

# Vertical transmission of HIV in the population treated at a reference center

Transmissão vertical do HIV em população atendida no serviço de referência

Sueli Teresinha Cruz Rodrigues<sup>1</sup>

Maria José Rodrigues Vaz<sup>2</sup>

Sonia Maria Oliveira Barros<sup>3</sup>

## Keywords

Obstetric nursing; Nursing care; Acquired immunodeficiency syndrome; HIV infections

## Descritores

Enfermagem obstétrica; Cuidados de enfermagem; Síndrome da imunodeficiência adquirida; Infecções por HIV

## Submitted

April 2, 2012

## Accepted

February 21, 2013

## Abstract

**Objective:** To identify the rate of vertical transmission of HIV and assess the factors involved in maternal and fetal share.

**Methods:** Cross-sectional study conducted in the Specialized Care Service. We investigated 102 clinical records of HIV positive women who had given birth to live newborns. The primary variable was the occurrence of vertical transmission of HIV and the secondary variables were the factors associated with vertical transmission of HIV.

**Results:** Prevalence of 6.6% of vertical transmission. Among the infected children: 40.0% of mothers with out prenatal care and 75% without prophylaxis with antiretroviral drugs during the prenatal, 50.0% without AZT prophylaxis with oral and breast-fed. Among the uninfected children: 91.5% were started on prophylaxis with oral AZT at birth and 84.1% of mothers received ARV delivery.

**Conclusion:** The occurrence of vertical transmission of HIV in the reference service corresponded to 6.6%, indicating a high prevalence.

## Resumo

**Objetivo:** Identificar a taxa de transmissão vertical do HIV e avaliar os fatores envolvidos em partes materna fetal.

**Métodos:** Estudo transversal realizado no Serviço de Atendimento Especializado. Foram investigados 102 prontuários de mulheres com HIV que deram à luz a recém-nascidos vivos.

**Resultados:** A prevalência de 6,6% de transmissão vertical. Entre as crianças infectadas: 40,0% de mães sem pré-natal e 75% sem a profilaxia com anti-retrovirais durante o pré-natal, 50,0% sem profilaxia com AZT com oral e amamentado. Entre as crianças não infectadas: 91,5% iniciaram a profilaxia com AZT oral ao nascimento e 84,1% das mães receberam ARV.

**Conclusão:** A ocorrência de transmissão vertical do HIV no serviço de referência correspondeu a 6,6%, o que indica uma alta prevalência.

## Corresponding author

Sueli Teresinha Cruz Rodrigues  
Lorival Melo Mota Avenue, S/N, BR 101,  
North Km 97, Campus A. C. Simões,  
Tabuleiro dos Martins, Maceió, AL,  
Brazil. Zip Code: 57072-970  
suelitcr@gmail.com

<sup>1</sup>Universidade Federal de Alagoas, Maceió, AL, Brazil.

<sup>2</sup>Hospital Universitário, Universidade Federal de São Paulo, São Paulo, SP, Brazil.

<sup>3</sup>Escola Paulista de Enfermagem, Universidade Federal de São Paulo, São Paulo, SP, Brazil.

**Conflict of interest:** Barros SMO is currently the editor in chief of Acta Paulista Enferm. This paper was submitted and evaluated before assuming this role.

## Introduction

The pandemic of human immunodeficiency virus (HIV) represents one of the most serious health crises in the world; there are 34 million people infected worldwide, including more than 15.4 million women. In Brazil in 2009, there were 38,538 reported cases of the disease with an incidence rate of 20.1 cases per 100,000 inhabitants. The prevalent form of transmission among those older than 13 years old is sexual, and this principal subcategory of exposure is growing.<sup>(1,2)</sup>

The HIV / AIDS epidemic in Brazil is associated with the trend toward the feminization of poverty; the incidence rates in recent years have affected mainly women with lower education. National trends show that in the south, south-east and west-central regions of Brazil, the feminization of the epidemic is stabilizing, but in the north and northeast the trend shows growth. The prevalence among women in Brazil, between 15 and 49 years, is 0.6%; among pregnant women it is 0.41%.<sup>(3,4)</sup>

