Prevalence of HIV infection in parturient women and coverage of HIV testing during prenatal care and delivery in Brasília, Brazil

Prevalência da infecção pelo HIV em parturientes e cobertura do teste no pré-natal e parto no distrito federal, brasil

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ABSTRACT

Introduction: Prevalence of HIV seropositivity among pregnant women in Distrito Federal, Brazil, is unknown. **Objective**: To estimate the prevalence of HIV infection among parturient women and to describe the coverage of serology testing during prenatal care and delivery in the public health system of Distrito Federal, Brazil. **Methods**: Cross-sectional study, in which the variables sociodemographic data, information on prenatal care, and outcomes in HIV serology were collected from prenatal care cards and medical records of pregnant women residing in the Distrito Federal, whose deliveries occurred in public maternities between June 2009 and May 2010. The parturient was considered seropositive if a test was done with a confirmatory technique. **Results**: We studied 3,726 parturient women, of whom 3,627 (97.3%) had information about the outcome of HIV testing. Twelve ones were detected as HIV positive, representing a prevalence of 0.33% (95%CI: 0.19–0.58). The prevalence analysis by race/skin color, education level, and age range variables showed no statistically significant differences. The proportion of parturient women who presented the mother's card was 94.6%. Coverage with two HIV tests in prenatal care was 22.1%. **Conclusion**: The prevalence of HIV seropositivity among pregnant women in public maternities in Distrito Federal is not significantly different from that estimated for Brazil. The coverage of testing for HIV was low.

Keywords: HIV seroprevalence, pregnant women, prenatal care, health services coverage, health services accessibility, hospital records.

RESUMO

Introdução: A prevalência da infecção pelo HIV em gestantes no Distrito Federal é desconhecida. **Objetivo:** Estimar a prevalência da infecção pelo HIV em parturientes e descrever a cobertura da sorologia no pré-natal e no parto na rede pública de saúde do Distrito Federal. **Métodos:** Estudo seccional no qual os dados sociodemográficos, as informações sobre o pré-natal e os resultados da sorologia para HIV foram coletados no cartão da gestante e no prontuário de uma amostra de parturientes residentes no Distrito Federal, cujos partos ocorreram em maternidades públicas, de junho de 2009 a maio de 2010. Foram consideradas soropositivas as que apresentaram resultado confirmadamente positivo para HIV. **Resultados:** Foram estudadas 3726 parturientes, das quais 3627 (97,3%) tinham informações quanto ao resultado da sorologia para HIV. Foram detectadas 12 parturientes soropositivas para HIV, representando uma prevalência de 0,33% (IC95%: 0,19–0,58). A análise da prevalência por extratos de raça/cor, escolaridade e faixa etária não mostrou diferenças estatisticamente significativas. A proporção de parturientes que apresentou o cartão da gestante foi 94,6%. A cobertura com dois testes para HIV no pré-natal foi de 22,1%. **Conclusão**: A prevalência de soropositividade para o HIV entre as parturientes não diferiu significativamente da estimada para o Brasil. A cobertura de sorologia para o HIV durante o pré-natal foi baixa.

Palavras-Chave: soroprevalência de HIV, gestantes, assistência pré-natal, cobertura dos serviços de saúde, acesso aos serviços de saúde, registros hospitalares.

INTRODUCTION

In the 1990s, it was proved that chemoprophylaxis done in HIV-seropositive pregnant and parturient women and in their newborns was effective to reduce HIV vertical transmission[1,2]. With the need of appropriately making available medicine that is used for such chemoprophylaxis and of implementing preventive, diagnostic, and therapeutical actions recommended in national level[3], it became essential to health services to know the frequency and distribution of HIV infection cases in pregnant women, and the coverage of diagnostic and prophylaxis actions with regard to opportunity and adaptation.

From Decree 993, from September 4th, 2000[4], the Brazilian Health Ministry (HM) established a compulsory notification of HIV infection cases in pregnant women; therefore, from that time on they had information about the occurrence of such cases.

