Frequency of reagent samples for syphilis in pregnant women treated at Districtal Leste Laboratory, Manaus, Amazonas, Brazil

Frequência de amostras reagentes para sífilis em gestantes atendidas no Laboratório Distrital Leste, Manaus, Amazonas, Brasil

Jéssica da Cruz Chagas¹ , Aldiane Passos de Oliveira² , Cleudiane Pereira de Andrade²,* , Jander Torres da Silva³ , Edirany dos Santos Silva³ , Ângela Cristina Cardoso de Sales³ , Rosilene Gomes da Silva Ferreira³,4

¹Department of Science Education, Federal University of Amazonas (UFAM). Manaus, Amazonas, Brazil.
²Superior School of Health, State University of Amazonas (UEA). Manaus, Amazonas, Brazil.
³Distrital Leste Laboratory, Municipal Health Department (SEMSA). Manaus, Amazonas, Brazil.
⁴Normal Superior School, State University of Amazonas (UEA). Manaus, Amazonas, Brazil.

Received in 20 Jul 2020, accepted in 10 Oct 2020, published in 17 Dec 2020

ABSTRACT

Objective: Checking the frequency of reagent samples for syphilis in pregnant women treated at the Districtal Leste Laboratory in the city of Manaus from January 2016 to December 2018, comparing the positive VDRL (Venereal Disease Research Laboratory) cases with the confirmatory FTA-Abs (Fluorescent Treponemal Antibody Absorption Test).

Methods: The study was cross-sectional and assessed the results of two syphilis diagnostic tests, VDRL and FTA-Abs. Data were obtained using the database of the electronic program SoftLab® and the Laboratory Environment Manager (GAL) and were quantitatively analyzed.

Results: In 2016, 9,028 VDRL tests were performed on pregnant women, 8,562 tests in 2017 and 5,064 in 2018. From this total, 1020 tested positive for syphilis; 392 in 2016, 320 in 2017 and 308 in 2018, increasing from 4 to 6%. Comparison with the FTA-Abs was only made possible in 2016 when the diagnosis was confirmed in 82% of the tests.

Conclusion: It was possible to check the frequency of pregnant women with positive and confirmatory results from 2016 to 2018, showing that although this pathology is easily preventable, it remains a challenging public health issue in pregnant women.
INTRODUCTION

Still described as a serious global health issue today, syphilis is a chronic, infectious and contagious disease, exclusive to humans and asymptomatic in many cases, caused by the microorganism Treponema pallidum. It comprises two main forms of transmission, sexual and vertical, presenting itself in acquired and congenital forms; the latter occurs when the pregnant woman is not treated, or treatment is improperly performed. It remains asymptomatic in 70% of cases or can evolve to more severe cases1-3.

For congenital syphilis, the most pronounced risk factors are the absence of prenatal care, inadequate anamnensis, in addition to the lack of serology in the first trimesters of pregnancy, failure to acknowledge signs of maternal syphilis, and lack of treatment by the sexual partner, which increases the progression of the disease4-5.

Today, syphilis still affects many pregnant women worldwide; America has the second-highest incidence of congenital syphilis and the third-largest number of general cases6-7. It is estimated that nearly two million pregnant women are infected with active syphilis every year. However, only 10% are diagnosed and receive proper treatment, of which 90% occur in developing countries, although there are cases of reappearance in developed countries8.

In Brazil, approximately 50 thousand pregnant women are diagnosed with syphilis. Its prevalence is 1.1 to 11.5%, resulting in up to 12 thousand live births diagnosed with congenital syphilis9. Amazonas, specifically Manaus, lacks studies that focus on the positive diagnosis of syphilis in pregnant women. The Eastern District Laboratory, located in Manaus’s eastern zone, treats 7,500 pregnant patients on average every year and requires research that can guide preventive measures to be adopted at an early stage for this group.

To date, there is no vaccine against syphilis and no protective immunity after contact with etiological agent T. pallidum, which allows the disease to be acquired whenever one is exposed to the bacteria5. However, recommendations for control include prevention and timely diagnosis, with particular attention to the most exposed populations10. Therefore, this research assessed the frequency of pregnant women who tested positive for syphilis in the Distrital Leste Laboratory in the city of Manaus, from January 2016 to December 2018, comparing positive VDRL cases with the confirmatory FTA-Abs.

METHODS

This cross-sectional study assessed the frequency of a given disease in a given group and collected retrospective data11. The studied sample was pregnant women who underwent VDRL testing, from January 2016 to December 2018, at the Distrital Leste Laboratory (LDL), of the Municipal Health Department of Manaus (SEMSA), Amazonas, Brazil, located in the East Zone of the city.