The growth of AIDS cases among women has, as a consequence, the increase in vertical transmission of HIV infection. Almost all AIDS cases in children under 13 years of age have vertical transmission of HIV as their source of infection.<sup>(8)</sup> The rate of vertical transmission of HIV, without any intervention, stands at around 25.5%, and it is possible to reduce this to levels between zero and 2%, by means of preventive interventions. However, only a broad implementation of these interventions will result in a significant reduction in the incidence of AIDS cases in children.<sup>(5-9)</sup>

This study arose from the observation of rapid and significant epidemiological transformations that this pandemic has undergone over the years, and with the professional in the team interacting with the SAE, and the direct involvement with the nursing care for pregnant women with HIV at the referral center in the city, since 2004.

The evolution of the AIDS epidemic in Brazil, in a manner especially affecting women, has brought the control of vertical transmission of HIV as a new challenge to be faced, and so it has

become a relevant and compelling objective to identify the rate of vertical transmission of HIV at the referral center in the city of Maceió, Alagoas, and to assess the associated maternal and fetal risk factors.

## Methods

This was a cross-sectional study conducted in the Specialized Care Service (SCS)-PAM Salgado, in the unit linked to the Municipality of Maceió, Alagoas State, northeast of Brazil.

We investigated clinical records of HIV positive women who had given birth to live newborns. We included women diagnosed with AIDS or HIV with positive serology confirmed prior to pregnancy, during prenatal care or on the maternity unit; all children born of these women were included in the study, with positive or negative diagnosis of HIV transmission, during the period from January 2002 to December 2006.

The primary variable was the occurrence of vertical transmission of HIV and the secondary variables were the factors associated with vertical transmission of HIV. The terms of the factors associated with vertical transmission for this research were modeled from the Record of Inquiry and Notice of HIV positive pregnant women and children exposed.

The determination of sample size considered the number of visits made during the study period. The sample size was 102 records (mother-child) and of these, 76 charts were evaluated that met the inclusion criteria of the study.

Qualitative variables were presented as absolute frequencies (n) and relative frequencies (%). Quantitative variables of the mean, median and standard deviation were calculated, along with minimums and maximums, to identify variation. An analysis for tests of comparison of qualitative variables utilized the Fisher's exact test, and we considered the level of significance to be 5%.

The study followed the development of national and international standards of ethics in research involving humans.

## Results

The sociodemographic characteristics of the 76 women studied are presented in table 1. It can be observed that the majority were young, of child-bearing age, and that low levels of education were significant in this population.

**Table 1.** Distribution of sociodemographic variables and sexual relationships, according to infected and uninfected children

Qualitative variables		Non infected n(%)	Infected n(%)
Maternal age (in complete years)	Between 15 and 19 years	14(20.0)	0(0)
	Between 20 and 39 years	54(77.1)	4(100.0)
	Between 40 and 50 years	2(2.9)	0(0)
Years of study (Education)	None	15(29.4)	1(33.3)
	Between 1 and 3 years	7(13.7)	1(33.3)
	Between 4 and 7 years	24(47.1)	0(0)
	Between 8 and 11 years	5(9.8)	1(33.3)
Municipality of residence	Rural zone of Alagoas	2(2.9)	0(0)
	Urban/rural area of Alagoas	16(22.9)	1(33.3)
	Maceió	52(74.3)	2(66.7)
Sexual partner	Serology status unknown	11(23.9)	0(0)
	Multiple partners	4(8.7)	1(25.0)
	Uninfected partner	6(13.0)	0(0)
	Infected partner	25(54.3)	3(75.0)

There was a statistically significant association related to vertical transmission, for these variables: the city in which prenatal care was obtained, whether or not prenatal care was obtained, and the use of antiretrovirals during prenatal care (Table 2).

