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Incidence of Nontreponemal Reactive Test in Women at Childbirth in a Maternity Facility in the Central Region of Rondonia State, Brazil

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Authors' contributions

This work was carried out in collaboration between all authors. Author MASC did the study design and wrote the protocol. Author AAO did the data analysis. Authors FTAG and RVG supervised the execution and reviewed the writing. All authors read and approved the final manuscript.

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ABSTRACT

Background: Syphilis is an infectious sexually transmitted disease caused by the spirochaeta *Treponema pallidum*. This disease is still a problem in public health, particularly in developing countries.
Aims: This study aimed to analyze the incidence of syphilis in women at childbirth in a maternity facility in the city of Ji-Paraná, state of Rondonia in Brazil.
Study Design: An analytical, cross-sectional, prospective study.
Place and Duration of Study: Department of Pharmaceutical Sciences (CEULJI/ULBRA) and the public maternity facility of the Ji-Paraná city, between August 2 to October 2, 2014.

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Methodology: We investigated a total of 300 pregnant women at childbirth. When VDRL test was positive a semi-structured interview was administered.
Results: We found 5 women (1.66%) with VDRL positive tests, however only one newborn, whose mother did not perform prenatal or therapy care, had a significant serology titration according to Brazilian diagnostic guidelines. Diagnosed women in this research were all adults with an average of 21.8±2.8 years of age, with basic education, married, and low income.
Conclusion: The estimated prevalence of VDRL positive tests in women at childbirth was similar to that reported in the latest studies in Brazil. However, the results found in this study show that Brazilian Unified Health System is far from the established goal for 2015 and strongly suggests that it may not be reached.

Keywords: Venereal Disease Research Laboratory (VDRL); Unified Health System (SUS); childbirth; Brazil.

1. INTRODUCTION

Syphilis is a Sexually Transmitted Disease (STD), caused by the spirochaeta *Treponema pallidum* in a systemic way [1]. When untreated or treated improperly, the disease evolves compromising the skin, internal organs, and central nervous system. Syphilis is still a problem in public health, especially in developing countries. The World Health Organization (WHO) estimated that in 2008, 12 million people, including about 2 million pregnant women were infected by *T. pallidum*. In addition, there is an increasing trend in the incidence of syphilis and congenital syphilis (CS) worldwide [2,3]. The WHO [4] estimative for developing countries is between 10 and 15% pregnant women infected by *T. pallidum.*

Congenital syphilis occurs with the transmission and hematogenous dissemination of *T. pallidum* in pregnant women untreated or treated inadequately to the fetus through the placenta. When infection happens in the first 6 months of pregnancy, vertical transmission in untreated women occurs in 70 to 100% of the cases, and in approximately 30% of the cases, for infection after the 6th month of pregnancy [3-8].

In places funded by the Brazilian Unified Health System (SUS), pregnant women during prenatal and birth must perform the screening for syphilis through the nontreponemal test (VDRL - Venereal Disease Research Laboratory). The screening must be performed in the first prenatal medical appointment, in the third trimester of pregnancy, and at childbirth or curettage [6-8].

Until the year of 2013, the nontreponemal test VDRL was used for CS screening, therapeutic follow-up and control. After this date, the rapid treponemal test which is target-specific was introduced, but it is still not available in all country regions. In the facilities where only VDRL is available, laboratory confirmation with treponemal tests for reactive VDRL, even though being decisive is not mandatory according to SUS policy [4,6,9-11]. In cases when the mother is reactive in the VDRL test, the newborn must be tested, if the result is of the child is also reactive, with clinical evidence or not, the treatment proceeds according to WHO guidelines [2,4,6].

Since 2005, the Brazilian Ministry of Health considers syphilis a notifiable disease. Previous works have reported flaws in the notification system, and it is known that the disease frequency actually is higher than shown by official data [6,8]. In this context, in which this disease is still a challenge in Brazil, this study aimed to analyze the prevalence of syphilis in women at childbirth in a maternity facility in the city of Ji-Paraná.

2. METHODS AND MATERIALS

2.1 Study Area

This study was conducted in the city of Ji-Paraná, Rondônia, Brazil, located in the North region of the country (Geographic coordinates: 10º53'07" S - 61º57'06" W). The estimated population for the year 2014 is 129,242 inhabitants and the Human Development Index (HDI) is 0.714, according to the census of the Brazilian Institute of Geography and Statistics (IBGE) in 2010. The maternity facility of the public Hospital was chosen because its serves the majority of women in the central area of the State.

2.2 Study Design

An analytical, cross-sectional, prospective study with qualitative and quantitative approach was

carried out in a two-month period from August 2 to October 2 in 2014.

2.3 Data Collection

2.3.1 Sample method

We investigated 300 pregnant women attending the public maternity facility for childbirth, covering the entire sampling space. Data collection was performed every day of the week during the study period, regardless of childbirth type (natural or C-section).

2.3.2 VDRL test

Blood samples of all participants were obtained by peripheral venous puncture, collecting 3 mL of mother's blood. Newborn blood samples were collected for VDRL test only when the mother's sample was reactive. All investigations were carried out according to manufacturers' instructions. VDRL test (Record Nº.10009010223; Labtest Diagnostica SA, Lagoa Santa, MG, Brazil) in newborn was considered significant when the titration was at least four times mother titration [6].

2.3.3 Interviews

A semi-structured interview was administered for collection of demographic and clinical information in women with reactive VDRL test. The studied variables in the interview are presented in Table 1.

