

Factors associated with submission to HIV rapid test in childbirth care

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Abstract *Rapid HIV tests are used in maternity hospitals to prevent mother-to-child transmission. This study aimed to analyze factors associated with submission to the rapid HIV test (outcome). This is a cross-sectional study conducted in 2009 in 15 hospitals from the Rio de Janeiro's Unified Health System (SUS) by interviewing a representative sample of 835 pregnant women hospitalized for birth and by verifying medical records. Adjusted prevalence ratios were obtained by Poisson regression according to a hierarchical model, and variables associated with the outcome ($p \leq 0.05$) remained in the final model. According to medical records (MR), 79.6% of mothers were submitted to rapid HIV test and, according to interviews (INT), 55.7%. At the distal level, the lack of a partner (MR), having ≥ 6 residents at home (MR) and non-white skin color (INT) were associated with a higher prevalence of the outcome. At the intermediate level, not having a negative HIV serology from prenatal care (MR and INT) was associated with a higher prevalence of the outcome, as well as PHC prenatal care (MR) and lack of prenatal care (INT). At the proximal level, delivery in a hospital not certified as Baby-Friendly was associated with a higher prevalence of outcome (MR and INT).*

Key words *Program evaluation and health projects, HIV, AIDS serological diagnosis, Cross-sectional studies, Unified Health System*

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Introduction

The Pan American Health Organization set a target for reducing HIV mother-to-child transmission to less than 2% by 2015, but this goal has not yet been achieved in Brazil¹. In order to prevent vertical transmission, coverage of HIV testing in prenatal care should reach at least 95% of pregnant women¹. However, in our country, only four in every five pregnant women are tested in prenatal care². This data reveals the importance of rapid testing of women at the time of delivery.

The Ministry of Health recommended that HIV testing be provided in the first trimester of pregnancy, or at the beginning of the prenatal care period, with a re-examination in the third trimester, whenever possible^{3,4}, and that upon pregnant women's entrance in the maternity ward, through counseling, a rapid anti-HIV test be provided to all pregnant women not tested for HIV in prenatal care or with no available results^{4,5}. It also recommended that pregnant women within some vulnerability criterion, such as STD carriers and users or partners of injecting drug users in unsafe sex be submitted to rapid testing, regardless of the time elapsed since the last HIV test³. Rapid HIV testing allows the detection of antibodies against HIV in less than 30 minutes; it has a low cost, it is highly sensitive and specific and simple to apply and interpret⁶.

As of 2010, the Ministry of Health recommended that pregnant women with no HIV test results from the last trimester of pregnancy be submitted to a rapid anti-HIV test⁶. Increased use of prenatal rapid test in situations in which the diagnosis of HIV infection could not be performed in a timely manner for the adoption of measures to reduce the mother-to-child transmission of HIV⁶ was also recommended.

Studies point to a paradox regarding the use of the rapid HIV test in maternity hospitals: overuse while still living with missed opportunities for HIV diagnosis and prevention^{7,8}, indicating that care practices do not always follow ministerial recommendations. In a literature review to identify factors associated with submission to the rapid HIV test, we found only one paper that investigated characteristics of hospital care associated with the test, such as the availability of hours of obstetricians and neonatologists by hour/birth and the availability of a rapid HIV test within the validity period⁹. It is fundamental to investigate which aspects contribute to the submission to the rapid test, in addition to the recommended indications, so that public resources are optimized for

the timely establishment of vertical transmission control prophylactic measures. This study aimed to analyze socioeconomic and care factors associated with the submission of pregnant women to the rapid HIV test.

Method

This is a cross-sectional study from the research "Evaluation of the implementation of the Baby-Friendly Hospital Initiative in the City of Rio de Janeiro, based on the women's perception of the issues of gender, power and citizenship in breastfeeding care"¹⁰. The research was submitted to the Ethics and Research Committee of the Municipal Health Secretariat of Rio de Janeiro and approved.

The study population was consisted of pregnant women hospitalized for birth in the second half of 2009 in hospitals with more than 1,000 births/year of the Unified Health System (SUS) in the city of Rio de Janeiro. These hospitals accounted for 94% of the total number of deliveries performed in 2008 in this municipality in SUS hospitals. Of these fifteen hospitals, seven were Baby-Friendly Hospitals (BFH) and eight were not accredited in the Initiative (NBFH)¹¹. Eleven hospitals, five BFHs and six NBFHs, were part of the High Risk Pregnancy System, of maternal and/or fetal reference.

