



Medical care provided to pregnant women with HIV/AIDS in Fortaleza, Ceará, Brazil

Asistencia a mujeres embarazadas con VIH/sida en Fortaleza, Ceará, Brasil

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ABSTRACT The objective of this study is to analyze the perinatal results of the prophylactic measures adopted in the prevention of the vertical transmission of HIV. The study was carried out using the medical records of 168 women with HIV and their newborns in a public maternity unit of Fortaleza, in the state of Ceará, from 2005 to 2009. The data was obtained between the months of March and September 2010 and was analyzed using the program SPSS 10.0. The women diagnosed before pregnancy received timely care that permitted them an effective antiretroviral therapy and a greater number of check-ups ($p < 0,05$). Antiretroviral therapy was administered to 97.6% of the pregnant women, and triple therapy in 88.7%. AZT was administered intrapartum in 95.2% of the women and oral AZT in syrup to 100% of the newborns. Birth by cesarean section was predominant (92.8%) and was associated to the intrapartum use of AZT when compared to vaginal birth ($p < 0.001$). Cesarean section favored intrapartum administration of AZT.

KEY WORDS Prenatal care; HIV Infections / prevention & control; AIDS Serodiagnosis; Delivery, Obstetric; Brazil.

RESUMEN El objetivo de este estudio es analizar los resultados perinatales de las medidas profilácticas adoptadas en la prevención de la transmisión vertical del VIH. Se realizó una investigación de las historias clínicas de 168 mujeres con VIH y sus recién nacidos en una maternidad pública de Fortaleza, estado de Ceará, entre 2005 y 2009. Los datos se obtuvieron entre los meses de marzo y septiembre de 2010 y fueron analizados con el programa SPSS 10.0. Las embarazadas que conocían el diagnóstico en forma previa al embarazo tuvieron una rápida atención que permitió una terapia antirretroviral eficaz y un mayor número de controles ($p < 0,05$). Se administró terapia antirretroviral al 97,6% de las embarazadas, triple esquema al 88,7%; AZT intraparto al 95,2% y AZT oral en jarabe al 100% de los recién nacidos. Predominó la cesárea (92,8%) asociada al AZT intraparto al ser cotejada con el parto vaginal ($p < 0,001$). La cesárea proporcionó mayor administración de AZT intraparto.

PALABRAS CLAVES Atención Prenatal; Infecciones por VIH / prevención & control; Serodiagnóstico del SIDA; Parto Obstétrico; Brasil.

INTRODUCTION

Vertical transmission is the main route of infection by Human Immunodeficiency Virus (HIV) among children under 13 years of age in Brazil and accounts for 92.9% of the cases registered in 2008 (1). With an HIV prevalence of 0.40% among pregnant women, it is estimated that 12,456 newborns would be exposed to infection on an annual basis (2).

Vertical transmission may occur during gestation, childbirth or breastfeeding (3), with childbirth considered the moment of greatest risk of transmission due to the newborn's contact with the blood and vaginal secretions of the mother (4,5).

The use of zidovudine (AZT) began to be recommended as a method of prevention for vertical HIV transmission after the first clinical trial (ACTG 076) was published (6). The study showed a drastic reduction of this form of transmission when AZT was administered from week 14 of gestation onward, during childbirth and to the newborn (7).

It is estimated that without intervention the transmission rate would be close to 30% (8,9). However, some studies have shown that transmission could be reduced to less than 2% (10,11) with the implementation of the prophylactic measures recommended and the performance of elective cesarean section if the viral load after week 34 of gestation were superior to 1000 copies/ml (or unknown).

According to a study conducted by Newell *et al.* (12) in 2004, the mortality rate among children under one year of age who were infected with HIV through vertical transmission was approximately nine times greater than that of uninfected children. Another study carried out in Nigeria compared a group of HIV-positive pregnant women who were treated with antiretrovirals during pregnancy with other groups of untreated women and it was found that the rate for vertical transmission of the first group was 4.8% while the rate of the other groups reached 19.5%, thus confirming the effectiveness of prophylactic measures (13).

