

# HIV infection in pregnant women and its challenges for the prenatal care

*Infecção por HIV em gestantes e os desafios para o cuidado pré-natal*  
*Infección por VIH en embarazadas y los desafíos para la atención prenatal*

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## ABSTRACT

**Objective:** To analyze the epidemiological profile of HIV infections in pregnant women. **Methods:** Analytical study with a quantitative approach. **Results:** The HIV rate in pregnant women increased from 1.5/1000 babies born alive, in 2010, to 3.3/1000 in 2017. There was a significant association between the prenatal and the variables educational level ( $p < 0.0001$ ), occupation ( $p = 0.0105$ ), gestational age ( $p < 0.0001$ ), and type of delivery ( $p < 0.0001$ ). The mean rate of adherence to the antiretroviral treatment in the prenatal was 68.8% ( $DP = \pm 3.7$ ). **Conclusion:** The high rates of HIV detection in pregnant women suggest the need to intensify the health care to women during the prenatal, guaranteeing an integral care, early diagnoses, and enhancing the strategies to improve the adherence to the antiretroviral treatment, aiming to achieve the viral suppression of the mother by the time of childbirth, thus diminishing the risk of a vertical transmission.

**Descriptors:** HIV infections; Pregnant Women; Prenatal Care; Infectious Disease Transmission, Vertical; Public Health.

## RESUMO

**Objetivo:** Analisar o perfil epidemiológico da infecção pelo HIV em gestantes. **Métodos:** Estudo analítico com abordagem quantitativa. **Resultados:** A taxa de HIV em gestantes aumentou de 1,5 em 2010 para 3,3 casos/mil nascidos vivos em 2017. Verificou-se associação significante entre o pré-natal e as variáveis escolaridade ( $p < 0,0001$ ), ocupação ( $p = 0,0105$ ), idade gestacional ( $p < 0,0001$ ) e tipo de parto ( $p < 0,0001$ ). A taxa média de adesão ao tratamento antirretroviral no pré-natal foi de 68,8% ( $DP = \pm 3,7$ ). **Conclusão:** As elevadas taxas de detecção de HIV em gestantes remetem à necessidade de intensificação do cuidado às mulheres durante o pré-natal, com garantia de integralidade da assistência, diagnóstico precoce e aprimoramento de estratégias para a melhoria da adesão ao tratamento antirretroviral visando à supressão viral materna no momento do parto e redução do risco de transmissão vertical.

**Descritores:** Infecções por HIV; Gestantes; Cuidado Pré-Natal; Transmissão Vertical de Doença Infecciosa; Saúde Pública.

## RESUMEN

**Objetivo:** Analizar el perfil epidemiológico de la infección por VIH en embarazadas. **Métodos:** Estudio analítico con abordaje cuantitativo. **Resultados:** La tasa de VIH en embarazadas aumentó de 1,5 en 2010 para 3,3 casos/mil nacidos vivos en 2017. Se verificó relación significante entre el prenatal y las variables escolaridad ( $p < 0,0001$ ), ocupación ( $p = 0,0105$ ), edad gestacional ( $p < 0,0001$ ) y tipo de parto ( $p < 0,0001$ ). La tasa media de adhesión al tratamiento antirretroviral en el prenatal fue de 68,8% ( $DP = \pm 3,7$ ). **Conclusión:** Las elevadas tasas de detección de VIH en embarazadas remiten a la necesidad de intensificación de la atención a las mujeres durante el prenatal, con garantía de integridad de la asistencia, diagnóstico precoz y perfeccionamiento de estrategias para la mejoría de la adhesión al tratamiento antirretroviral objetivando a la supresión viral materna en el momento del parto y reducción del riesgo de transmisión vertical.

**Descriptorios:** Infecciones por VIH; Embarazadas; Atención Prenatal; Transmisión Vertical de Enfermedad Infecciosa; Salud Pública.

## INTRODUCTION

The progressive increase of cases of HIV/aids in women in reproductive age contributed for an increase in the rates of vertical transmission, which has been shown to be an important challenge for public health policies<sup>(1-3)</sup>.