Sample size was stratified, and hospitals were the strata. Since no similar study was found as a basis for calculation, we decided to consider an arbitrary prevalence of 50% of the outcomes investigated for the calculation of the sample size. Prevalence of 50% was also used as a weighting factor for each stratum, since it ensures the largest possible sample size for the level of controlled error and confidence¹².

For a level of error of 5% and a confidence level of 99%, we obtained a minimum size of 687 rooming-in mothers distributed among strata according to the number of deliveries in 2008. The research inclusion criterion was women having had a live birth for more than 24 hours, and the exclusion criterion was women having some contraindication to breastfeeding, as a reactive serological HIV test, since breastfeeding at birth was one of the outcomes investigated in the study¹⁰.

Two sources of information were used: interviews with mothers and consultation of mothers' medical records. We chose not to establish a gold standard, because we found medical records with flaws and mothers lacking knowledge of available

information. The comparison of the two sources of information returned an accuracy of 61.9%: 406 mothers had been submitted to the rapid test according to interviews and medical records and 111 were not tested according to the two sources of information. Divergent data indicated that 259 mothers (31.0%) had reportedly not been submitted to the rapid test or were unaware of the submission, but with a record in the medical records, and 59 (7.1%) reported submission to the rapid test, which was not found in the medical records.

Interviews were conducted in the rooming-in wards between August and December 2009. Respondents were selected by systematic draw, based on the relation of mothers hospitalized registered in the nursing station. When the draw selected a mother with a baby in a neonatal care unit hospitalized more than 48 hours ago, this mother was also interviewed, generating a sample of 148 mothers of hospitalized babies. We used structured questionnaires that contained questions about the characteristics of the mother, her home, prenatal care and delivery and the newborn. A form was used to collect information from maternal medical records about HIV tests carried out during the prenatal period and rapid anti-HIV tests performed in the maternity ward. All information was collected by health interviewers trained in the Baby-Friendly Hospital

Initiative (BFHI)¹¹ and previously trained for the application of data collection tools.

A hierarchical theoretical model¹³ of outcome determination was elaborated, which comprised distal (maternal, reproductive and domiciliary), intermediate (prenatal care) and proximal (delivery care) characteristics, and being submitted to the rapid HIV test was the outcome (Figure 1).

A description of the sociodemographic characteristics of mothers (age, skin color, schooling, paid work, mother's income), reproductive and household-related (with partner, parity and number of residents), prenatal care received (performance of prenatal care, type of service where prenatal care was carried, prenatal initiation trimester, number of prenatal consultations, prenatal HIV testing, and negative serology of any pre-natal HIV test according to mother's interview and to medical records) and child-birth care (type of delivery and certification as a Baby-Friendly Hospital) characteristics was performed. It was considered that the woman had negative prenatal serology when she had undergone one or more anti-HIV tests at any time during prenatal care, according to the prevailing recommendation in 2009^{3,4}. The outcome was dichotomized into two categories: 1. submission to the rapid HIV test; 2. no submission / lack of knowledge about submission to the rapid HIV test, according to the two sources of information.

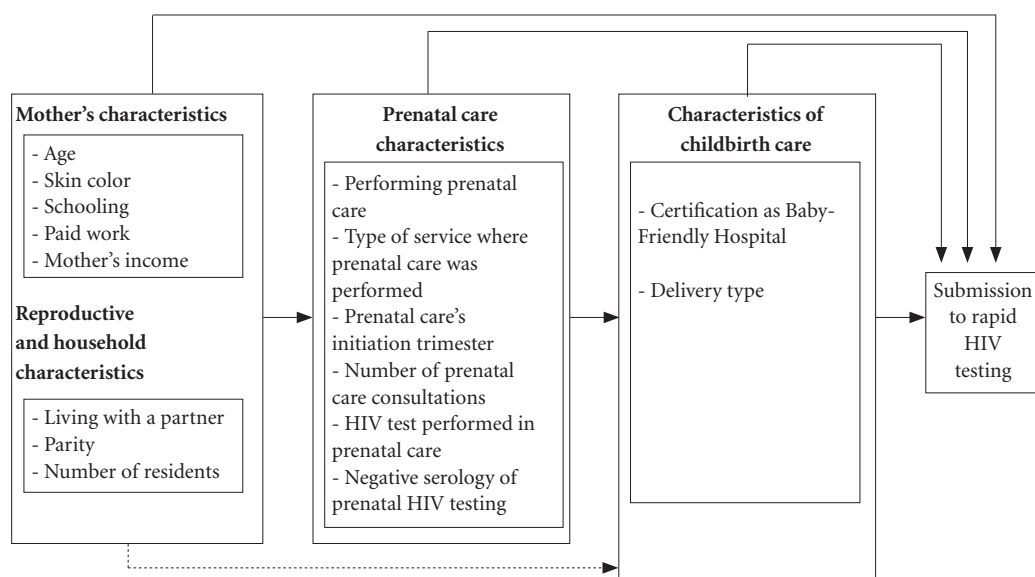


Figure 1. Theoretical model for the determination of the submission to the rapid HIV test in hospitals with more than 1000 births / year in the municipality of Rio de Janeiro, 2009.

