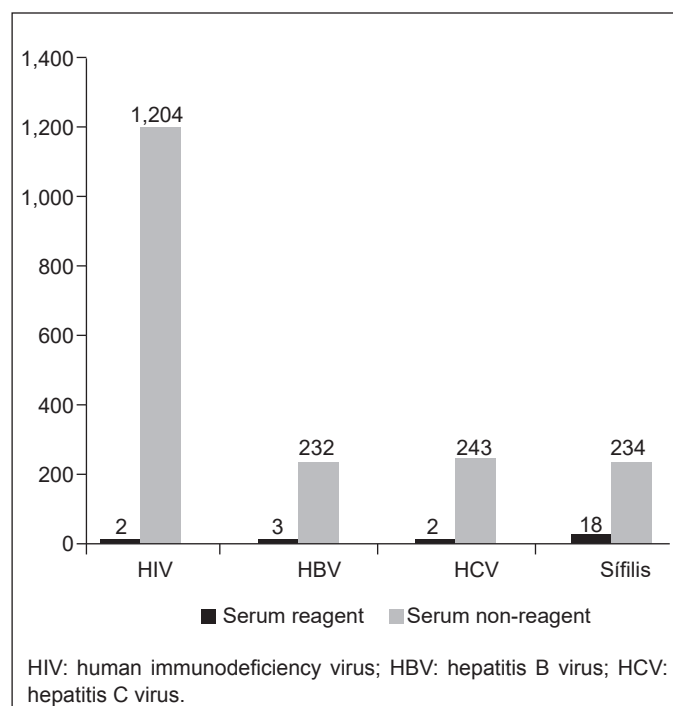
Characteristics	n	%
<b>Age</b>		
14–19	221	17.3
20–29	639	49.9
30–39	384	30.0
>39	36	2.7
Not informed	1	0.1
<b>Ethnicity</b>		
White	1,135	88.6
Non-white	127	9.9
Not informed	19	1.5
<b>Marital status</b>		
Married/Common-law marriage	1,093	85.3
Divorced	17	1.3
Single	161	12.6
Widow	6	0.5
Not informed	4	0.3
<b>Occupation</b>		
Self-employed	150	11.7
Wage earner	496	38.7
Housewife	406	31.7
Student	108	8.4
Pensioner	6	0.5
Unemployed	36	2.8
Not informed	79	6.2
<b>Education</b>		
0–8	539	42.1
>8	726	56.7
Not informed	16	1.2
<b>City of residence</b>		
Tubarão	466	36.4
Other cities of Amurel	669	52.3
Other cities of Santa Catarina	135	10.5
Other Brazilian cities	7	0.5
Not informed	4	0.3

Amurel: Associação de Municípios da Região de Laguna.

and reduce mother-to-child transmission by up to 97% of cases<sup>(11)</sup>. A study conducted with 1,380 women met in public maternity hospitals of the city of Vitória (Espírito Santo, Brazil) found that the prevalence of syphilis was of 0.4%<sup>(12)</sup>, below the present study result (7.7%). However, it should be noted that in the present study there

**Table 2** – Obstetrical data of pregnant women subject to rapid testing for HIV, hepatitis B and C, and syphilis from 2014 to 2016 (n=1,281).

Obstetrical data	n	%
<b>Prenatal</b>		
Incomplete	1,221	95.3
Not accomplished	60	4.7
<b>Number of children</b>		
0–1	528	41.2
2–3	579	45.2
>3	105	8.2
Not informed	69	5.4
<b>Gestational age in quarters</b>		
First	2	0.2
Second	36	2.8
Third	1,203	93.9
Not informed	40	3.1
<b>Type of delivery</b>		
Vaginal	532	41.5
Caesarian	738	57.6
Abortion	2	0.2
Not informed — accomplished	9	0.7
<b>Birth weight in grams</b>		
<2.500	119	9.3
≥2.500	870	67.9
Not informed	292	22.8



**Figure 1** – Rapid testing results of parturients admitted in the obstetric center from 2014 to 2016 (n=1,281).

is a reactive serology only in nontreponemal rapid testing, and cannot be considered a diagnosis of gestational syphilis as it could be a serological scar, and it is necessary the confirmation with definitive diagnosis with treponemic testing application. The comparison between studies strengthens the authorities of Santa Catarina's current concern about the growing number of syphilis cases in the state.

Concerning HIV, according to the Department of Epidemiological Surveillance (Diretoria de Vigilância Epidemiológica — DIVE), the average of 468 new cases in pregnant women per year was verified in the state between 2010 and 2016<sup>(10)</sup>. As the rapid testing has been implemented earlier in the mentioned hospital and due to the severity of the disease, it was observed that the test application is usual to all pregnant women who failed prenatal care or incomplete prenatal, mainly when prenatal portfolio does not indicate the result of anti-HIV serology.

