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Barriers for HIV testing during pregnancy in Southern Brazil

Barreiras para a realização do teste para a detecção do HIV em gestantes no Sul do Brasil

ABSTRACT

OBJECTIVE: To assess HIV testing rate and determine risk factors for not have been tested during pregnancy.

METHODS: A cross-sectional study was carried out in Porto Alegre, Southern Brazil, from December 2000 to February 2001. Socioeconomic, maternal and healthcare variables were obtained by means of a standardized questionnaire. Crude and adjusted odds ratios and their 95% confidence intervals were obtained in logistic regression models.

RESULTS: A total of 1,642 mothers were interviewed. Of them, 94.3% reported being offered HIV testing before or during pregnancy or during labor; 89 mothers (5.4%) were not tested or did not know if they were tested. Attending fewer than six prenatal visits, being single and younger than 18 years old were relevant barriers preventing HIV testing. There was found a relationship between maternal schooling and the category of prenatal care provider. Having low 22.20 (12.43-39.67) or high 3.38 (1.86-7.68). schooling and being cared in the private sector strongly reduced the likelihood of being HIV tested.

CONCLUSIONS: The Brazilian Health Ministry's recommendation for universal counseling and HIV testing has been successfully implemented in the public sector. In order to improve HIV testing coverage, new strategies need to target women cared in the private sector especially those of low schooling.

KEYWORDS: HIV. Pregnancy. HIV antibodies. Prenatal care. HIV infections, diagnosis.

RESUMO

OBJETIVO: Avaliar o padrão de realização do teste para a detecção do HIV e os fatores de risco para a sua não realização durante a gestação.

MÉTODOS: Trata-se de um estudo transversal realizado em Porto Alegre, de dezembro de 2000 a fevereiro de 2001. Foram obtidas de puérperas variáveis biológicas, demográficas e sociais por meio de questionário padronizado. Foi elaborado modelo de regressão logística para determinar os fatores risco para não ser testada para a detecção do HIV.

RESULTADOS: Foram entrevistadas 1.642 mães. Destas, 94,3% informaram testadas para o HIV. Oitenta e nove (5,4%) não foram testadas para HIV ou não sabiam se haviam feito o teste. Realizar menos do que seis consultas pré-natais, ausência de companheiro e idade inferior a 18 anos foram fatores de risco para não realização do teste. Houve interação entre escolaridade materna e categoria do atendimento pré-

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natal. Baixa escolaridade 22,20 (12,43-39,67) e alta escolaridade 3,38 (1,86-7,68) com acompanhamento pré-natal no setor privado foram condições preponderantes para não realização do teste de detecção do HIV.

CONCLUSÕES: A testagem universal para a detecção do HIV durante o pré-natal no setor público foi implementada com sucesso pelo Ministério da Saúde. Contudo, novas intervenções e estratégias necessitam ser direcionadas objetivando ampliar o acesso ao diagnóstico da infecção por HIV no setor privado.

DESCRIPTORIOS: HIV. Gravidez. Anticorpos anti-HIV. Cuidado pré-natal. Infecções por HIV, diagnóstico.

INTRODUCTION

In Brazil, universal voluntary HIV testing has been available for all pregnant women since 1997. Free anti-retroviral therapy is available for all HIV-positive pregnant women from week 14 of pregnancy up to delivery and for their newborns. In order to provide an adequate replacement for breastfeeding, infant formula preparations are available during the first six months of life at no cost.^{1,2,3} The program has had an extremely significant impact in terms of lowering mother-to-child HIV transmission, with a decrease from 926 HIV-infected newborns in 1996 to 111 in 2001.³

Some studies have estimated the coverage of HIV testing among pregnant women in Brazil. One study¹³ was carried out before free anti-retroviral therapy was available for all pregnant women and showed an overall HIV testing rate of 68% during prenatal care in the city of Ribeirão Preto (State of São Paulo). Recently, after free access to anti-retroviral therapy, another study showed similar results. The coverage of HIV testing during pregnancy was 52% nationwide, 69% in the Southeast and 72% in the Southern region.¹⁷

Current research suggests that mothers who are HIV infection diagnosed late in the course of their pregnancies or after delivery come from poor socioeconomic background.²⁰ The reasons why these women are not being tested when anti-retroviral therapy is available are not clear.