In order to characterize the frequency of the disease, data were collected from two immunological tests: VDRL (Venereal Disease Research Laboratory) and FTA-Abs (Fluorescent Treponemal Antibody Absorption Test) - the latter is to confirm the VDRL reagent tests (cut-off value of 1:2) - both obtained through a local electronic bank (SoftLab™) and the GAL (Laboratory Environment Manager).

Data was quantitatively analyzed, as such analysis utilizes data collection to test hypotheses, based on numerical measurements and statistical analysis that allows the establishment of standards and the proving of theories12.

This research was conducted according to the principles expressed in the Declaration of Helsinki and was approved by the State University of Amazonas’s Research Ethics Committee under number 3.140.866.

RESULTS

The Distrital Leste Laboratory (LDL) performed 22,654 VDRL tests on pregnant women; 9,028 in 2016, 8,562 in 2017 and 5,064 in 2018. From this total, 1,020 tested positives for syphilis; 392 in 2016, 320 in 2017 and 308 in 2018. This result shows a decrease in the number of positive samples compared to 2016 and nearly a 50% decrease in the demand for testing in 2018.
However, the comparison between reactive and non-reactive tests each year showed that the percentage of reactive samples was 4% in 2016 and 2017, while it increased to 6% in 2018. Therefore, the total number of positive tests for syphilis represented 5% of the tests performed from 2016 to 2018.

It is worth noting that these amounts include follow-up tests; that is, pregnant women diagnosed with syphilis were periodically re-tested to check the progress or return of the disease. Therefore, of the 1,020 positive samples, 192 were follow-up tests, of which 102, 83, and 7 comprised follow-ups in 2016, 2017, and 2018, respectively. Thus, the 828 new VDRL-positive test cases were distributed as follows: 290 in 2016, 213 in 2017, and 301 in 2018 (Figure 1) showing an increase in the incidence. In contrast, there was a decrease in the demand for follow-up tests.

Comparing the monthly distribution of positive cases for syphilis in pregnant women from 2016 to 2018 shows a decrease in almost all months of 2018, especially in July, compared to the months of 2016 (Figure 2). However, this may be due to less demand for the test or technical problems, such as the absence of reagents or system failures, which rendered it impossible for tests to be performed.

Regarding the age of the 828 pregnant women, it is possible to note that the VDRL test had more positive results in pregnant women aged 18 to 22 (Figure 3), totaling 129 tests in 2016, 104 in 2017, and 127 in 2018. It is also possible to observe a high rate of pregnant women aged 23 to 27, followed by those aged 13 to 17, demonstrating that the disease’s highest incidence occurs in women aged 20 to 30.

As for the gestation period, the number of pregnant women in the first trimester of pregnancy who had a positive result in the VDRL reached 52 in 2016, 56 in 2017 and 70 in 2018 (Figure 4). It is essential to highlight that these figures may be higher, considering that 135 pregnant women did not say their gestation period. However, the highest incidence of pregnant women who obtained a positive result in the VDRL test was found in the second (n = 318) and third (n = 197) trimester.

Regarding titration (Figure 5), 51% of the pregnant women presented a positive VDRL sample with low titration, i.e., 1:2 (n = 174), 1:4 (n = 131), and 1:8 (n = 118). Among the high titers, the main registered were 1:16 (n = 110), 1:32 (n = 113), and 1:64 (n = 97). However, 85 pregnant women still had extremely high titers, reaching 1:4096. Low titers were recorded for all years assessed, being 2018 the year with the lowest titers.
Figure 3 – Distribution of syphilis-positive tests (VDRL or FT-Abs) in pregnant women by age group, from 2016 to 2018. Manaus, AM, Brazil (n = 1,020).

Figure 4 - Number of positive tests in pregnant women according to the gestation period in the years 2016 to 2018. Manaus, AM, Brazil (n = 1,020).

Figure 5 - Main titrations of the VDRL tests registered in pregnant women from 2016 to 2018. Manaus, Brazil (n = 1,020).
Regarding the FTA-Abs, a confirmatory test for syphilis, only data from 2016 were obtained, as the Central Laboratory of Public Health of Amazonas (LACEN/AM) could only perform a few tests in 2017 and 2018 due to the lack of resources, a significant setback. Therefore, only the 2016 data were analyzed. From the 290 pregnant women who obtained a positive VDRL result in 2016, syphilis was confirmed in 82% (n = 238) FTA-Abs tests, 8% tested negative (n = 23) and 10% (n = 29) were not tested.

**DISCUSSION**

The Brazilian Ministry of Health recommends prenatal serological screening for syphilis and the realization of the VDRL test essentially during the first medical appointment. It should be repeated at the beginning of the third trimester if the woman obtains a negative result on the first test. For pregnant women who test positive in the first test, treatment must be monitored through periodic tests every month until the baby is born.