The North of Brazil stands out in the national setting as the region with the highest increase in HIV detection rates in the last ten years. Within this epidemiological setting, the state of Pará had the fourth highest rate of HIV detections in pregnant women in the country, reporting a rate of 3.4 cases/1000 children born alive in 2017<sup>(1)</sup>.

HIV in pregnancy affects the quality of life of women and has negative impacts in the mother-child unity, especially when the diagnostic is found later, which makes it increasingly difficult to eliminate the vertical transmission of HIV<sup>(4-5)</sup>.

Studies have shown that the risk of HIV vertical transmission during birth is expressive, approximately 65%, while the risk of this type of transmission during pregnancy or breastfeeding is of 35% and 22%, respectively. However, the implementation of prophylactic measures during pregnancy and delivery reduces the risk of mother-child transmission to rates below 2%<sup>(6-7)</sup>.

The main factors associated to this type of transmission are especially related to a high viral load in the mother, lack of antiretroviral use, ruptures of the amniotic sac lasting for more than four hours, childbirth, premature children, and drug use<sup>(4,8-9)</sup>.

Young women, with a low socioeconomic standard and little formal education are, as a group, vulnerable for perinatal infections, whether because they do not know factors related to the infection, or due to the possibility of consecutive pregnancies with no adequate prenatal follow up<sup>(4,10-11)</sup>.

Therefore, tests to detect HIV during the prenatal are an opportunity for serological triage. Getting to know that there is a positive diagnostic for the virus directs health actions, such as the choice of an adequate antiretroviral therapy (ARVT), the planning of the type of delivery, and the early prophylaxis for the newborn exposed, to minimize the risk factors of HIV infections from mother to child and the negative post-natal outcomes<sup>(8-9)</sup>.

Considering the above, the prevention of vertical HIV transmissions is an important challenge for the health team in the scope of the prenatal follow up. That is especially true for nursing assistance, both due to the complexity involved in caring for this type of pregnancy and for the special types of care that the mother-child unity requires in these cases<sup>(12)</sup>. Therefore, it is essential to carry out wider analyses of HIV in this female public, considering local specificities and the adherence to prenatal strategies for the prevention and control of the vertical transmission of the aids virus.

## OBJECTIVE

To analyze the epidemiological profile of HIV infections in pregnant women.

## METHODS

### Ethical aspects

This study is part of the master's dissertation "Spatial standards of HIV infection in indigenous and non-indigenous pregnant

women and their relation to socioeconomic determinants". It was approved by the Research Ethics Committee of the Nursing Graduation Course at Universidade do Estado do Pará (UEPA), according to the recommendations of Resolution 466/12 from the National Council of Health.

### Design, period, and place of study

This is an analytical, cross-sectional, quantitative study, carried out with HIV cases in pregnant women from the state of Pará who were notified in the System of Information on Noted Health Problems (SINAN), from 2010 to 2017. The state is in the North of Brazil and is comprised of 144 cities. With regard to its territory, it is the second largest state in the country, with 1,248,042.515 km<sup>2</sup>. Its estimated population in 2019 was of 8,602,865 people<sup>(13)</sup>.

### Population; criteria of inclusion and exclusion

The target population of the study included 2,400 cases of HIV in pregnant women. Inclusion criteria adopted were: being from the state of Pará and having the case notified to SINAN from 2010 to 2017.

Duplicate notifications were excluded as well as any others whose record of the variables needed by the study were incomplete or inconsistent.

### Study protocol

Data were requested to the State Coordination of STI/aids and Viral Hepatitis, from the Public Health Secretariat of Pará (SESPA) and made available in the form of a data bank. Cases of HIV in pregnant women were exported to the Microsoft Office Excel software® 2010, and later organized according to the variables of the study: year of notification, age, educational level, race/color, occupation, whether there were prenatal consultations, laboratory evidence of HIV, use of antiretroviral during the prenatal, gestational age at the time of notification and type of delivery.