As for Brazil, the gradual implementation of prophylactic measures caused a reduction in the incidence of vertical HIV transmission, which dropped from 904 to 66 cases between the years 2000 and 2010 (1). This reduction demonstrates

that this form of infection can be prevented through the effective implementation of proper prophylactic measures.

Early HIV diagnosis and the adoption of prophylactic measures during pregnancy, childbirth, postpartum and breastfeeding are essential in the process of prevention of vertical transmission. Moreover, these measures can also help carry out the follow-up of HIV-exposed infants, which allows those children with confirmed diagnosis to have early access to the treatment.

Given the aforementioned context and the importance of the subject, this study aims at describing the prenatal care, labor and mode of delivery provided to pregnant women with HIV/AIDS and their newborns in a public maternity unit in Fortaleza, Ceará, Brazil, between the years 2005 and 2009.

METHODOLOGY

A retrospective study was conducted among all pregnant women infected with HIV/AIDS who received prenatal care and gave birth in a tertiary care maternity unit in the city of Fortaleza, Ceará between the years 2005 and 2009. This maternity unit carries out follow-up with HIV-positive pregnant women referred from the *Unidades Básicas de Saúde* [basic health units] and other health care facilities. Pregnant women are admitted to this maternity unit with the first positive HIV test. Later they undergo a second test for confirmation of diagnosis as well as a Papanicolaou test.

Data collection was conducted from March to September in 2010. The information on the prenatal care of the mothers was extracted from both inpatient and outpatient medical records while the information on childbirths and newborns was obtained from inpatient medical records. The outpatient medical records were designed for the specific use of the health care services for pregnant women with HIV/AIDS to be filled in during routine check-ups.

The study excluded data from women who did not give birth in the maternity unit where the study was conducted, women whose medical records were not found and women with unconfirmed HIV diagnosis. In the case of women who

had delivered more than one child, only the data on the last pregnancy was included.

The variables analyzed in the mothers were: age, level of educational attainment, whether they had a stable partner, knowledge of serological status before pregnancy, gestational age at the start of prenatal care estimated according to the date of last menstrual period or ultrasound performed at the HIV/AIDS health care unit, number of medical check-ups, Papanicolaou test results reported according to the Bethesda system (14), use of antiretroviral therapy, gestational age at the beginning of antiretroviral therapy, type of treatment administered, mode of delivery, whether premature rupture of membranes occurred and interval between membrane rupture and delivery, and whether AZT was administered intrapartum as a prophylactic measure. The variables analyzed among newborns included: birth weight, gestational age determined by the Capurro method, birth weight for gestational age based on the World Health Organization (WHO) growth charts (15), and administration of oral AZT in syrup.

Data was registered in the statistical software SPSS 18.0. Initially, a univariate analysis was conducted, calculating proportions for the categorical variables and measures of central tendency for the numerical variables. Pearson's chi-squared test was adopted to analyze differences between the categorical variables, with a significance level set at 5%. A bivariate analysis was then carried out using the statistical software package STATA 11.0. The odds ratio (OR) was used as the measure of effect with a 95% confidence interval.

This article is part of a more comprehensive study titled "*Perfil Epidemiológico de gestantes HIV positivas atendidas no ambulatório de prevenção da transmissão vertical da Maternidade Escola Assis Chateaubriand da Universidade Federal do Ceará*" approved by the Research Ethics Committee of the Universidade Federal do Ceará (UFC) under protocol number 13/07.