For decades, the increase in syphilis cases has been reported worldwide, and congenital syphilis has been the main issue. To the extent that, in 2011, the incidence was 3.3 cases per 1,000 live births in Brazil; the northeast and southeast regions obtained the highest percentages. Such a rising number of new cases resulted in the intensification of campaigns to eradicate the disease by the end of 2015, according to the World Health Organization's goals. However, the incidence in Brazil reached 6.8 cases per 1,000 live births in 2016. In Manaus, the rate was 10/1,000 live births for the same period. Therefore, it was observed that this rate would increase to 50/1,000 live births if no early detection occurred in 5% of pregnant women who had a positive VDRL result.

In this context, initial detection becomes essential for reducing congenital syphilis. However, in Manaus, the obtained results demonstrate that this challenge is still far from being overcome. Nevertheless, one can see that the strong tendency in the incidence rate of syphilis in pregnant women is due to a considerable increase in the number of notifications rather than an actual increase in the number of cases. Therefore, these data should not be misinterpreted, as the observed behavior may not reflect the actual situation of the disease in the country. Lower incidence rates of congenital syphilis could demonstrate a possible deficiency in early diagnosis and timely notification of syphilis cases in pregnant women.

According to the Technical Manual for the Diagnosis of Syphilis of the National Quality Control Program, it is estimated that false-positive results occur in 0.2 to 0.8% of the tests and, in general, are associated with titers of less than 1:4. However, it is essential to note that this cannot define suspected false-positive cases. According to the World Health Organization, samples with false-positive results may also have high titers, for example, in people who use injectable drugs and HIV and leprosy carriers.

It is noteworthy to understand that the non-treponemal test (VDRL) alone does not determine syphilis diagnosis. The diagnosis must be confirmed through a treponemal test such as the FTA-Abs. These tests are also useful in diagnosing late syphilis since in approximately 85% of cases treponemal tests remain positive throughout the life of syphilis carriers, due to their high sensitivity.

Recently, Brazil has shown a considerable increase in the number of syphilis cases. This increase is considered three times higher than that of 2010 and 2016, when there were approximately 6.8 and 12.4 cases/1,000 live births, respectively. The considerable increase in the amount of congenital syphilis and syphilis cases in pregnant women can be mainly attributed to a reduction in the use of condoms, an increase in testing coverage, low supply of antibiotics, among others. In contrast, an improved surveillance system can affect the number of reported cases.

However, in this research, we observed a notable increase in the cases of syphilitic pregnant women in the eastern zone of Manaus, supporting the pre-established hypothesis, since, in 2018, the number of positive cases increased, and that of tests performed decreased. This is due to failure to perform confirmatory FTA-Abs tests for comparison with the positive VDRL tests, caused by the lack of test kits in the Central Laboratory, which performs the confirmatory tests of all district units of the city. Thus, comparing 100% of the VDRL-FTA-Abs tests performed in pregnant women, as initially defined in the research, was not possible.

Despite being easily preventable, this disease remains a challenging public health issue. It is observed that, despite the importance of conducting screening and confirmatory tests in pregnant women and the population in general, these people are still neglected within municipal, state, or federal programs and public policies. There are still discontinuities in diagnoses and treatments in certain state localities, which should not occur when faced with a threat that can lead pregnant women and unborn children to irreparable damage. The results allowed us to visualize an increase in the frequency of pregnant patients with a positive VDRL test result for this period. Based on these data, proposals can be made for raising public awareness of this disease and its consequences, stimulating the search for earlier diagnosis and treatment, in order to decrease the amount of cases at the local level.

**CONCLUSION**

This ongoing work shows that although there are an effective diagnosis and treatment of congenital and gestational syphilis, it persists as a serious public health problem. The results showed an increase in the frequency of pregnant women with a positive VDRL test for the years 2016 and 2017. However, the number of tests performed in 2018 may influence these data. The highest rates of positive cases were between 18 and 22 years old in all study years. Based on these data, proposals can be made to make the population aware of the disease and its consequences, stimulating the search for an earlier diagnosis and treatment so that the number of cases decreases locally.
REFERENCES


Conflicts of interest: No conflicts of interest declared concerning the publication of this article.

Indications about the contributions of each author:
Conception and design of the study: RGSF, CPA
Analysis and interpretation of data: JCC, APO, CPA, RGSF
Data collection: RGSF, JCC, CPA
Writing of the manuscript: CPA, JCC, APO
Critical revision of the article: RGSF, CPA
Final approval of the manuscript*: RGSF, CPA, JCC, APO, ACCS, ESS, JTS
Statistical analysis: CPA
Overall responsibility: RGSF

*All authors have read and approved of the final version of the article submitted to Rev Cienc Saude.