### Analysis of results and statistics

The level of HIV detection in pregnant women (per 1000 children born alive), according to the year of notification, was calculated. To make up the denominators, the number of children born alive was used, considering the data provided by the Information System on Children Born Alive (SINASC). Variables were analyzed using the software Bioestat 5.3. To check for an association between prenatal consultations and the other variables from the study, the G test and Pearson's chi-squared were used, considering a 5% significance level ( $p < 0.05$ ).

## RESULTS

The analysis of sociodemographic data, shown in Table 1, denotes the prevalence of women in the age group from 20 to 29 years of age (59.8%). It also shows that 50.1% of pregnant women reported having finished elementary education, while 89.8% reported being brown. This was the most present phenotype among the cases notified. Regarding their occupation, most of them (46.8%) stated to be housekeepers.

The bivariate analysis of sociodemographic variables and the prenatal had statistically significant associations with the educational level ( $< 0.0001$ ) and occupation (0.0105).

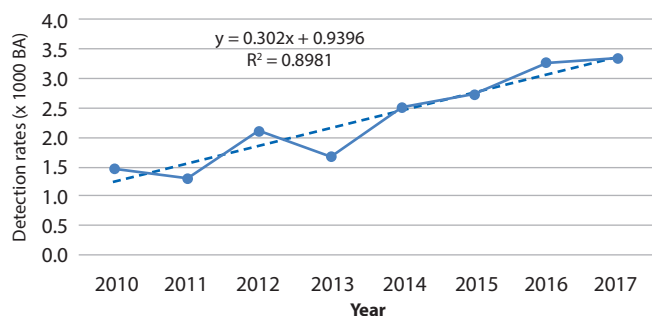
**Table 1** - Sociodemographic characteristics of pregnant women with HIV, according to the performance of a prenatal follow up, Pará, Brazil, 2010-2017

Variables	Total n (%)	Prenatal follow up		p value
		Yes (%)	No (%)	
Age				
< 15	17 (0.7)	16 (0.7)	1 (0.4)	0.5747*
15 to 19	376 (15.7)	348 (16.0)	28 (12.2)	
20 to 29	1,436 (59.8)	1,290 (59.4)	146 (63.8)	
30 to 39	542 (22.6)	491 (22.6)	51 (22.3)	
40 to 49	29 (1.2)	26 (1.2)	3 (1.3)	
Years of formal education				
Illiterate	19 (0.8)	10 (0.5)	9 (3.9)	< 0.0001*
Elementary school	1,202 (50.1)	1,058 (48.7)	144 (62.9)	
High School	763 (31.8)	723 (33.3)	40 (17.5)	
Higher education	57 (2.4)	57 (2.6)	0 (0)	
Ignored/not answered†	359 (15.0)	323 (14.9)	36 (15.7)	
Race/color				
White	104 (4.3)	99 (4.6)	5 (2.2)	0.3149*
Black	118 (4.9)	105 (4.8)	13 (5.7)	
Yellow	15 (0.6)	13 (0.6)	2 (0.9)	
Brown	2,156 (89.8)	1,947 (89.7)	209 (91.3)	
Indian (native)	7 (0.3)	7 (0.3)	0 (0)	
Occupation				
Housekeeper	1,124 (46.8)	1,016 (46.8)	108 (47.2)	0.0105†
Maid	367 (15.3)	323 (14.9)	44 (19.2)	
Student	126 (5.3)	121 (5.6)	5 (2.2)	
Other	120 (5.0)	115 (5.3)	5 (2.2)	
Ignored/not answered†	663 (27.6)	596 (27.5)	67 (29.3)	

Source: SINAN/SESPA/CE IST-AIDS, 2019.

Note: \*G test; † Pearson's chi-squared (X2); ‡ not included in the statistical analysis.

For the last few years, HIV detection rates in pregnant women have been increasing in the state, with a mean annual growth of 0.8%. The coefficient increased from 1.5/1000 babies born alive, in 2010, to 3.3/1000, in 2017 (Figure 1).



Source: SINAN/SESPA/CE IST-AIDS, 2019.