Between 2004 and 2009, the detection rate of seropositive pregnant women in Distrito Federal (DF), calculated from the Information System of Notification Losses and Information System of

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Live Births, which presents the official records of compulsory notification and births, respectively varied from 0.10 to 0.15% of the live births[5]. However, a serological testing concerning Brazilian parturient women[6] that was performed in 2004, pointed out that 0.413% of them (95%CI: 0.294–0.533) were HIV-seropositive, and it also indicated a 0.425% prevalence for the Midwest area.

We must remember that in DF there were no prevalence studies of HIV infection in pregnant women and the number of notifications with regard to such losses remained beyond estimations for Brazil and for the Midwest area, therefore a hypothesis that such prevalence between parturient women in DF was lower than the one estimated for the Midwest area and for the country was suggested.

We believe that knowledge on the prevalence of HIV infection and of coverage of actions concerning prenatal care and delivery allows a better planning of strategies for prevention, diagnosis, and prophylaxis of this increase in vertical transmission.

OBJECTIVE

To estimate the prevalence of HIV infection among parturient women, and to calculate the coverage of serology testing during prenatal care and delivery in the public health system of Distrito Federal, Brazil.

METHODS

This is a cross-sectional study, in which the variables sociodemographic data, information on prenatal care, and outcomes in HIV serology were collected from prenatal care cards and medical records of pregnant women residing in DF.

The study happened in public maternities from DF, from June 2009 to May 2010. This methodology, with secondary data, was proposed for the State and Municipal Health Secretariats by the Brazilian HM[7].

Mothers that were still hospitalized after birth were asked without scheduling a day or a time to sign the free informed consent to agree to take part in the research, and then data were collected. Only information about self-reported educational level and race/skin color was taken from an interview with the mother, the others were taken from the pregnant women cards and hospital documents. Records about how many women refused to take part in the study could not be found. The inclusion criteria included only women who were residents in DF. For a 0.425% rate of infected pregnant women[8], it was considered a bilateral absolute error established in 0.22% and a 5% level of significance. Thus, a minimum sample of 3,359 parturient women was indicated to be collected. Following the national recommendation to develop this study in a state level[7], we tried to compensate the possible losses due to the inclusion of pregnant women who did not have information concerning serology by stipulating the size of the sample to be studied in 4 thousand pregnant women.

The number of participants in each public maternity was then proportionally established to that of live births residents in DF, registered in 2008, in the Information System on Live Births (SINASC), in the respective institutions. Two public maternities, Unidade Mista de Saúde de São Sebastião and Hospital da Força Aérea de Brasília, whose total was of 1.3% of births recorded in SINASC in 2008, were not included due to the small number of pregnant women care. Other two public maternities, Hospital das Forças Armadas and Hospital Regional de Santa Maria, were not included because they were closed in the beginning of the research. Parturient women from private health institutions were also not included due to operational issues. After the investigation, in the same computerized system, the number of live births by maternity during the data collection period was obtained through the verification of sample representation proportionality as to public maternities. In order to also check similarity of the proportions by age range, distributions by age range were collected both in the sample and also in the SINASC in the same period.

Diagnosis of HIV infection in Brazil can be done by conducting immunoenzymatic tests like ELISA, indirect immunofluorescence, immunoblot, Western blot, and quick tests. Herein, only positive results were considered, i.e. with two reagent stages, one through screening technique and the other through confirmatory technique (IFI, immunoblot, quick immunoblot or Western blot) or two quick tests, according to specific algorithm established by the HM for the country[9].

Data collection was performed in a standardized form that had been previously validated by the HM.

The team of field researchers was composed initially of 19 health professionals, who represented 11 of the maternities included in the study. Among the problems concerning data collection, there were replacements of field researchers and temporary closure of some maternities. There were 24 interviewers in total. For each chosen maternity, there was an investigator in charge to orient the field researcher on how to collect information from parturient women.

Pregnant individuals who agreed to participate in the research signed the Free Informed Consent. The research was approved by the Ethics Committee in Research, from the DF Health State Secretariat, according to protocol number 389/08.

RESULTS

Distribution of the parturient women included in the study, of those that had the serology results, and of the number of live births in the research period per public hospital can be found in **Table 1.** Parturient women from Hospital Regional do Paranoá had lower representation in the sample, while those from Hospitais Regionais de Sobradinho and Asa Norte had a higher one.