FINDINGS

During the period under review, the health care service for HIV prevention performed prenatal check-ups for 187 HIV-positive women, of

Table 1. Sociodemographic and prenatal care data of pregnant women with HIV/AIDS who received medical care in a public maternity unit of Fortaleza, Ceará, Brazil, 2005-2009. (n=168)

Variables	Pregnant women	
	n	%
Age		
≤ 18	10	6.0
19-29	104	61.9
> 29	54	32.1
Level of educational attainment		
Primary education complete/ incomplete	94	56.0
Secondary education complete/ incomplete	58	34.5
Higher education complete/ incomplete	4	2.4
Unknown	12	7.1
Stable partnership		
Yes	156	92.9
No	3	1.8
Unknown	9	5.3
Start of prenatal care (trimester)		
First	39	23.2
Second	86	51.2
Third	43	25.6
Number of prenatal check-ups		
< 6	89	53.0
≥ 6	79	47.0
Use of ARVT		
Yes	164	97.6
No	3	1.8
Unknown	1	0.6
Type of ARVT		
Monotherapy	3	1.8
Triple therapy	149	88.7
Therapy without AZT use	4	2.4
Unknown	12	7.1
Beginning of ARVT (trimester)		
First	37	22.0
Second	66	39.3
Third	42	25.0
Unknown	23	13.7

Source: Own elaboration based on data from inpatient and outpatient medical records provided by the health care service for the prevention of vertical transmission of the Maternidade Escola Assis Chateaubriand of the Universidade Federal do Ceará.

ARVT = Antiretroviral therapy.

which the medical records of 168 pregnant women and their newborns were included in the study. Nineteen medical records were excluded: in eight of them the serum sample analysis did not confirm HIV infection, in four of them it was impossible to

Table 2. Data on childbirth and newborns of women with HIV/AIDS who received medical care in a public maternity unit of Fortaleza, Ceará, Brazil. 2005-2009. (n=168)

Variables	Newborns	
	n	%
Mode of delivery		
Elective cesarean	145	86.3
Vaginal	12	7.1
Cesarean with membrane rupture	11	6.5
Use of AZT intrapartum		
Yes	160	95.2
No	8	4.8
Premature rupture of membranes		
Yes	14	8.3
No	154	91.7
Duration of rupture (n=12)		
< 4 h	4	33.3
≥ 4 h	8	66.7
Gestational age (Capurro method)		
32 weeks	3	1.8
32 to 37 weeks	21	12.5
> 37 weeks	144	85.7
Newborn's birth weight for gestational age		
Appropriate for GA	150	89.3
Small for GA	15	8.9
Large for GA	3	1.8
Use of oral AZT in syrup		
Yes	166	98.8
No	2	1.2
Newborn's birth weight		
< 2500 g	26	15.5
≥ 2500 g	142	84.5

Source: Own elaboration based on data from inpatient and outpatient medical records provided by the health care service for the prevention of vertical transmission of the Maternidade Escola Assis Chateaubriand of the Universidade Federal do Ceará.

GA = Gestational age.

find the records, and in five of them the baby was not delivered at the studied maternity unit.

The mothers' ages ranged from 15 to 43 years, with an average of 26 ± 6 years (mean \pm SD); 104 women (61.9%) were between 19 and 29 years old, and 10 women (6.0%) were 18 years old or younger; 58 women (34.5%) were studying or had finished secondary school and only 4 women (2.4%) had attained higher education; 156 women (92.9%) had a stable partner at the time of the prenatal check-up (Table 1).

The average gestational age at the start of prenatal care was 22 weeks; 89 pregnant women

(53.0%) had less than six check-ups and the average number of check-ups in the referral maternity unit was 5.6. Seventy-six percent began their prenatal care between the second and the third trimester of pregnancy (51.2% in the second trimester and 25.6% in the third), 129 women in all. The HIV status before pregnancy was known by 89 women (53.0%).

Antiretroviral therapy was administered during pregnancy to 164 pregnant women (97.6%). Triple therapy was administered to 149 of these women (88.7%), with AZT as part of the prescribed therapy in all cases. Therapy was started in the third trimester in 42 cases (25.0%). Papanicolaou test results were available in 161 outpatient medical records (95.8%), 22 of which presented some type of abnormality (13.1%): 14 (63.6%) due to low-grade squamous intraepithelial lesion (LSIL), 5 (22.7%) due to high-grade squamous intraepithelial lesion (HSIL), and 3 (13.6%) due to atypical squamous cells of undetermined significance (ASC-US).