Note: BA = Born Alive

**Figure 1** - Detection rate of HIV in pregnant women, according to the year of delivery, Pará, Brazil, 2010-2017

Considering the laboratory HIV evidence, results showed that 50.3% of pregnant women found their serological condition during the prenatal, while 31.9% knew about their condition before their pregnancy. The significant percentage (16.5%) of cases that were notified during delivery should be highlighted (Table 2).

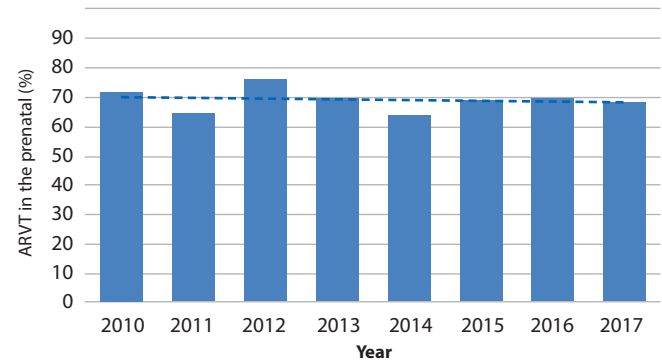
Regarding the rate of the use of ARVT before the prenatal (Figure 2), a noticeable decline can be perceived with regard

to the adherence to the treatment by pregnant women as time progressed. The year 2012 reported the highest percentage of the HIV therapy adherence among women who underwent prenatal follow ups, with 75.5% ( $X = 68.8$  and  $S = \pm 3.7$ ).

**Table 2** - Distribution of HIV cases in pregnant women, according to laboratory evidence, Pará, Brazil, 2010-2017

Laboratory evidence	N = 2400	%
Before the prenatal	765	31.9
During the prenatal	1,207	50.3
During delivery	396	16.5
After delivery	32	1.3

Source: SINAN/SESPA/CE IST-AIDS, 2019.



Source: SINAN/SESPA/CE IST-AIDS, 2019.

**Figure 2** - Rate of ARVT during the prenatal, according to the year of notification, Pará, Brazil, 2010-2017

Table 3 shows the analysis of obstetric variables of pregnant women with HIV with regard to the prenatal. Results showed that 67% were in the 3rd trimester of pregnancy when their case was notified, with a significant statistical relation between gestational age and undergoing a prenatal ( $< 0.0001$ ).

**Table 3** - Obstetric variables of pregnant women with HIV, according to the performance of a prenatal follow up, Pará, Brazil, 2010-2017

Variables	Total n (%)	Prenatal follow up		p value
		Yes (%)	No (%)	
Gestational age				
1st trimester	304 (12.7)	280 (12.9)	24 (10.5)	<0.0001
2nd trimester	447 (18.6)	432 (19.9)	15 (6.6)	
3rd trimester	1,608 (67.0)	1,423 (65.5)	185 (80.8)	
Ignored/dos not apply†	41 (1.7)	36 (1.7)	5 (2.2)	
Type of delivery				
Vaginal	319 (13.3)	246 (11.3)	73 (31.9)	<0.0001
Elective cesarean section	395 (16.5)	371 (17.1)	24 (10.5)	
Urgent cesarean section	1,124 (46.8)	1,020 (47.0)	104 (45.4)	
Ignored/dos not apply†	562 (23.4)	534 (24.6)	28 (12.2)	

Note: Pearson's chi-squared (X2); ‡ not included in the statistical analysis.

A residual analysis showed that women who received prenatal care knew their HIV diagnostic earlier than those who did not (Table 3).

Considering the type of delivery, urgent cesarean sections were the most frequent, with 46.8% of cases (Table 3). There was a significant difference between the type of delivery and the existence of prenatal consultations ( $< 0.0001$ ). Through a residue analysis, it could be found that the vaginal birth is more frequent among women who did not underwent prenatal consultations

(31.9%) than it was among those who received a follow up from the health team (11.3%).

## DISCUSSION

The results described show a significant growth of HIV detection rates in pregnant women in the state of Pará throughout the years of study, with a substantially expressive index in 2017, when compared to the national rate in the same year<sup>(1)</sup>.