Proportions by age range found in the sample and in the records of SINASC in the same period are in **Table 2**. Pregnant women aged 15 to 19 years old had lower representation in the sample.

From the 3,726 pregnant women studied, 3,627 (97.3%) presented information regarding the serological testing result for HIV. Twelve pregnant women were seropositive, representing a 0.33% prevalence coefficient (95%CI: 0.19–0.58). Prevalence by race/skin color, educational level, and age range did not show statistically significant differences with regard to the general prevalence of the sample (**Table 3**).

As to HIV testing, only 22.1% of the studied pregnant women performed the two HIV tests needed during gestation, 57.0% had

only one, and 18.3% carried out one at delivery. A 2.7% rate was found for women that did not have the test results in any moments (**Table 4**).

At delivery, 74.9% of the pregnant women had an indication to do the exam, because there were no records of a result in the last quarter of gestation. 7.2% of the parturient women did not take the test in labor although there was an indication (**Table 4**).

Proportion of parturient women that had the mother's card at delivery was of 94.6%. Only 0.8% reported not having the card. The others did not take it or the information was not collected (**Table 4**).

Coverage to carry out the two HIV tests during gestation varied according to educational level, age range, number of prenatal care appointments, and quarter when the prenatal care started. It was lower in pregnant women with lower educational level, in younger ones, in those who started late the prenatal care and had few consultations. In the race/skin color variable, there were no statistically significant differences of coverage of two HIV tests in pregnancy (**Table 5**).

DISCUSSION

Prevalence of HIV seropositivity among parturient women at delivery in the sample did not present a statistically significant difference in comparison to that estimated for Brazil. This finding indicates that a sub-notification of HIV seropositive pregnant women may exist in DF, since the records of compulsory notification show a highly lower prevalence than the one found in this and in other studies[8,10].

It was not possible to achieve the initial estimation of 4 thousand parturient women for the sample size, due to lack of people to gather data in some maternities throughout the research period. However, the final number was higher than the minimum limit established to calculate the prevalence according to established parameters.

Representation differences in the sample happened more due to alterations in the demand of maternities than to study losses. The number of parturient women who had their deliveries in Hospital

Table 2 – Distribution of parturient women with HIV serological results available and mothers of live births in public maternities during the research period, who lived in Distrito Federal, Brazil, by age range

Age range (years)	Parturient women with serology results	Mothers of live births during research period
	n (%)	n (%)
Younger than 14	15 (0,4)	196 (0,6)
15 to 19	526 (14,5)	5275 (16,9)
20 to 34	2654 (73,2)	22467 (71,9)
35 or older	425 (11,7)	3311 (10,6)
Ign	7 (0,2)	–
Total	**3,627 (100,0)**	**31,249 (100,0)**

Ign: non-reported aged.

Table 1 – Parturient women included in the study, those who had the results of HIV serology, and live births from Distrito Federal, Brazil, recorded during the study period in the Information System on Live Births (SINASC) in public maternities

Hospital / Maternities	Parturient women from the sample		Live births during the research period
	Studied	With serology testing results	
	n (%)	n (%)	n (%)
Hospital Regional de Ceilândia	644 (17.3)	636 (17.5)	5,202 (16.6)
Hospital Regional da Asa Sul	605 (16.20)	580 (16.0)	4,981 (15.9)
Hospital Regional de Taguatinga	508 (13.6)	462 (12.7)	4,244 (13.6)
Hospital Regional do Paranoá	196 (5.3)	195 (5.4)	2,815 (9.0)
Hospital Regional do Gama	334 (9.0)	327 (9.0)	2,795 (8.9)
Hospital Regional de Planaltina	349 (9.4)	348 (9.6)	2,636 (8.4)
Hospital Regional de Samambaia	295 (7.9)	295 (8.1)	2.308 (7.4)
Hospital Regional da Asa Norte	300 (8.1)	292 (8.1)	1,847 (5.9)
Hospital Regional de Sobradinho	269 (7.2)	268 (7.4)	1,561 (5.0)
Hospital Regional de Brazilândia	140 (3,8)	139 (3.8)	1,019 (3.3)
Hospital Universitário de Brasília	86 (2.3)	85 (2.3)	735 (2.4)
Hospital Regional de Santa Maria	–	–	549 (1.8)
Hospital das Forças Armadas	–	–	323 (1.0)
Unidade Mista de Saúde de S. Sebastião	–	–	193 (0.6)
Hospital da Força Aérea de Brasília	–	–	40 (0.1)
Hospital Naval de Brasília	–	–	1 (0.0)
Total	**3,726 (100.0)**	**3,627 (100.0)**	**31,249 (100.0)**