The recommended care in Maceió for the mother at delivery, which are protective factors for vertical transmission and that resulted in the highest

**Table 2.** Distribution of prenatal care according to infected and uninfected children

Qualitative variables		Non infected n(%)	Infected n(%)	p-value
City in which prenatal care was completed	Rural zone of Alagoas	8(11.4)	0(0)	0.031
	Maceió	57(81.4)	2(50.0)	
	Did not have prenatal care	5(7.1)	2(50.0)	
Prenatal care obtained	No	5(7.0)	2(40.0)	0.51
	Yes	66(93.0)	3(60.0)	
Trimester of pregnancy when received first prenatal visit	First trimester	17(25.4)	1(25.0)	0.248
	Second trimester	20(29.9)	1(25.0)	
	Third trimester	25(37.3)	0(0)	
	Did not have prenatal care	5(7.5)	2(50.0)	
Confirmed case of AIDS in prenatal care of pregnancy	Yes	15(23.1)	0(0)	0.366
	No	50(76.9)	4(100.0)	
Use of antiretrovirals for the treatment of AIDS in pregnancy	Yes	14(21.5)	0(0)	0.395
	No	51(78.5)	4(100.0)	
Trimester of pregnancy in which TARV was used for prophylaxis of vertical transmission	First trimester	9(14.3)	0(0)	0.058
	Second trimester	21(33.3)	1(25.0)	
	Third trimester	21(33.3)	0(0)	
	Did not have prophylaxis	12(19.0)	3(75.0)	

percentage of uninfected children (Table 3). There is a noted exception of the births in rural areas, which had the highest percentage of children who did not receive antiretroviral prophylaxis (ARV) within 24 hours of life among the group of infected children, and a tendency for the highest percentage of children who breastfed among the group of infected children ( $0.05 < p < 0.10$ ).

**Table 3.** Distribution of care during childbirth and after birth, according to infected and uninfected children

Qualitative variables		Notinfected n(%)	Infected n(%)	p-value
City in which delivery occurred	Interior of Alagoas	2(2.8)	2(50.0)	0.014
	Pernambuco	1(1.4)	0(0)	
	Maceió	68(95.8)	2(50.0)	
Time of rupture of the membranes (in hours)	More than 4 hours	1(1.6)	0(0)	0.982
	Less than 4 hours (Including cesarean section)	59(96.7)	1(100.0)	
	Home birth	1(1.6)	0(0)	
Use of ARV during delivery	Yes	58(84.1)	1(25.0)	0.021
	No	11(15.9)	3(75.0)	
Initiation of TARV prophylaxis in the child	Did not receive	5(8.5)	3(75.0)	0.005
	Started in the first 24 hours	54(91.5)	1(25.0)	
Breast feeding	Yes	6(8.8)	2(50.0)	0.058
	No	62(91.2)	2(50.0)	

**Table 4.** Distribution of outpatient treatment of the child, according to infected and uninfected children

Qualitative variables		Non infected	Infected
		n(%)	n(%)
First examination and qualification of viral load of child completed in outpatient setting	Yes	63(90.0)	5(100.0)
	No	7(10.0)	0(0)
Second examination and qualification of viral load of child completed in outpatient setting	Yes	44(80.0)	5(100.0)
	No	11(20.0)	0(0)
Third examination and qualification of viral load of child completed in outpatient setting	Yes	1(14.3)	5(100.0)
	No	6(85.7)	0(0)

## Discussion

The limits of the study results refer to the cross-sectional design that performs measurements at a single time, without follow-up period. Was chosen for the research because it allows to describe the variables and their distribution patterns. As a practical contribution the results pointed to the need to im-

plement primary prevention of vertical transmission in reference service.

The characteristics of the population studied, taking into account sociodemographic data and the type of maternal exposure to HIV, imply an impact on the transmission of the virus. The increased number of HIV infection cases associated with the category of heterosexual exposure has been accompanied by an increasing proportion of infected women: those of childbearing age.<sup>(9-14)</sup>

The data in this study correspond to findings in the literature (Table 1), showing alower level of school education among women. In Brazil, the majority of AIDS cases in women occur in those who are poorly educated and have less skilled occupations.<sup>(4,14-17)</sup> The conditions of poverty and social exclusion directly affect the lives of these women and their descendants. The lack of bargaining power in sexual relationships characterize an aggravating factor for HIV infection.<sup>(17-19)</sup>

