



## CLINICAL, EPIDEMIOLOGICAL AND VERTICAL TRANSMISSION RATE OF HIV-INFECTED PREGNANT

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### ARTICLE INFO

#### Article History:

Received 18<sup>th</sup> March, 2018  
Received in revised form  
07<sup>th</sup> April, 2018  
Accepted 20<sup>th</sup> May, 2018  
Published online 30<sup>th</sup> June, 2018

#### Key Words:

Pregnancy; Pregnant Women HIV;  
Infectious Disease Transmission, Vertical.

### ABSTRACT

The human immunodeficiency virus epidemic has been increasing in Brazil, especially in women of childbearing age, the identification and follow-up of these women is an important aspect during prenatal care. This study describes the clinical, epidemiological profile and the vertical transmission rate of pregnant women infected. Descriptive and retrospective study was carried out involving 233 pregnant attending a prenatal care center in Brazil from January 2010 to December 2015. Data collection was performed by medical records, information from the Injury Information System and the Live Birth Information System. Results: mean age was 28.2 years, 176 (78.6%) were white, 109 (52.2%) lived without a partner, and 188 (89.5%) had between 4 and 8 years of schooling. More than 76% of the pregnant women had previous gestation, the diagnosis of HIV infection was before the current gestation in 142 (66.7%) women. The newborns were full term (87.2%) and in 43.8% vaginal deliveries. There were 3.4% prevalence of HIV pregnant women and 5 newborns (2.1%) contracted the virus. Conclusions: Public health policies and health promotions should be encouraged to provide comprehensive care to mothers and families from gestational and postnatal planning in all biopsychosocial aspects, especially when HIV is present.

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Citation: Graziele Arruda Alves, Tatiana Mezadri and Leo Lynce Valle de Lacerda. 2018. "Clinical, epidemiological and vertical transmission rate of HIV-Infected pregnant", *International Journal of Development Research*, 8, (06), 21219-21223.

### INTRODUCTION

In recent years, the epidemic of Acquired Immunodeficiency Syndrome (AIDS) in Brazil has been increasing, especially among women (Deeks *et al.*, 2013). The feminization and internalization of the disease brought a great challenge in controlling the vertical transmission of the virus. In most cases, the diagnosis of infection in women occurs during the gestational period, by means of serological screening, anti-HIV, standardized in Brazil (Brasil, 2010). The Ministry of Health establishes conduits for the improvement of actions to control transmission; mainly vertical transmission. Rapid HIV testing, follow-up exams, and antiretroviral drugs are available in the public network. These technical normalizations result in a reduction in transmission from mother to fetus in almost all cases. HIV infection is still a challenge in the control of transmission, approach and treatment of these patients (Brasil, 2015). For epidemiological control, standardization of notifications of diseases and diseases was implemented, with clinical and epidemiological data.

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Notification of pregnant women with HIV occurs through the Notification of Injury Information System – SINAN (Brasil, 2006) and the birth is by the Live Birth Research System - SINASC (Brasil, 2004). Thus, local epidemiological data on HIV-positive pregnant women are of great value for future planning of care in order to minimize the risk of mother-to-child transmission and reduce maternal / fetal problems.

### MATERIALS AND METHODS

A quantitative, retrospective and descriptive study was carried out. The population was composed of all the records of HIV positive pregnant women and NBs enrolled in a Reference Center for Infectious Diseases (CEREDI) of a municipality in the region of Vale do Itajaí (SC) from January 2010 to December 2015. The variables related to the epidemiological profile and the clinical and obstetric interferences were collected from the patient records of SINAN and SINASC from the Epidemiological Surveillance Center of the municipality. Deaths, incompatible abnormalities with life, initial abortion, serodiscordant patients (only the partner was diagnosed with HIV), NB who did not complete 12 months of