In case of syphilis and hepatitis B and C, besides their recent implementation in the obstetric center routine, hepatitis C is not mandatory in neonatal screening. In addition, the diagnosis of syphilis and hepatitis B can occur in the puerperium.

At time of childbirth, non-reagent women have no indication for chemoprophylaxis. The parturients with reagent result from two rapid testing of different brands will have positive results for HIV, and mother and son should receive chemoprophylaxis during childbirth and puerperium.

According to the updated regulations, injectable zidovudine (AZT) is indicated for the prevention of vertical transmission and should be administered during the early labor until the clamping of the umbilical cord<sup>(8)</sup>.

The newborn should receive the first dose of AZT oral solution preferably in the delivery room, soon after the immediate care, or within the first 4 hours after birth<sup>(8)</sup>. In this study, only two cases of HIV infection were detected in the rapid testing, which reduces the prevention chances of vertical transmission to the neonate, if there was an early diagnosis. Rapid testing allows the intervention recommended by the protocol for HIV-seropositive pregnant women<sup>(13)</sup>. In the two cases in question, elective caesarean section was carried out as the diagnosed parturients' viral load was unknown.

In rapid testing for hepatitis B and C, three had reagent result for hepatitis B (1.3%) and two for hepatitis C (0.8%). The vertical transmission of hepatitis B is quite common in pregnant women with HBsAg reagents (surface antigen of the hepatitis B virus). Its prevalence in pregnant women varies according to the endemic infection in the studied geographical region and population<sup>(14)</sup>.

The hepatitis B virus (HBV) transmission routes include sexual contact and possible infection by contact with infected blood or blood products. It is important to note that vertical transmission in global terms represents the main dissemination route of HBV in regions of high prevalence and occurs predominantly during childbirth, through blood, amniotic fluid or maternal secretions contact, being rare the transplacental transmission via breastfeeding, or after birth<sup>(15)</sup>. Newborns of mothers with reagent rapid testing shall receive, in addition to the vaccine against hepatitis B, human immunoglobulin anti-hepatitis B (IGHHB) in the first 10 hours of life<sup>(8)</sup>.

In hepatitis C, the hepatitis C virus (HCV) vertical transmission rate has been estimated at 5%, with higher rates in women with HCV infection co-infected with HIV. As already mentioned, the

compulsory hepatitis C serologic tracking during pregnancy is not recommended. Nevertheless, the recommendation that women with risk factors should be screened during pregnancy remains, as well for those ones who make use of injecting drugs or have partners who use them. After delivery, there is no immediate conduct for the newborn of mother infected with HCV; there is only monitoring in the first year of life in childcare consultation<sup>(16)</sup>.

One parturient had syphilis and hepatitis C co-infection. It is fact that STIs, especially those ones that cause ulceration as the *Treponema pallidum*, favor the acquisition of other viral infections, such as HIV and hepatitis C. HCV is not considered an STI, but sexual transmission is common among men who have sex with men, with the presence of HIV infection and other STIs, and in sexual intercourse with bleeding, such as anal sexual intercourse<sup>(17,18)</sup>.

Most published studies points out that, in general, prenatal care failure occurs mainly due to socio-economic factors (low income and education family), access to appointments (place of residence far away from the service and cost of transportation), health care quality and social support<sup>(19)</sup>.

Other potentially related factors are: maternal age (late teens and older age), not living with partner, use of alcohol or other drugs during pregnancy, multiparity, non-acceptance of pregnancy, lack of family support, adverse social context, negative experiences during medical appointments and prenatal discredit conceptions<sup>(20)</sup>. All cases of rapid testing reactors results occurred among pregnant women with incomplete prenatal, and four cases of syphilis and one case of HIV occurred among pregnant women who failed prenatal care.

The present study was limited to describe the obstetric evolution and the characteristics of neonatal births of pregnant women infected with HIV, syphilis and/or hepatitis B and C, since there was no subsequent monitoring of pregnant women and newborns infected. In addition, part of the information had no data recorded, which prevented a more accurate analysis of the reality found. In addition, the lack of association between the reactors results and the sociodemographic and obstetric characteristics are probably because of the small number of reagents results in the studied universe.

## CONCLUSION

Among women subject to serological screening rapid testing, the higher prevalence was for syphilis, followed by hepatitis B. The reactivity for hepatitis C was four times higher than for HIV, although screening for hepatitis C is not in the compulsory routine.

## Conflict of interests

The authors declare no conflict of interests.

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