3. RESULTS AND DISCUSSION

We analyzed 300 pregnant women in this study, and in 1.66% of the cases VDRL tests were reactive. Diagnosed women in this research were all adults with an average of 21.8±2.8 years of age, with basic education, married, and low income. Table 1 presents the risk factors for syphilis diagnostic.

The WHO [4] estimated that developing countries had between 10 and 15% of pregnant women infected by *T. pallidum*. Research work on syphilis in Brazil reported that each year about three million women give birth and syphilis prevalence rate is estimated in 1.6% [3,12-15]. The Brazilian Ministry of Health had joined efforts to eradicate syphilis in Brazil. The official goal was set to reach eradication (0.5 cases per 1000 live births) in 2015. In order to eradicate the disease, the government had intensified awareness campaigns and treatment programs, as well as improving the notification system. Syphilis has been reported more commonly in single women with active sex life which suggests that number of sexual partners is more significant than frequency of sexual intercourse for this disease [3].

Table 1. Profile of patients positive for VDRL

Variables	Woman 1	Woman 2	Woman 3	Woman 4	Woman 5
Age	20	22	25	18	24
Color	White	Brown	White	Brown	White
Marital status	Married	Married	Married	Married	Married
Education	Basic	High School	Basic	Basic	Basic
Income[1]	234.50	469.00	> 234.50	234.50	469.00
Number of pregnancy	2	2	2	1	1
Age of 1st sexual relationship	17	18	17	15	18
Used condom?	No	No	No	No	No
Number of sexual partners	2	3	1	2	2
If condom is always used	No	Sometimes	No	Sometimes	No
Knowledge about STD	Yes	Yes	No	No	Yes
Communication method	Lecture	Radio	-	-	Radio
When syphilis was diagnosed?	Prenatal care	Prenatal care	Pre childbirth	Prenatal care	Prenatal care
If during pregnancy, which trimester?	1st	2nd	3rd	2nd	1st
Medical treatment	Yes	Yes	No	Yes	Yes

[1] *US$ per month*

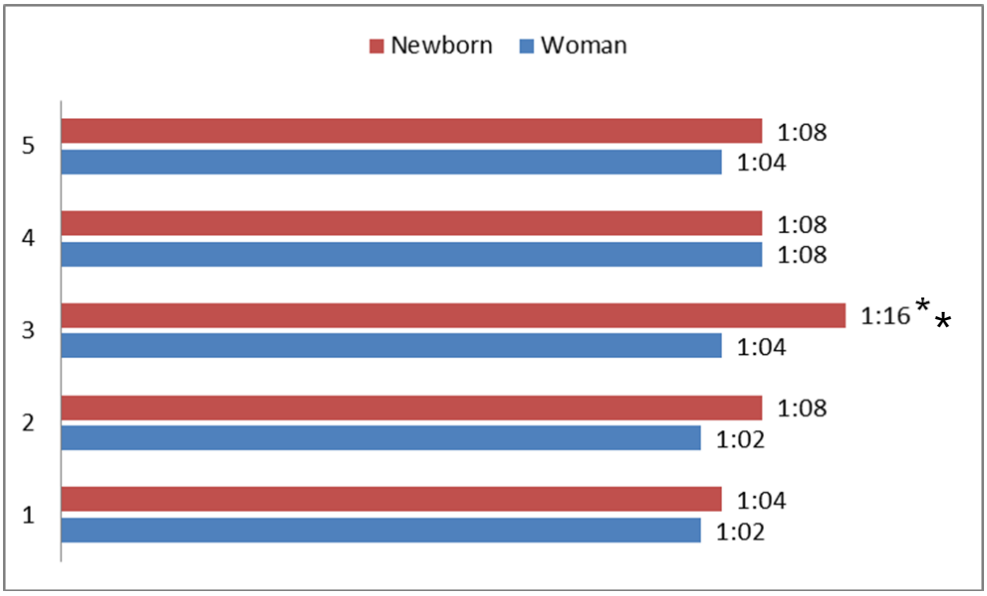

Fig. 1. Patients' titration
**Significant value according Brazilian Ministry of Health*

The results of serological tests were reported in Fig. 1 above. We found that only the newborn from Woman 3, who did not receive prenatal care or therapy, had significant serology titration (1:16) associated with syphilitic characteristics.

According to previous works, titrations 1:02 should be considered suspect and the treponemal test should be performed. This is because neonates may be in immunologic window period in which low titrations occur, even false negative or false positive due to the presence of maternal antibodies and/or cross-reactivity [16-19]. Our results confirm that, the timing of antenatal care interventions makes a significant difference in the risk of having an adverse outcome due to syphilis. Women who sought care in the first two trimesters of their pregnancy, and received the appropriate intervention, were more likely to have a healthy infant, compared to women screened and treated in the third trimester [18,20].

4. CONCLUSION

The estimated prevalence of VDRL positive tests in women at childbirth was similar to that reported in the latest studies in Brazil. However, the results found in this study show that Brazilian unified health system is far from the established goal for 2015 and strongly suggests that it may not be reached.

CONSENT

All authors declare that "written informed consent" was obtained from the patients for publication of this research. The original copies are archived in the Department of Biomedicine, CEULJI/ULBRA. The questionnaires were kept separated from the written consent, making it impossible to know which data belongs to a particular participant.

ETHICAL APPROVAL

The authors have obtained ethical approval from the Research Ethic Committee (CEP-CEULJI/ULBRA: 79.807/2014) and Legal authorization from the Hospital manager.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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