Table 3 – Distribution of seropositive parturient women who presented the serology tests results, and prevalence of HIV-seropositivity, according to race/skin-color, educational level, and age range

Variables*	Number of parturient women		Prevalence	
	Seropositive	With serology results	%	95%CI
Educational level				
Illiterate and incomplete primary school	1	123	0.81	0.14–4.46
Complete primary school and incomplete elementary school	1	847	0.12	0.02–0.67
Complete elementary school and incomplete high school	5	1,027	0.49	0.21–1.14
Complete high school and incomplete superior	5	1,466	0.34	0.15–0.79
Complete superior school or more	–	124	–	–
Race/Skin color				
White	6	895	0.67	0.31–1.45
Black	–	573	–	–
Mulatto	6	1,992	0.30	0.14–0.65
Yellow	–	36	–	–
Indigenous	–	15	–	–
Age range				
< 20	–	541	–	–
20 to 39	11	2,984	0.37	0.21–0.66
40 or older	1	95	1.05	0.19–5.72
Total	**12**	**3,627**	**0.33**	**0.19–0.58**

*Proportion of records with ignored information – educational level: 1.1%; race/skin color: 3.2%; age range: 0.2%.

Table 4 – Distribution of parturient women included in the study according to HIV testing and pregnancy card availability

Variables	n (%)
Number of HIV tests	
Two tests in the prenatal care period	823 (22,1)
Took one test at delivery	581 (15,6)
Did not take a test at delivery	242 (6,5)
One test in the prenatal care period	2,123 (57,0)
Took one test at delivery	1,873 (50,3)
Did not take a test at delivery	250 (6,7)
No results in the prenatal care period	780 (20,9)
Took one test at delivery	681 (18,3)
Did not take a test at delivery	99 (2,7)
Indication to take the test at delivery	
With indication*	2,790 (74,9)
Took one test at delivery	2520 (67,6)
Did not take a test at delivery	270 (7,2)
Card	
Has and took it	3526 (94,6)
Has but did not take it	98 (2,6)
Does not have	30 (0,8)
Information was not collected	72 (11,9)
Sample total	3,726 (100,0)

*There was no HIV test result in the last quarter of pregnancy.

Regional do Paranoá, for example, changed from 1,645 in 2008 to 2,711 in 2009, a 65% raise. Such differences cause some caution as to the result extrapolation for the population of parturient individuals from the public health system. The public maternities that were not included in this sample took care of only 3.5% of the parturient women from public institutions in the DF. Some of them provide services for specific populations, like those from military hospitals that receive servers of the Armed Forces and the Unidade Mista de São Sebastião, which performs only normal deliveries.

On the other hand, the proportion of pregnant women that had some record of HIV testing results was pretty high, therefore the absence of serology results records little influenced on the prevalence calculation.

The analysis of prevalence by race/skin color, educational level, and age range variables did not show any statistically significant differences; however, such analysis was limited due to the reduced size of the sample, which was not sized to carry out prevalence stratified analyses.

As to the number of tests, the most frequent situation was the performance of only one serology testing in pregnancy, so a new test was performed at delivery. More than half of the parturient women were in this situation.