**Table 1. Sociodemographic characteristics and life habits of pregnant women**

Variable	Year										Total			
	2010		2011		2012		2013		2014		2015		n	%
	n	%	n	%	n	%	n	%	n	%	n	%		
Marital status														
With partner	5	11,4	9	19,2	22	66,7	23	82,1	18	69,2	23	74,2	100	47,8
Without partner	39	88,6	38	80,9	11	33,3	5	17,9	8	30,8	8	25,8	109	52,2
Education														
Up to 4 years of study	2	4,6	5	10,4	2	6,1	2	14,3	1	2,9	2	5,4	14	6,7
From 4 to 8 years of study	41	93,2	42	87,5	31	93,9	10	71,4	33	97,1	31	83,8	188	89,5
Over 8 years of study	1	2,3	1	2,1	0	0,0	2	14,3	0	0,0	4	10,8	8	3,8
Ethnicity														
White	38	82,6	37	75,5	25	75,8	23	82,1	24	70,6	29	85,3	176	78,6
Others	8	17,4	12	24,5	8	24,2	5	17,9	10	29,4	5	14,7	48	21,4
Smoking														
Yes	10	23,8	15	30,6	7	20,0	2	7,4	8	23,5	6	16,2	48	21,4
No	32	76,2	34	69,4	28	80,0	25	92,6	26	76,5	31	83,8	176	78,6
Drugs														
Yes	4	9,5	5	10,4	2	5,6	1	3,7	6	17,7	2	5,6	20	9,0
No	38	90,5	43	89,6	34	94,4	26	96,3	28	82,4	34	94,4	203	91,0

Data: SINAN and CEREDI, 2010 to 2015.

**Table 2. Obstetric characteristics of HIV positive pregnant women**

Variable	Year								Total	
	2012		2013		2014		2015		n	%
	n	%	n	%	n	%	n	%		
Appointment number in CEREDI										
0 to 3	5	13,9	0	0,0	9	26,5	8	20,5	22	16,1
4 to 6	9	25,0	8	28,6	11	32,4	10	25,6	38	27,7
7 or more	22	61,1	20	71,4	14	41,2	21	53,9	77	56,2
First pregnancy										
Yes	9	25,0	7	25,0	4	14,8	9	27,3	29	23,4
No	27	75,0	21	75,0	23	85,2	24	72,7	95	76,6
Time gestation										
Premature	6	16,2	2	7,1	6	22,2	0	0,0	14	11,2
Mature	30	81,1	26	92,9	21	77,8	32	97,0	109	87,2
Postmature	1	2,7	0	0,0	0	0,0	1	3,0	2	1,6
Type of gestation										
Only	34	94,4	28	100,0	27	100,0	31	93,9	120	96,8
Multiple	2	5,6	0	0,0	0	0,0	2	6,1	4	3,2
Induced labor										
Yes	3	8,3	2	7,1	1	3,7	1	3,0	7	5,6
No	33	91,7	26	92,9	26	96,3	32	97,0	117	94,4
Birth										
Vaginal	13	40,6	11	40,7	11	35,5	18	58,1	53	43,8
Cesarean	17	53,1	14	51,9	12	38,7	9	29,0	52	43,0
Emergency cesarean	2	6,3	2	7,4	8	25,8	4	12,9	16	13,2
Evolution of childbirth										
Born alive	32	100,0	27	100,0	30	90,9	29	93,5	118	95,9
Stillborn	0	0,0	0	0,0	3	9,1	2	6,5	5	4,1
Childbirth Presentation										
Cephalic	34	91,9	27	96,4	25	92,6	33	100,0	119	95,2
Others	3	8,1	1	3,6	2	7,4	0	0,0	6	4,8
Cesarean occurred prior to labor										
Yes	16	72,7	11	64,7	10	52,6	10	76,9	47	66,2
No	6	27,3	6	35,3	9	47,4	3	23,1	24	33,8

Data: SINAN and CEREDI, 2010 to 2015. Years 2010 and 2011 not available

follow-up and those who had a maternal diagnosis at the time of delivery. Data collection was performed by a single researcher, thus avoiding collection bias and double interpretation. The data were tabulated in the Excel program. The quantitative variables were calculated the means and standard deviations, minimum, maximum and median values. The categorical variables were described by means of their absolute (n) and relative (%) frequencies. For the calculation of the vertical transmission rate, the number of AIDS cases in children under one year of age followed by CEREDI in the proposed period was used as numerator; as a denominator, the number of cases of HIV-infected pregnant women reported in the same period and multiplied by 100. This study was approved by the Research Ethics Committee (CEP) of the University of Vale do Itajaí under protocol number 1,713,254.

## RESULTS

At SINAN there were 306 notifications of HIV positive pregnant women, of which 275 were registered at CEREDI and 233 were eligible for the study, according to exclusion criteria. The mean age of the women in the study was 28.2 years (minimum 14 and maximum 46 years), 5.2% were less than 18 years old, 1.7% were less than 15 years of age and 13, 3% were 35 years or older. It can be observed that most of the pregnant women (52.2%) declared themselves single, however, from the year 2012 there was an increase among those who had companions compared to previous years. The sociodemographic characteristics and life habits are shown in Table 1. Regarding the educational level, 89.5% presented up to 8 years of study.