During childbirth, 160 women (95.2%) were injected with AZT. Mode of delivery was cesarean section in 156 cases (92.8%), out of which 145 cases were elective cesareans. Out of the total number of deliveries, 14 women had premature rupture of membranes; in 12 cases, the interval between rupture and delivery was obtained and in 8 of them, the interval was four hours or longer. Gestational age was more than 37 weeks in 144 cases (85.7%).

Regarding the newborns, 166 (98.8%) were administered oral AZT in syrup during the first eight hours of life; 150 (89.3%) presented appropriate weight for gestational age; and 142 (84.5%) weighed 2500 grams or over (Table 2).

Table 3 displays a bivariate analysis regarding the women's knowledge of HIV diagnosis before pregnancy. A statistically significant difference was observed between knowledge of diagnosis before pregnancy and start of prenatal care (OR=8.16; 95%CI [2.61; 33.46]; $p < 0.001$), number of check-ups (OR=4.61; 95%CI [2.28; 9.39]; $p < 0.001$) and start of antiretroviral therapy before the third trimester of pregnancy (OR=5.70; 95%CI [2.37; 14.38]; $p < 0.001$).

Table 3. Knowledge of HIV diagnosis before pregnancy and start of prenatal care, number of check-ups, start of antiretroviral therapy and mode of delivery in pregnant women who received medical care in a public maternity unit of Fortaleza, Ceará, Brazil. 2005-2009. (n=168)

Variable	Knowledge of HIV diagnosis				OR	95%CI	p-value
	Yes		No				
	n	%	n	%			
Start of prenatal care (weeks)							
≤ 13	27	30.3	4	5.1	8.16	2.61; 33.46	<0.001
> 13	62	69.7	75	94.9			
Number of check-ups							
< 6	32	36.0	57	72.2	4.61	2.28; 9.39	<0.001
≥ 6	57	64.0	22	27.8			
Start of ARVT (trimester)							
Before the third	66	74.2	37	46.8	5.70	2.37; 14.38	<0.001
During the third	23	25.8	42	53.2			
Mode of delivery							
Cesarean	82	92.1	74	93.7	1.26	0.32; 5.27	0.699
Vaginal	7	7.9	5	6.3			

Source: Own elaboration based on data from inpatient and outpatient medical records provided by the health care service for the prevention of vertical transmission of the Maternidade Escola Assis Chateaubriand of the Universidade Federal do Ceará.

OR = Odds ratio. 95%CI = 95% Confidence interval. ARVT = Antitetroviral therapy.

Table 4 shows findings from the analysis of the relation between mode of delivery of HIV-positive women and start of prenatal care, use of AZT intrapartum and the occurrence of premature rupture of membranes. A statistically

significant association was observed between the performance of cesarean delivery and the use of AZT intrapartum (OR=0.05; CI95% 0.00-3.51; p<0.001) and for rupture of membranes (OR=0.22; CI95% 0.05-0.96; p=0.030).

Table 4. Relation between mode of delivery and start of prenatal care, use of AZT intrapartum and premature rupture of membranes in women with HIV/AIDS who received medical care in a public maternity unit of Fortaleza-Ceará, Brazil. 2005-2009. (n=168)

Variable	Mode of delivery				OR	95%CI	p-value
	Cesarean		Vaginal				
	n	%	n	%			
Start of prenatal care (weeks)							
≤ 13	29	18.6	2	16.7	0.87	0.18; 4.21	0.868
> 13	127	81.4	10	83.3			
Use of AZT intrapartum							
Yes	152	97.4	8	66.7	0.05	0.00; 3.51	<0.001
No	4	2.6	4	33.3			
Premature rupture of membranes							
Yes	11	7.1	3	25.0	0.22	0.05; 0.96	0.030
No	145	92.9	9	75.0			

Source: Own elaboration based on data from inpatient and outpatient medical records provided by the health care service for the prevention of vertical transmission of the Maternidade Escola Assis Chateaubriand of the Universidade Federal do Ceará.

OR = Odds ratio. I95%CI = 95% Confidence interval.