The proportion of pregnant women with indication of serology testing at delivery, due to lack of serology result in the last quarter of gestation, including those that did not perform the test in any previous moments, was very high. Most pregnant women took the test at delivery, but the opportunity of prophylaxis of vertical transmission in the prenatal care was missed. Furthermore, the great demand for testing in maternities overloads the services and may compromise the quality of the result, especially due to late availability after the child's birth. Quick tests in Brazilian maternities

Table 5 – Coverage of HIV testing with two tests in prenatal care by biosocial and prenatal care variables in the studied sample

Variables*	Coverage (%)	Statistical analyses by variable
Educational level		
Illiterate and incomplete primary school	11.5	
Complete primary school and incomplete elementary school	16.6	
Complete elementary school and incomplete high school	21.1	$\chi^2 = 43.4$; FD = 4; $p < 0.001$
Complete high school and incomplete superior school	26.0	
Complete superior school or more	31.0	
Race/Skin color		
White	24.8	
Black	18,9	
Mulatto	22.2	$\chi^2 = 8.8$; FD = 4; $p = 0.067$
Yellow	16.7	
Indigenous	15.4	
Age range (years old)		
< 20	18.2	
From 20 to 39	22.9	$\chi^2 = 6.21$; FD = 2; $p = 0.045$
40 or older	20.0	
Prenatal care appointments (number)		
7 or more	29.8	
4 to 6	16.1	$\chi^2 = 141.6$; FD = 2; $p < 0.001$
1 to 3	3.8	
Quarter of the prenatal care beginning		
First	27.6	
Second	18.6	$\chi^2 = 68.1$; FD = 2; $p < 0.001$
Third	5.7	
Sample total	22.1	

*Proportion of records with ignored information – educational level: 1.2%; race/skin color: 3.2%; age range: 0.3%; prenatal appointments (number): 6.1%; prenatal quarter beginning: 10.3%.
χ^2 = chi-square; FD: freedom degrees.

have some implantation issues, mainly concerning the availability of fast results and the appropriate intervention[11].

Even parturient women who had several prenatal care appointments and those who initiated prenatal care in the first quarter had low coverage of taking two HIV tests during gestation, which are recommended by the Decree from the Health State Secretariat of DF Government (SES-DFG) number 37/08[12]. For those who initiated prenatal care late and had few appointments, coverage with two tests was even lower. The parturient women with lower educational level and the younger ones also had a very low coverage. It is possible that an important condition that created low coverage may be the precarious socioeconomic condition of the parturient, which can cause several other inter-connected factors, such as late prenatal care beginning, with few consultations, low educational level, and pregnancy at a younger age range. National and local experiences have showed this influence and reinforce the condition of higher social vulnerability in the poorest social classes[8,13-16]. Such finding indicates the need of health services that prioritize a solution for the problems associated with the access of such population to health services.

Low coverage of the serology testing found among the youngest women also indicates the need of specific strategies to increase prevention knowledge, opportunities, and options in this populational range[17-19].

Since this research works with a survey of secondary data, which were obtained from the mother's card and from administration records, the possible failures concerning the notes in such documents should be considered as the limitations of this study.

There is a strong possibility that some parturient women have reported a false district address to the health services, since they actually reside in other states, mainly around the DF. A study carried out in 2002 estimated in 3.6 and 8.0% the proportion of mothers that stated living in DF at delivery, but they actually lived in other states[20].

Parturient women from the public health system correspond to 78.9% of DF residents[21], however, since SINASC data indicate that the sociodemographic profile of parturient women who had their children in private maternities is very different from that of public services[21], it was considered that it would not be appropriate to extrapolate the result from this study for all the parturient women who reside in the district region.

CONCLUSION

Prevalence of HIV seropositivity among the studied parturient women was not significantly different from that estimated for Brazil, therefore it is in accordance with the possibility that there may be a sub-notification of HIV seropositive pregnant women in DF.

HIV serology testing coverage in pregnancy in DF with two tests is low.

Prevention guidelines of HIV vertical transmission with respect to the access to previous diagnosis are not being fully complied, because a very high proportion of pregnant women at labor arrive with an indication to take the quick test, both because they do not present the HIV test result from the first quarter or they do not have the result written in their cards.

The main recommendations from this study concern structure of the health system in order to overcome aspects that difficult the access to tests; the efficient flow of laboratorial results; and care of health professionals, especially obstetricians, nurses and pharmaceuticals, to the importance of fully following the screening protocol for HIV in the prenatal care service.

Efficient access to services, correct prophylactic managements, epidemiological surveillance, and other actions that reduce HIV vertical transmission, according to the protocols approved by the HM and the World Health Organization, without a doubt will reflect upon future studies that aim at estimating the HIV prevalence in pregnant women.

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Conflict of interests

There was no conflict of interests to declare.

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