The present study sought to determine the coverage of HIV testing and to identify barriers that reduce the likelihood of HIV testing during pregnancy. The study findings will contribute to promoting changes in practice and policy in order to improve HIV testing rate and anti-retroviral therapy coverage. This is particularly relevant given there are resources available to

address health care needs of HIV infected women and their children.

METHODS

A cross-sectional hospital-based study was carried out in the city of Porto Alegre, Southern Brazil, from December 2000 to February 2001. There were 1,440,000 inhabitants in Porto Alegre in 1999.

All mothers who gave birth in the city's three largest public hospitals during the study period were eligible, making it a total of 1,658 mothers. These three hospitals accounted for 9,570 (41%) of 23,360 deliveries reported in the city in 2000. Hospital deliveries corresponded to 99% of all live births in the city. It was estimated that a sample size of 1,268 subjects would provide an odds ratio of 1.80 with 95% confidence interval and 80% power, considering a 10% prevalence of not being HIV tested in the unexposed group.⁶

Socioeconomic, maternal and medical care information were obtained from the mothers by means of a standardized questionnaire. Interviews were performed after delivery by trained personnel supervised by the research team. The socioeconomic variables were: marital status, educational level; and the category of prenatal care provider. Maternal variables were: mother's age and number of pregnancies including the current one. The medical care variables were: the pregnancy trimester in which the first prenatal visit occurred, and number of prenatal care visits.

A small amount of additional data was collected from prenatal care records in order to confirm whether HIV testing was performed. Less than 1% of the mothers refused to be interviewed, and data were missing for some mothers.

HIV testing during pregnancy care was considered

*Ministério da Saúde. Portaria Técnica Ministerial n. 874/97, de 03 de julho de 1997. Diário Oficial da União, Brasília, 04 jul 1997.

**Ministério da Saúde. Portaria Técnica Ministerial n. 709/99, de 10 de junho de 1999. Diário Oficial da União, Brasília, 11 jun 1999.

Table 1 - Anti-HIV antibody testing and prevalence of HIV-positive women during pregnancy. Porto Alegre, Brazil, 2001.

Anti-HIV antibody testing	Women tested (N)	(%)	95% CI	HIV-positive women
First trimester	539	32.8	30.5-35.2	4
Second trimester	723	44.0	41.6-46.5	8
Third trimester	219	13.3	11.7-15.1	3
Rapid test during labor	48	2.9	2.2-3.9	5
Before pregnancy	20	1.2	0.7-1.9	0
Do not know if they were tested	68	4.1	3.2-5.2	0
Not tested	21	1.3	0.8-1.9	-
Declined to be tested after counseling	4	0.2	0.1-0.6	-
Total	1,642	100		20

as the dependent variable, and coded 0 if tested and 1 if not tested. Mothers (n=16; 1%) known to be HIV-positive before the current pregnancy were excluded from the analysis. Thus, the sample comprised 1,642 parturient women. Pregnant women who did not know if they were HIV tested or who were not tested at all were defined as "not being HIV tested". To investigate the associations, crude and adjusted odds ratios and their 95% confidence intervals were estimated in logistic regression models. P-values for each variable were derived from the log-likelihood ratio statistic. A conceptual model guided the regression strategy used in the adjusted analysis.²¹ According to this approach, socioeconomic variables are the first events that directly or indirectly should determine the outcome. For this reason, the first model was adjusted only for socioeconomic variables. The second model included these socioeconomic variables plus maternal variables. The third model was adjusted for socioeconomic and maternal variables plus medical care variables. Gestational age was included in the last model as a continuous variable and was measured in complete weeks according to Capurro's method.⁴ The odds ratios reported for socioeconomic variables were drawn from model 1, those for maternal variables were drawn from model 2 and those for health care variables were drawn from the estimates derived in model 3.

Plausible interactions were tested. There was an interaction between maternal schooling and the category of prenatal care provider. To better explain this interaction a new variable including maternal schooling and category of prenatal care provider together was presented in four categories as follows: low schooling mothers cared in the public sector, low schooling mothers cared in the private sector, high schooling mothers cared in the public sector and high schooling mothers cared in the private sector. Low schooling mothers cared in the public sector were taken as reference.

Consent and ethical approval for the study were obtained from the Ethics Committees of all three hospitals. Consent was obtained individually from each mother who participated in the study.