**Table 3. Characteristics of Viral Load and antiretroviral use of pregnant women**

Variable	Year										Total			
	2010		2011		2012		2013		2014		2015		n	%
	n	%	n	%	n	%	n	%	n	%	n	%		
Last charge viral														
High	11	25,0	6	12,5	4	11,8	2	7,0	8	27,6	5	13,5	36	16,4
Low	33	75,0	42	87,5	30	88,2	26	93,0	21	72,4	32	86,5	184	83,6
Laboratory evidence of HIV														
Before prenatal care	17	48,6	27	55,1	24	72,7	19	68,0	29	83,0	26	76,5	142	66,7
During prenatal care	16	45,7	22	44,9	8	24,2	9	32,0	5	14,7	8	23,5	68	31,9
During childbirth	2	5,7	0	0,0	1	3,0	0	0,0	0	0,0	0	0,0	3	1,4
After childbirth	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Use of antiretroviral during prenatal care														
Yes	32	97,0	49	100,0	32	100,0	28	100,0	32	100,0	32	94,1	205	98,6
No	1	3,0	0	0,0	0	0,0	0	0,0	0	0,0	2	5,9	3	1,4
Use of antiretroviral prophylaxis during born														
Yes	32	91,4	40	83,3	30	90,9	26	92,9	32	100,0	27	9,4	187	89,0
No	3	8,6	4	8,3	3	9,1	1	3,6	0	0,0	5	14,7	16	7,6
Ignored	0	0,0	4	8,3	0	0,0	1	3,6	0	0,0	2	5,9	7	3,3

Data: SINAN and CEREDI, 2010 to 2015.

**Table 4. Total number the HIV prevalence in pregnant women and the vertical transmission rate**

Year	Number of pregnant women	Pregnant woman SINAN HIV	Prevalence of pregnant women HIV (%)	Number pregnant CEREDI HIV	Newborn HIV +		Prevalence of vertical transmission (%)	
					CEREDI	CEREDI/HIV +	CEREDI	CEREDI/HIV +
2010	-	72	-	46	2		4,3	
2011	-	61	-	50	1		2,0	
2012	751	36	4,8	36	0		0,0	
2013	2190	37	1,7	28	0		0,0	
2014	2803	36	1,3	34	2		5,9	
2015	3547	64	1,8	39	0		0,0	
Total	9291	306	3,4	233	5		2,1	

Data: SINAN and CEREDI, 2010 to 2015. Years 2010 and 2011 not available for some variables

The race variable had a minimum percentage declared white in 2014 (70.6%) and the maximum in 2015 (85.3%), with a total average of 78.6% of the analyzed years. As for tobacco, we can observe a higher consumption of cigarettes in 2011 (30.6%) and lower in 2013 (7.4%). With regard to drug use, there were more users in 2014 (17.7%). That is, most of the pregnant women denied the use of cigarettes and drugs during all the years of the study. The obstetric characteristics (Table 2) were collected from the SINASC database, which changed in the middle of 2011, had incomplete data and were removed from the survey in the years 2010 and 2011 of this category. Regarding the prenatal care performed at CEREDI, the number of consultations averaged 6.5 visits (minimum 1/maximum 14). The mean gestational age at first approach/consultation was 16 weeks (minimum 4 and maximum 39 weeks). It was observed that, in 2013, 71.4% participated in more than 7 consultations in counterpart in 2014, this percentage was 41.2%. Regarding previous gestation, those considered multiparous were the majority, with a variation of 72 to 85%. Preterm births accounted for 11.2% of the total in the years with the highest prevalence in 2014 (22.2%) in the variable gestation time. The prevalence of term deliveries was 87.2% with 37 to 41 weeks. With regard to the type of pregnancy, most of the years, were of single fetus. It was observed that between 2012 and 2014 cesarean delivery presented a higher prevalence, only in 2015, 56% of deliveries were vaginal. However, it was also verified that most of the pregnant women underwent cesarean section before going into labor, the evolution of the pregnancy occurred from live births (90-100%). According to Table 3, the majority of pregnant women had a diagnosis of HIV before prenatal care, had low viral load (above 72%), antiretroviral use during prenatal care (over 94%) and of antiretroviral prophylaxis during delivery (above 80%). Regarding the use of ARV during prenatal and delivery,

98.6% and 89%, respectively, adhered to this drug therapy during the years studied. Table 4 shows the prevalence of HIV in pregnant women in the municipality studied and the rate of vertical transmission in the period from 2012 to 2015. In a total of 9,291 pregnant women in the analyzed period, 3.4% were diagnosed with HIV positive. Vertical transmission occurred in 2.1% of the 233 women followed up at CEREDI.