The increase in the number of infection cases in this population ratifies the need for redefining programmatic actions in the state, as well as the recognition of the conditions of female vulnerability in the context of HIV/aids, considering the reduction and effective prevention of HIV cases among pregnant women, who are under the risk of transmitting the virus vertically<sup>(8-9,11,14)</sup>.

In Brazil, the epidemiological profile of the infection in pregnant women has been characterized by an increase in cases involving young women with low educational levels, who do not have a paid job; this study found similar results<sup>(5,10)</sup>.

The significant association between undergoing a prenatal and the educational level and occupation of pregnant women suggests that a deeper analysis is necessary of the socioeconomic factors that potentialize the risk of exposure to the aids virus.

A low educational level is recognized to be related to the increase in the number of HIV cases in developing countries<sup>(4,15)</sup>. This is possibly justified by a greater difficulty in understanding the information made available by health professionals and in recognizing one's susceptibility to being infected by the HIV virus, which reflects in the continuity of risk behaviors and, consequently, in the worsening of the quality of life of the individual<sup>(16-17)</sup>.

Furthermore, the low educational level tends to make it more difficult for the person to find a place in the job market<sup>(18)</sup>, which would explain the results found, according to which most pregnant women (46.8%) reported not having a paid job. Similar studies showed that HIV was more common among housekeepers and women who received low salaries for their work<sup>(2,4,19-20)</sup>.

It stands out that the absence of paid jobs means that these women depend financially on their partners<sup>(21)</sup>, which may impact in their negotiation power concerning the use of condoms in sexual relations, making them vulnerable and exposed to HIV and other sexually transmitted diseases<sup>(16,22-23)</sup>.

Regarding lab evidences, data shows that most pregnant women had access to positive HIV diagnostics during their prenatal, reiterating the importance of follow up for serological triage, to ensure that ARVT is started, to control the viral load, and, consequently, to diminish the risks of vertical transmission to the child<sup>(4,6,24)</sup>.

Similarly, a study carried out in the state Rio Grande do Norte found that 44.3% of pregnant women discovered their serological status during their prenatal<sup>(25)</sup>. Pregnancy is a sensitive moment, and a woman going through it is in a specific stage of her biological, psychological, and social development, in which one of her main preoccupations is generating a healthy child. However, a pregnancy influenced by HIV brings forth personal and family conflicts, as well as feelings of indignation or even indifference, since many women do not think of themselves as vulnerable to HIV until their diagnostic is revealed by a health professional<sup>(5,25,27)</sup>.

This is why nurses have an important role in this setting. They actively participate in the care of these women during prenatal consultations, guiding them about maternal antiretroviral therapy, breastfeeding suspension, lactation inhibition, and care to the newborn<sup>(21,28-29)</sup>.

A worrisome finding is relate to the number of cases of HIV that have been confirmed only during delivery, which indicates: the need to increase prenatal coverage; the weakness of the assistance offered; and lost opportunities to conduct quick HIV tests<sup>(11,21,30)</sup>.

A quality prenatal is known to contribute for decreased morbidity and mortality of the mother-child unity through the identification of gestational risks and the adequate guidance to the pregnant woman<sup>(31)</sup>. To do so, the availability of quick tests to detect HIV and other infections is an important tool for early diagnoses, if possible in the first trimester, to guarantee a timely treatment of infections and the implementation of intervention measures that can lead to a reduction of vertical transmissions<sup>(10,24,32-33)</sup>.

The analysis of the gestational age at the moment of notification showed that most women were in their third trimester. This shows that the pregnant women were brought in late for the prenatal, and, as a result, the start of antiretroviral prophylaxis was delayed. These factors, when timely, can contribute for an effective prevention of vertical transmission<sup>(4,34)</sup>.

The North of the country has one of the lowest levels of prenatal HIV testing in the first trimester of pregnancy, which is a shortcoming in attending to the prescribed protocols to prevent against vertical transmission<sup>(3)</sup>.

Studies have shown that most cases where the suppression of the HIV viral load did not take place by the time of delivery are due to insufficient adherence. This reiterates that the late identification of the virus is a factor that makes it harder for prophylactic measures to be implemented in an effective and safe way, which would guarantee a viral load that could be detected at the moment of delivery<sup>(4,10-11)</sup>.