RESULTS

A total of 1,553 women (94.6%) reported being offered HIV testing during their current pregnancy, of which 1,549 (94.3%) were HIV tested shortly before or during their current pregnancy. Four (0.2%) declined to be tested after counseling. Eighty-nine (5.4%) were not HIV tested during their current pregnancy and 48 were tested with rapid testing during labor. Forty-one were not either offered voluntary counseling or testing during their current pregnancy, including 20 who were only tested before their current pregnancy (Table 1).

The majority of women were tested in the first and second trimesters of pregnancy. Eight women were diagnosed as HIV-positive late in the second trimester, corresponding to 40% of the all HIV-positive women diagnosed in the current pregnancy (Table 1). The group of women tested by rapid test just before delivery showed the highest percentage of HIV-posi-

Table 2 - Social, maternal and medical care variables of women attending prenatal care. Porto Alegre, Brazil, 2001.

Variable	N	%
Marital status		
Married	1,475	90.1
Single	158	9.7
Missing data	5	0.3
Maternal schooling		
Low	923	56.4
High	713	43.5
Missing data	2	0.1
Category of prenatal care provider		
Public	1,401	85.5
Private	237	14.5
Maternal age (years)		
18-30	1,088	66.4
31-44	357	21.8
<18	192	11.7
Missing data	1	0.1
Number of pregnancies		
>3	545	33.3
2-3	688	42.0
1	405	24.7
Trimester of first prenatal care visit		
First or second	1,445	88.2
Third	106	6.5
Missing data	87	5.3
Number of prenatal care visits		
>5	1,040	63.5
≤5	497	30.3
Missing data	101	6.2
Total	1,638	100.0

Table 3 - Unadjusted analysis of social, maternal and medical care risk factors for not being HIV tested during pregnancy. Porto Alegre, Brazil, 2001.

Variable	% of women not tested	Crude odds ratio	95% CI		p-value
Marital status					0.027
Married	5.0	1			
Single	9.5	2.01	1.13	3.60	
Maternal schooling					0.004
Low	6.8	1			
High	3.5	0.50	0.31	0.80	
Category of prenatal care provider					<0.001
Public	2.5	1			
Private	22.8	11.52	7.33	18.11	
Maternal age (years)					0.201
18-30	5.0	1			
31-44	5.3	1.08	0.63	1.84	
<18	8.3	1.74	0.97	3.11	
Number of pregnancies					0.324
>3	5.1	1			
2-3	4.8	0.93	0.55	1.56	
1	6.9	1.37	0.80	2.35	
Trimester of first prenatal care visit					0.228
First or second	2.6	1			
Third	4.7	1.88	0.72	4.90	
Number of prenatal care visits					0.011
>5	1.9	1			
≤5	4.2	2.25	1.21	4.19	
Maternal schooling and prenatal care provider					<0.001
Low schooling and public care	2.8	1			
Low schooling and private care	40.0	23.19	13.03	41.25	
High schooling and public care	2.08	0.74	0.36	1.50	
High schooling and private care	9.6	3.68	1.81	7.45	

tive results. The overall prevalence of positive HIV testing (including women who were tested by rapid test) was 1.2% (95% CI: 0.1-1.9).

Table 2 shows the independent variables included in the analysis. Mothers were predominantly married (90.1%), and most of them had low schooling (56.4%). Most attended prenatal care in the public sector (85.5%) and were between 18 and 30 years of age (66.4%), 42.0% had had two to three pregnancies, most began prenatal care in the first or second trimester of pregnancy (88.2%) and attended more than five prenatal care visits (63.5%).

Those with an increased likelihood of not being HIV tested in the unadjusted analysis were single, attended prenatal care in the private sector and had less than six prenatal visits. In contrast, mothers with high schooling were at a low risk of not being tested (Table 3). Among 237 women (14.5%) who attended prenatal care in the private sector, four were diagnosed as HIV-positive, a prevalence of 1.7% (95% CI: 0.1-4.2).

In the adjusted analysis, being younger than 18 years and attending fewer than six prenatal care visits were risk factors for not being HIV tested. Living without a partner was marginally associated with an increased risk of not being HIV tested (p-value between 0.05 and 0.10). There was an interaction between maternal schooling and the category of prenatal care provider. Mothers with low schooling who were cared in the private sector had the highest risk

of not being HIV tested (OR=22.2), whereas mothers with high schooling who were cared in the private sector had 3.78 higher chance of not being HIV tested (Table 4).