Table 2 shows that 9.8% of the pregnant women did not have prenatal care; 82.3% had prenatal care, and of these, 23.5% initiated consultations in the first trimester of pregnancy. However, 28.4% initiated prenatal care during the second trimester, and 30.4% during the third trimester, showing that the majority lost opportunities for both early diagnosis and for the initiation of antiretroviral prophylaxis.<sup>(15,16,20,21)</sup> The prevalence of the drop in viral load is a result of interventions in the prenatal period, resulting in the reduction of vertical transmission.<sup>(4,5,9,10,16-21)</sup>

Different authors, in Brazil and in other regions of the world, have demonstrated that the period of major risk of transmission of the virus is concentrated in the third trimester of pregnancy, and principally at the time of birth. It is known that, when the viral load is lowered for the mother, there is a lower possibility of vertical transmission.<sup>(4,7,8,10,16,20-23)</sup> The use of antiretroviral treatment in the second and third trimesters of pregnancy (29.4% and 26.5%, respectively), showing a low adherence to prophylaxis. Even worse are the numbers (18.6%) of those pregnant women who did not prophylaxis.

Table 3 shows that 96.7% of women delivered their child in less than four hours after rupture of

their amniotic membranes, including those by cesarean delivery. This result demonstrates a protection in relation to the adnexal factors, since these are among those that potentially increase the transmission of HIV.<sup>(16,17,23)</sup>

In this study, 79.4% of pregnant women (Table 3) received intravenous AZT during labor and delivery, which accounted for 93.1% of the births of those women that occurred in Maceió, and not in the interior of the State.

There is a proportion of vertical transmission that can occur in the intrapartum period and a lower rate of infection occurs when birth occurs via caesarean section. Caesarean section in women infected with HIV may have a clinically important protective effect to reduce transmission before the onset of labor, when membranes are intact.<sup>(18-23)</sup>

Access to health care is different in each region of the country for HIV-infected pregnant women, and for their exposed children. Thus, isolated facts may change the time that the diagnosis of HIV infection on women and the child is made.<sup>(23)</sup>

In Maceió, in the referral service, an elective cesarean section has been adopted due to the access these women have for the time of delivery. Although the majority of births took place in Maceió, a large number of these came from the interior of the state.

The newborns of HIV-infected women should receive the oral solution of Zidovudine (AZT) in the first two hours of life, even if the mothers have not received antiretroviral drugs during pregnancy and / or childbirth. Table 3 shows that of the children exposed who received no antiretroviral treatment, three were infected with the virus.<sup>(19-24)</sup>

Maternal (natural) breastfeeding is an additional risk for vertical transmission indicated in Brazil, it is systematically contraindicated. One of the most effective interventions to avoid the return to breastfeeding is to begin the orientation towards formula feeding during the prenatal period, thus complementing other known interventions to reduce vertical transmission of HIV.<sup>(11,23)</sup>

Despite orientation in order to prevent breastfeeding and the provision of infant formula, of the total number of children studied, two of those who

were breastfed presented asinfected with HIV (Table 3). The results show that there is a tendency for a higher percentage of breastfed children among the group of infected children ( $0.05 < p < 0.10$ ).

Sociocultural and economic factors may be responsible for the decision to breastfeed, which is known to increase the risk of viral transmission. In a study by Succi in 2007,<sup>(23,24)</sup> children monitored in the Northeast were proportionally more likely to be breastfed. Social expectations place mothers in embarrassing situations and they create socially acceptable excuses to justify not breastfeeding. Health professionals should support women with HIV to “deconstruct” the desire of breastfeeding, providing information on how to establish, maintain and strengthen the bond with her child.<sup>(4,5,23,24)</sup>

The routine of clinical and laboratory monitoring of the child exposed to HIV should be monthly for the first six months, and then a minimum of every two months beginning at the sixth month of life.<sup>(21-24)</sup>

Table 4 shows that 90% of charts showed completion of the first examination of the viral load, in outpatient treatment; 80% had the second examination, and only 14.3% had the third exam. These data show that the SAE has fulfilled its role in monitoring these exposed children, and the closing of cases. However the social reality of Maceió, does not permit the ideal monitoring recommended to occur, due to loss of follow up or interruption in the service due to lack of return to the clinic.