Significant differences were found when the gestational age was associated with the performance of prenatal care consultations, leading to the inference that women who receive this type of assistance during gestation tend to have their HIV identified earlier when compared to those who did not undergo a follow up.

Regarding the type of delivery, results showed that urgent cesarean sections were the most common in the childbirths. In another study, which evaluated the health care chain in the prevention of vertical HIV transmission in the states of Rio de Janeiro, Rio Grande do Sul, Espírito Santo, Amazonas, Ceará, and Federal District, the main type of delivery was the elective cesarean section, with expressive indexes in the last three of these states<sup>(35)</sup>.

It is important to remember that the recommendations of the Ministry of Health for the prevention of vertical transmission do not contraindicate the vaginal birth in pregnant women with HIV/aids, as long as their viral load is within safe parameters. The protocol reinforces that the elective c-section is only indicated for pregnant women whose viral load is unknown or above 1,000 copies/mL<sup>(36)</sup>.

Therefore, the significant percentages of elective and urgent c-sections found in this study point out at a possibly inadequate prenatal follow up, in which the adherence to the ARVT by the pregnant women was impaired, which is the main reason why there would be no viral suppression at the time of birth<sup>(4,20-37)</sup>.

The adherence to the treatment promotes the improvement of the state of health and of the survival of people who live with HIV/aids. These factors can favor maternity and diminish the risk of vertical transmissions, which is why it is recommended for all pregnant women with HIV regardless of their clinical conditions, and should be maintained even after birth<sup>(36)</sup>.

The mean use of the ARVT during the prenatal was 68.8%, a percentage below the expected, when compared to the adherence rates described in scientific literature<sup>(7,11,35)</sup>. This is evidence of the challenges faced in the state of Pará for the achievement of the goal of eliminating vertical HIV transmissions<sup>(38)</sup>.

Some hypotheses have been raised to justify the non-adherence to the ARVT during the prenatal, among them: the difficulties in accessing health services, the absence of an early identification of the diagnostic, the bureaucratization of the system of referrals for specialized services, and the lack of professional qualifications to care for pregnant women with HIV/aids<sup>(39)</sup>. These elements influence the quality of the prenatal and synergistically influence the increase in the number of HIV/aids cases in children under 5 years old<sup>(4,16,19,32)</sup>.

Considering the above, it can be understood that the early diagnoses, the adequate prenatal follow up, and a qualified nursing care, aiming at integral health care to pregnant women and their needs show themselves to be important for the adherence to the treatment during pregnancy, and, consequently, to reducing vertical transmission rates<sup>(10,21)</sup>.

### Study limitations

The limitation of this study is associated to the use of a secondary source, which can lead to undernotification, inconsistencies, and incomplete data due to an inadequate filling in

of the notification forms or of their inadequate insertion in the Information System.

### Contributions to the fields of Nursing, Health or Public Policy

The research contributed for an analysis of the problem of HIV in pregnant women in Pará and for its discussion. The results also enabled the recognition of alterations in the epidemiological infection in the last few years, promoting subsidies for the evaluation of the prenatal care offered to pregnant women and the planning of their actions to control the vertical HIV transmission.

### CONCLUSION

The significant increase in the HIV detection rates in pregnant women in recent years reiterate the need to redefine strategies to deal with the HIV/aids infection, and to improve the public policies related to the prevention of the infection and targeted at the changes the epidemiological setting is going through.

An early approach to pregnant women becomes essential, so that an HIV diagnostic can be carried out early and the treatment can be conducted in a safe and efficient way, aiming to suppress the mother's viral load.

To this end, effective actions to control the vertical transmission must be based on the intensification of prevention strategies, expanded access to a diagnostic, decentralization of services of health care to people with HIV/aids, and investments in professional qualification. The latter is especially related to nurses, since these professionals have an essential role in prenatal care and in the other stages of this line of care (childbirth and puerperium). Through these actions, an improvement in the quality of health assistance for these women and their newborns can be achieved.

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