## DISCUSSION

In a Santos *et al.* study (2015) they affirm that the identification of the profile of women in care is essential so that the actions recommended by the Ministry of Health can be established for the improvement of care and assistance in the evolution of gestation, delivery and puerperium. Such information helps the team in planning and implementing appropriate health care in the region. Most HIV cases in Brazil are prevalent in the young population, between 20 and 34 years (Brasil, 2016). The mean age of the women in the present study was 28.2 years (minimum 14 and maximum of 46 years), which includes the second Brazilian fertility peak; first peak is between 20 and 24 years old and the second peak is between 25 and 29 years old (IBGE, 2013). Another characteristic observed is in relation to the marital status, which in the total of the years prevailed single pregnant women. In a study with HIV positive pregnant women in a Maternity Hospital in the North of Brazil, between 2010 and 2011, regarding the marital status, they found that in 2010, 79% of the pregnant women declared themselves unmarried, and in 2011, 43% have a stable union. It was verified that in this population there was an increase in the number of pregnant women with HIV who have a stable union and with unprotected sexual intercourse with their fixed partners (Ramos *et al.*, 2013). Recent studies have shown that gestation

considered unplanned and / or without support to this pregnant woman generates conflicts of acceptance and even repulsion with abortion attempts. It is emphasized that when the pregnant woman has the support of the partner, the conflicts of the gestational condition tend to be overcome before this stability. Emphasis is also placed on the incentive of men to participate effectively in the gestational/puerperal process, with continuity in the education of the child (Souza *et al.*, 2013; Parcero *et al.*, 2017).

Regarding the educational level of this research, the pregnant women presented between 4 and 8 years of study. In a survey in Northern Brazil in the years 2007 to 2015 in a Reference Hospital in infectious diseases in which about 30% of pregnant women had incomplete elementary education (Lima *et al.*, 2017). It is a fact that maternal schooling has a positive impact on the child's health indicators (Brasil, 2012). Women with higher levels of education are able to perform better gestation of a more adequate prenatal care (Brasil, 2017a). On the other hand, a level of education of less than 5 years is classified as a gestational risk (Santos *et al.*, 2015). The white race/color variable declared by the women in the study was prevalent. Similar to one study, the majority (56.8%) of pregnant women infected with HIV were white (Konopka *et al.*, 2010). It is worth noting that in the country records of HIV/AIDS cases in relation to self-declared race/color, 59.6% of brown or black women are predominant, however, the predominance of white race/color is found in regions of southern Brazil (Brasil, 2016). Most of the pregnant women in the study denied using cigarettes and drugs every year. In a study from 2007 to 2015, they evaluated the registry of drug use in pregnant women with HIV positive, and found that 40.4% did not use any type of drug, but in 34.7% of the records it was not found no information, revealing weaknesses in the follow-up of care for pregnant women during prenatal care (Lima *et al.*, 2017). The questioning and faithful response to drug use or not, depends on the context in which the individual is. The way it is questioned, the denial of addiction, and other factors may interfere with the response; studies show that there is a tendency for women not to report drug use; one can then contain a bias in the exact consumption of these drugs. The use of drugs is harmful in terms of maternal / fetal health, during pregnancy and after birth by direct contact or not with this type of consumption; and the effects that can generate in the individual be it the mother, fetus or RN; such as abstinence syndrome, cognitive deficit and others (Kassada *et al.*, 2013). Regarding prenatal care performed by pregnant women in CEREDI, out of the 233 registered, the number of consultations averaged 6.5 visits. Brazilian data for 2017 report that the average is 8 queries; the southern region of Brazil, including Santa Catarina, registers an above-average number referring to the number of prenatal consultations (Brasil, 2017a). A study of pregnant women in Porto Alegre can be said that those who performed up to two prenatal consultations, had a higher incidence of HIV-infected children by vertical transmission than those who performed the largest number of visits (Wachholz *et al.*, 2006). Regarding the previous gestation trait, the multiparous were the majority. Study in the state of Rio Grande do Sul observed that 51% of pregnant women with HIV already had two or more children, with a higher than average number of children (Konopka *et al.*, 2010). In a study carried out, it was observed that the vast majority of pregnant women infected with the virus, who had already had other children with negative HIV serology, found in this situation the stimulus for a next pregnancy, seeking