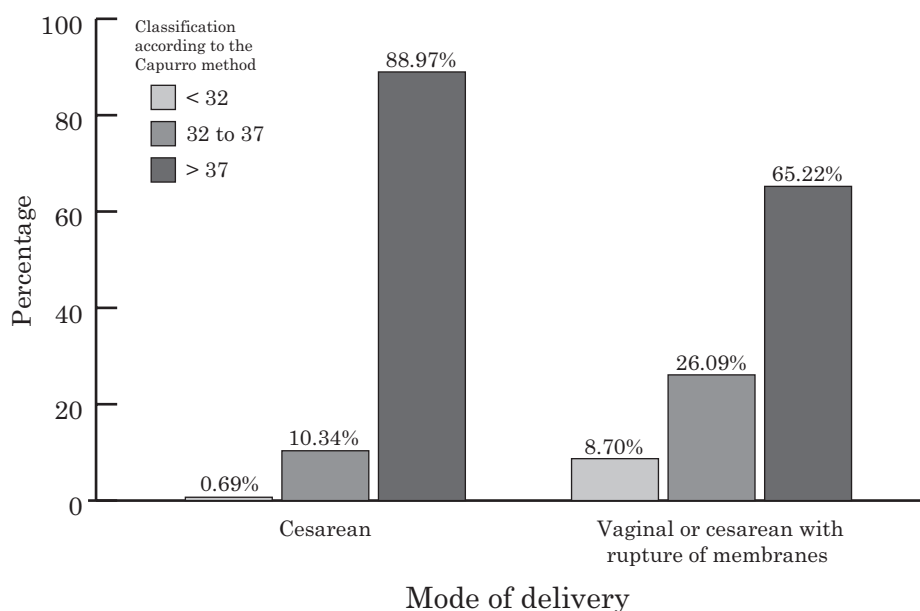


Figure 1. Comparative analysis between gestational age and mode of delivery in women with HIV/AIDS who received medical care in a public maternity unit of Fortaleza, Ceará, Brazil, 2005-2009.

Source: Own elaboration based on data from inpatient and outpatient medical records provided by the health care service for the prevention of vertical transmission of the Maternidade Escola Assis Chateaubriand of the Universidade Federal do Ceará.

Note: p -value = <0.001.

Figure 1 shows a comparative analysis between gestational age and mode of delivery. A greater number of premature newborns (<37 weeks) can be observed among the group of infants born by vaginal delivery or by cesarean section with rupture of membranes ($p < 0.001$).

DISCUSSION

It can be observed that almost every woman received antiretroviral therapy during the pregnancy, although in seven cases triple therapy was not administered. It would be useful to identify the reasons why combined therapy was not used, since this form of therapy significantly decreases plasma viral load and causes less drug resistance (16,17).

A significant percentage of pregnant women (25.6%) began to receive antiretroviral therapy at more than 28 weeks of gestation, and among this group, 76.1% had received a diagnosis of HIV

infection during pregnancy, which demonstrates the importance of measures that facilitate access of pregnant women not only to HIV testing but also to treatment. It should be highlighted that, notwithstanding the effectiveness of antiretroviral drugs when used in the last trimester of pregnancy onward (18), it is recommended that antiretroviral therapy be started as from week 14 of gestation – a recommendation which is hardly ever observed by the health care services.

AZT intrapartum was administered to 94% of the pregnant women, and oral AZT in syrup was given to 100% of the newborns during their first hours of life. The importance of elective cesarean section is stressed, considering that the possibility of using AZT intrapartum was higher among patients undergoing this procedure. Therefore, it can be noted that adequate follow-up with pregnant women during prenatal care permits scheduling the best mode of delivery according to the recommendations of the Ministério da Saúde (18), decreasing the risk of mother-to-child transmission

(19), which occurred in the case of the three patients that were administered monotherapy and underwent elective cesarean section.

Out of the eight cases of patients who did not receive AZT intrapartum, five were due to lack of time for its administration (in two labor was already at the expulsion stage, in one the labor was preterm and in the last there was acute fetal distress); in two cases it was not prescribed as the fetus had died; and in one case there was no data on prophylaxis in the medical records.