Of the 76 children exposed by vertical transmission to HIV, five were infected. These five monitored children did not have the opportunities available to them for prophylactic treatment against vertical transmission of HIV. These results confirm the urgency of increasing the availability of HIV testing to pregnant women, and access to prenatal care in the city of Maceió, with supervision of the actions.

We considered the prevalence of HIV infection with vertical transmission in this reference service in the city of Maceió was high (6.6%), as the national disclosed rate was 1%.<sup>(23,24)</sup>

Demonstrating the partial results achieved in this research and complying with the practice recommendations from 2007, there was an opportu-



nity in the SAE to offer a group to support women in the preparation for labor and delivery, under the guidance of the author of this work. Pregnant women were encouraged and supported to participate weekly in the group, providing a privileged moment for clarification of issues unique to them, and their partner or companion. The meetings allowed us to talk of intimacy with safety; by promoting strengthening of the path until delivery.

This strategy has enabled prenatal care at the reference center to be better quality and has instituted timely measures to prevent vertical transmission of HIV. Some of the requirements for changes that have already been identified still demand attention and transformation. Other studies are recommended that complement this research, especially with concern for the issues raised in its development.

## Conclusion

The study confirmed the occurrence of vertical transmission of HIV in the reference service and that it corresponded to 6.6%, indicating a high prevalence. These infected children did not have the opportunity for prophylaxis, which confirms the urgency of increasing the supply of HIV testing for pregnant women and supervision of the actions.

## Collaborations

Rodrigues STC contributed to study conception, the literature review, data collection, input, analysis and interpretation, drafting of manuscript and final approval of submitted manuscript. Vaz MJR contributed to study conception, analysis and interpretation, critical revision of manuscript for important intellectual content and final approval. Barros SMO contributed to research design, interpretation of data, critical revision of manuscript for important intellectual content and final approval.

## References

1. Joint United Nations Programme on HIV/AIDS. AIDS epidemic: UNAIDS/WHO. [update: December, 2010]. Available from: URL: [www.unaids.org](http://www.unaids.org).
2. Guidozzi F, Black V. The obstetric face and challenge of HIV/AIDS. *Clin Obstet Gynecol*. 2009;52(2):270-84.
3. Brasil. Ministry of Health. Health Secretariat of Surveillance. Health National Program of STD and AIDS. [Integrated plan for coping with the feminization of the AIDS epidemic and other STDs]. Brasília (DF): Ministry of Health; 2007. Portuguese.
4. Brasil. Ministry of Health. Health Secretariat of Surveillance. Health National Program of STD and AIDS. [Recommendations for the Prophylaxis of Vertical Transmission of HIV and Antiretroviral Therapy in Pregnant Women: pocket handbook]. Brasília (DF): Ministry of Health; 2010. Portuguese.
5. Romanelli RM, Kakehasi FM, Tavares MC, Melo VH, Goulart LH, Aguiar RA, et al. [Profile of HIV infected pregnant women at a reference prenatal care service in Belo Horizonte]. *Rev Bras Saude Mater Infant*. 2006;6(3):329-334. Portuguese.
6. Brazil. Ministry of Health. Health Secretariat of Surveillance. Health National Program of STD and AIDS. [Operational plan for the reduction of vertical transmission of HIV and Syphilis]. Brasília (DF): Ministry of Health; 2007. Portuguese.
7. Lehman DA, John-Stewart GC, Overbaugh J. Antiretroviral strategies to prevent mother-to-child transmission of hiv: striking a balance between efficacy, feasibility, and resistance. *PLoS Med*. 2009; 6(10): e1000169.
8. Connor EM, Sperling RS, Gelber R, Kiselev P. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. Pediatric AIDS Clinical Trial Group Protocol 076 Study Group. *N England J Med*. 1994;331:1173-80.
9. Calvet GA, João EC, Nielsen-Saines K, Cunha CB, Menezes JA, D'ippolito MM, et al. [Trends in a cohort of HIV-infected pregnant women in Rio de Janeiro, 1996-2004]. *Rev Bras Epidemiol*. 2007; 10(3): 323-37. Portuguese.
10. Brasil. Ministério da Saúde. Secretaria Executiva. Coordenação Nacional de DST e Aids. Projeto Nascer / Ministério da Saúde, Secretaria Executiva, Coordenação Nacional de DST e Aids. Brasília (DF): Ministério da Saúde; 2003.
11. Moreno CC, Rea MF, Filipe EV. [HIV-positive mothers and non-breastfeeding]. *Rev Bras Saude Mater Infant*. 2006;6(2):199-208.
12. Moura EL, Praça NS. [Vertical HIV transmission: expectations and actions of HIV positive pregnant]. *Rev Latinoam Enferm*. 2006;14(3):405-13. Portuguese.
13. Neves LA, Gir E. [HIV positive mothers' beliefs about mother-to-child transmission]. *Rev Latinoam Enferm* 2006;4(5):781-8. Portuguese.
14. Brazil. Ministry of Health. Secretariat of Health Care. Department of Programmatic Actions Strategies. Technical Area of Women's Health. [Prenatal and puerperium: qualified and humanized care - technical manual]. Brasília (DF): Ministry of Health; 2005. Portuguese.
15. Luo Y, Ping-He G. Pregnant women's awareness and knowledge of mother-to-child transmission of HIV in South Central China. *Acta Obstet Gynecol*. 2008;(87):831-36.
16. Bastos FI, Szwarcwald CL. [AIDS and pauperization: main concepts and empirical evidence]. *Cad Saude Pública*. 2000;16(Sup. 1):65-76. Portuguese.
17. Porto JR, Homero MN, Luz, AM. Violence against woman and the female increase of HIV/AIDS incidence. *Online Braz J Nurs*. 2003;2(3). Available at: [www.uff.br/nepae/objn203portohomeroluz.htm](http://www.uff.br/nepae/objn203portohomeroluz.htm).
18. Geddes R, Knight S, Reid S, Giddy J, Esterhuisen T, Roberts C. Prevention of mother-to-child transmission of HIV programme: low vertical transmission