assistance during prenatal care. It was also found that the seropositive pregnant women had similar expectations, and believed in the seronegativity of the baby and the effectiveness of the treatment. Therefore, it was concluded that there is a need for the implementation of orientation directed at women with a focus on vertical HIV transmission (Leal *et al.*, 2012). In the present study, gestation time was characterized, and preterm births accounted for 11.2% of the total in the analyzed years, with the highest prevalence in 2014 (22.2%). The same percentage (11.2%) was recorded in SINASC (Brasil, 2017a). An important factor in relation to prematurity is the association between the use of ART and the increase in the rates of preterm deliveries; the benefit of prophylaxis is unquestionable in reducing vertical transmission; but at the time of prenatal care, the use of medication should be carefully monitored due to possible adverse effects (Brasil, 2017b).

The type of pregnancy, most of the years, was of single fetus. Of the total of charts analyzed only in the years of 2012 and 2015 presented twinning. Multiple pregnancies have a larger number of children at risk of contamination. In another study group, the researcher observed that the type of pregnancy with the highest incidence of pregnant women with HIV was single gestation and that more than 92% of the participants were not submitted to induced labor (Ramos *et al.*, 2013). A similar result was found in 94.4% of the pregnant women who did not induce labor. Brazil occupies the second position among all countries with a higher percentage of cesarean deliveries. While the WHO establishes up to 15% of the incidence of cesarean deliveries, in Brazil this percentage is up to 57%. In addition, the southern region of the country occupies the second place among the regions of the country that most perform caesarean sections (Brasil, 2017a). In the present study, it was observed that between 2012 and 2014 cesarean delivery presented a higher prevalence. In 2015 alone, 58.1% of deliveries were vaginal. In another study with pregnant women with HIV positive, it was observed that the operative delivery prevailed in 2010, with 73.5%, followed by normal delivery with 17.6% and in 2011 followed the same trend of the previous year with 70% of operative deliveries and 20% of normal deliveries (Ramos *et al.*, 2013).

Although there is evidence that cesarean sections can help reduce the vertical transmission of HIV in patients with high CV, there are still doubts as to whether the additional benefit would outweigh the risks of complications for women associated with the procedure (Brasil, 2017). Regarding the presentation of newborns at the time of delivery, more than 92% of the infants were cephalic. The evolution of pregnancy occurred between 90-100% of live births. In the research, when performed cesarean section, most occurred before labor; the Ministry of Health aims at the shortest possible rupture of amniotic membranes; perform the immediate laboring of the umbilical cord; bathing soon after birth, cleansing secretions, aspirating when needed, and initiating oral prophylaxis with AZT. For such care to be performed, it is important the knowledge of the exposed child and trained personnel for such care at birth (Brito *et al.*, 2000). During the years included in the study, most pregnant women who had been diagnosed with HIV prior to prenatal care, low viral load, had used antiretroviral during prenatal and antiretroviral prophylaxis during childbirth. Reducing vertical HIV transmission can occur at zero levels through the combination of preventive intervention measures and combined antiretroviral use (Brasil, 2017). Another group observed that the diagnosis of infection

was performed in the current or previous gestation in more than 70% of the time (Konopka *et al.*, 2010). Adherence to the use of ART is indisputable of its benefits in relation to the reduction of CV (Aweeka *et al.*, 2010). Vertical transmission of HIV occurs in about 70% during labor and delivery itself. The remaining 30% may occur intra-uterus, especially during the third trimester of gestation. There is also the risk of infection during breastfeeding (Brasil, 2010). During 2010-2015, there was a prevalence of 3.4% of pregnant women diagnosed with HIV positive. Vertical transmission occurred in 2.1% of the 233 women followed up at CEREDI. Official data from the Ministry of Health show that the average rate of AIDS detection in the general population in the last 3 years was 66.1%; and in children under 5 years old it was 10.2% 7. In a study in São Paulo, they determined the prevalence of vertical HIV transmission in the western region of the State of São Paulo, analyzing the records of HIV-infected mothers between 2001 and 2006, found an incidence of vertical transmission of 5.5% in Araçatuba and 6.5% in Presidente Prudente (Gonçalves *et al.*, 2011). This study made it possible to characterize the profile of pregnant women enrolled in a reference unit of the municipality and the rate of vertical transmission. Public health policies and health promotions should be encouraged to provide comprehensive mother and family care from gestational, gestational and postnatal planning in all biopsychosocial aspects for improvements in obstetric/fetal outcomes.

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