Although this study uncovered a large number of cesarean sections (92.8%) – which present higher morbidity compared with vaginal birth (as a result of infections, hemorrhages, thrombosis, among others) (20) – in Brazil the recommendation of the Ministério da Saúde is that if the mother's viral load after week 34 of pregnancy is lower than 1000 copies/ml, the mode of delivery should be as indicated by the obstetrician. However, if the load is higher than 1000 copies/ml or is not available, elective cesarean section should be prescribed (18). The prenatal care service for HIV-positive pregnant women does not possess results of viral load tests, which compromises the obstetricians' decision-making regarding the most appropriate mode of delivery.

It was demonstrated that the professionals were able to adopt all recommended measures to prevent vertical transmission of HIV, given that administration of AZT intrapartum was more frequent among women who underwent cesarean section and with less membrane rupture. In the results of a meta-analysis, Angelillo and Villari (21) observed a significant reduction in the rates of perinatal HIV transmission with elective cesarean sections as compared to emergency cesarean deliveries and vaginal births.

Elective cesarean sections should be performed when cervical dilation is less than 4 centimeters and the membrane is intact (between weeks 38 and 39 of gestation) so as to prevent preterm births. When comparing gestational age at birth among the pregnant women who underwent elective cesarean section, vaginal birth or cesarean section with membrane rupture, a smaller percentage of premature babies was observed among the first group (11% and 35% respectively).

Some characteristics such as the gestational age of the newborn, assessed using the Capurro

method for birth weight, and the appropriateness of weight for gestational age did not show significant differences with other results published in literature (22). In a multicenter study (23) on newborns whose mothers received prophylactic zidovudine or other antiretrovirals, 17% of newborns were premature, 13% had low birth weight and 6% had intrauterine growth retardation; these proportions are similar to those of newborns of uninfected mothers also receiving adequate prenatal care. A study conducted by Lambert *et al.* (24) supports the hypothesis that antiretrovirals, in addition to reducing vertical transmission by improving maternal health, can yield better neonatal outcomes.

This study illustrates the importance of HIV-testing during prenatal check-ups, given the amount of women who learned their serological status through that test. This situation was also described in a study conducted in the Netherlands, in which 40% of pregnant women learned their HIV status at prenatal check-ups (25).

It should be highlighted that the pregnant women who had been diagnosed before pregnancy had earlier access to the referral services, had more prenatal check-ups and began antiretroviral therapy earlier, which shows the importance of an early diagnosis for a more effective compliance with the preventive stages of vertical transmission. Thus, it is essential to offer and make available the test prior to pregnancy, that is to say, during women's check-ups in programs for family planning or gynecologic and breast cancer prevention, or at any of their visits to the health care centers.

Practically all of the women had a stable partner at the time of data collection. The condition of having a partner, which makes women wrongly believe that they are safe from the virus, in many cases helps increase vulnerability given the complexity of using condoms in stable relationships (26). The possibility of extramarital sex by either partner or of infection before the start of the relationship should not be dismissed.

Furthermore, not using condoms increases the risk of human papillomavirus (HPV) transmission, which is linked to cervical cancer. The results of the Papanicolaou tests showed abnormalities in 13.1% of samples, which reveals that HIV infection is a factor independent from HPV infection (27).

CONCLUSION

This study helps to highlight the importance of prenatal care in HIV-positive women. Women's knowledge of diagnosis before pregnancy was linked to a higher number of prenatal check-ups in the referral service, and allowed for the early administration of antiretroviral therapy.

The mode of delivery presented the strongest association with administration of AZT

intrapartum. The highest number of premature babies was registered among pregnant women with unscheduled deliveries. Perinatal results did not show differences with the results found in literature about HIV-negative mothers.

Finally, it can be concluded that the performance of an HIV serologic test during pregnancy is an effective measure for good prenatal care. Early detection proves beneficial for women and their newborns, since HIV transmission can be prevented by adopting prophylactic measures.

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