- in KwaZulu-Natal, South Africa. *S Afr Med J*. 2008;98(6):458-2.
19. McIntyre JA, Hopley M, Moodley D, Eklund M, Gray GE, Hall DB, et al. Efficacy of Short-Course AZT Plus 3TC to Reduce Nevirapine Resistance in the Prevention of Mother-to-Child HIV Transmission: A Randomized Clinical Trial. *PLoS Med*. 2009;6(10):e1000172.
  20. Iribarren JA, Ramos JT, Guerra L, Coll O, de José MI, Domingo P, et al. [Prevention of vertical transmission and treatment of infection caused by the human immunodeficiency virus in the pregnant woman. Recommendations of the Study Group for AIDS, Infectious Diseases, and Clinical Microbiology, the Spanish Pediatric Association, the National AIDS Plan and the Spanish Gynecology and Obstetrics Society]. *Enferm Infecc Microbiol Clin*. 2001;19(7):314-35. Review. Spanish
  21. Succi RCM. Mother-to-child transmission of HIV in Brazil during the years 2000 and 2001: results of a multi-centric study. *Cad Saúde Pública*, 2007;23(Supl 3):S379-S89.
  22. Dunn DT, Newell ML, Mayaux MJ, Kind C, Hutto C, Goedert JJ, Andiman W. Mode of delivery and vertical transmission of HIV-1: a review of prospective studies. *J Acquir Immune Defic Syndr*. 1994;7(10):1064-6.
  23. Brasil. Ministry of Health. Health Secretariat of Surveillance. Health National Program of STD and AIDS. [Recommendations for Antiretroviral Therapy in Children and Adolescents Infected with HIV: a pocket manual]. Brasília (DF): Ministry of Health; 2009. Portuguese.
  24. Moura EL, Kimura AF, Praça NS. [Being pregnant seropositive and having acquired the human immunodeficiency Virus (HIV): a theoretical interpretation under the Symbolic Interactionism]. *Acta Paul Enferm*. 2010;23(2):206-11.