DISCUSSION

Despite the high rate of HIV testing during pregnancy, some barriers for testing were identified, such as those related to medical care. Having low schooling and being cared in the private sector were most strongly associated with reduced likelihood of being HIV tested. Having high schooling and being cared in the private sector also increased the risk of not being HIV tested. Attending fewer than six prenatal visits, being single and young (<18 years) were also relevant barriers preventing HIV testing.

Despite almost universal availability of HIV testing, socioeconomic inequalities are still preventing women from poor backgrounds from testing, especially if they are cared in the private sector. The study results showed that the private sector is not adequately implementing the policy of universal HIV testing offer: 22.8% of mothers cared in this sector were not tested and refusal rate was only 0.2%. Conversely, for those cared in the public sector HIV testing coverage is almost universal (only 2.5% were not tested).

The results add to the evidence that the Brazilian Ministry of Health has nearly overcome two major obstacles to the systematic voluntary HIV testing of

Table 4 - Adjusted models of social, maternal and medical care risk factors for not being HIV tested during pregnancy. Porto Alegre, Brazil, 2001.

Variable	Adjusted odds ratio	95% CI		p-value
Marital status*				0.064
Married	1			
Single	1.87	0.96	3.61	
Maternal schooling and category of prenatal care provider*				<0.001
Low schooling and public care	1			
Low schooling and private care	22.20	12.43	39.67	
High schooling and public care	0.75	0.37	1.51	
High schooling and private care	3.78	1.86	7.68	
Maternal age (years)**				0.079
18-30	1			
31-44	0.86	0.46	1.61	
<18	2.27	1.08	4.77	
Number of pregnancies**				0.394
>3	1			
2-3	1.09	0.58	2.03	
1	1.58	0.76	3.30	
Trimester of first prenatal care visit***				0.339
First or second	1			
Third	1.66	0.59	4.68	
Number of prenatal care visits***				0.009
>5	1			
≤5	2.67	1.28	5.55	

*Model 1: adjusted for socioeconomic variables: marital status, maternal schooling and category of prenatal care provider

**Model 2: adjusted for maternal variables: maternal age and number of pregnancies plus variables in model 1

***Model 3: adjusted for medical care variables: trimester of first prenatal care visit and number of prenatal care visits plus variables in model 2 and also adjusted for gestational age in completed weeks

pregnant women seen in developing countries: cost, and the complex logistics of testing and treating with zidovudine. Considering that only four mothers refused to be tested after the counseling session, the acceptance rate was similar to that found in Thailand, Sweden and Canada^{2,10,23} and higher than the rate observed in England and the United States (74% and 95%, respectively).^{7,9}

The estimated prevalence of HIV-positive testing in pregnant women in Brazil was 0.6%, which ranks Brazil in an intermediate position between high-rate African countries and low-rate developed countries.^{11,15,18,22} Porto Alegre showed a similar prevalence when compared with other large cities in Brazil: 1.5% in Rio de Janeiro,¹⁴ and 0.8% in Vitória.¹²

Despite the high HIV testing rate in the first and second trimesters, a large number of HIV-positive women were still diagnosed late in the third trimester. This finding highlights the importance of rapid HIV testing as a complementary strategy for increasing HIV testing and diagnosis, although a later diagnosis can constitute an additional risk for mother-to-child transmission.⁸ However, the use of rapid HIV testing has a limitation because it can produce false positive results.²⁴

The finding of high risk of not being tested for mothers cared in the private sector was unexpected. Doc-

tors may regard better-off women as being less exposed to the risk of HIV infection. It can also be speculated that doctors may also fear losing their patients if they offer HIV testing to them because this can be interpreted as suggestive of unsafe sexual behavior.¹⁶ The private sector provides approximately 30% of all prenatal care in Brazil,⁵ thus a policy aimed at increasing HIV testing in this sector could have a positive impact on the mother-to-child transmission rate.

Having an adequate number of prenatal care visits was associated with higher rates of HIV testing, therefore improving access to prenatal care and increasing the number of prenatal care visits appears to be a key factor for increasing HIV testing rates.^{1,6,19}

The present study showed that the Brazilian Health Ministry's recommendation for universal counseling and HIV testing has been successfully implemented in the public sector. However, those from socially underprivileged groups and who were cared in private sector had reduced chance of being HIV tested. Therefore, in order to improve HIV testing, new strategies need to target women cared in the private sector especially those of low schooling. In addition, women who attend few prenatal care visits, who are living without a partner and are younger than 18 years of age as well as those better-off women cared in the private sector need to be targeted as well.

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