Data analysis was conducted using the Statistical Package for Social Sciences - SPSS program¹⁷. At first, a univariate analysis was conducted to understand the distribution of exposure variables and the outcome to be studied. Then, a bivariate analysis was carried out between each exposure variable and the outcome, as per the two sources of information. Tests of chi-square hypotheses were performed and crude prevalence ratios (PR) were obtained. Exposure factors that were associated with the outcome with a significance level of less than or equal to 20% in the chi-square test ($p\text{-value} \leq 0.20$) were selected for multivariate analysis in the bivariate analysis. The hierarchization of the variables allowed us to evaluate the effect of the groups of variables according to the proximity to the outcome. The adjusted prevalence ratios were obtained by Poisson regression model with robust variance, due to the high prevalence of the outcome¹⁴. The final model used to estimate measures of association with their respective 95% confidence intervals consisted of exposure variables that obtained an observed level of significance less than or equal to 5% ($p\text{-value} \leq 0.05$).

Results

A sample of 835 mothers was interviewed. About a quarter were adolescent, the same proportion declared white skin color, a third had incomplete elementary education and half had paid work. Most mothers had a partner and almost half were primiparous (Table 1).

Most mothers (95.3%) had prenatal care, but almost 30% were followed in less than 6 visits, and less than two thirds started prenatal care in the first trimester of pregnancy. Around 91.5% of pregnant women were tested for HIV during prenatal care. According to interviews, 86.7% of mothers had negative serological tests for prenatal care; medical records found 68.0%. About half of births occurred in hospitals certified by the Baby-Friendly Hospital Initiative (Table 2).

According to information from interviews, 55.7% of the mothers were submitted to the rapid HIV test in hospitals, and the result of this test was known before delivery by only 37.4% of women submitted to it. According to data collected from mothers' medical records, 79.6% of the mothers were submitted to the rapid HIV test in the hospital.

In the bivariate analysis, the sociodemographic variables associated with rapid HIV test-

ing ($p\text{-value} \leq 0.20$) were skin color, schooling and parity according to the interview data (Table 1). Among the intermediary factors, performing prenatal care, trimester of prenatal care onset, the number of prenatal care consultations, prenatal HIV testing and negative serology of the HIV test in prenatal care were variables associated with the outcome. Regarding childbirth care, its occurrence in a Baby-Friendly certified hospital and type of delivery were associated with submission to the rapid HIV test (Table 2). According to data from medical records, the distal variables mother's age, skin color, living with a partner and number of residents were associated with the outcome (Table 1). Intermediate variables prenatal care, place of prenatal care, quarter of prenatal care onset, number of prenatal care consultations, prenatal care HIV test and negative serology in prenatal care HIV test, as well as the following proximal variables: type of delivery and occurrence in a Baby-Friendly Hospital were also associated with the submission to the rapid HIV test ($p\text{-value} \leq 0.20$) (Table 2).

In the multivariate model, according to interview information, non-white skin color (PR = 1.155) was associated with a higher prevalence of submission to the rapid HIV test, while mother's schooling up to incomplete elementary education (PR = 0.856) was associated with a lower prevalence of the outcome. Both the non-realization of prenatal care (PR = 1.289) and the negative serology of prenatal care HIV test (PR = 1.226) and the occurrence of childbirth in a hospital not certified as Baby-Friendly (PR = 1.286) were associated with a higher prevalence of rapid HIV testing at the hospital (Table 3).

According to data from medical records, in the multiple analysis, distal factors associated with the submission to the rapid HIV test were the lack of a partner (PR = 1.127) and having six or more residents (PR = 1.082). The intermediate factors associated with the outcome were hospital prenatal care (PR = 0.811) and the lack of negative serology in the prenatal HIV test (PR = 1.335), whereas delivery at a non-baby-friendly accredited hospital (PR = 1.286) was the only proximal variable associated with the outcome (Table 4).

Discussion

It is noteworthy that more than half of the women were submitted to the rapid anti-HIV test at admission for delivery, according to both sour-

Table 1. Prevalence and crude prevalence ratio (PR) of submission to the rapid HIV test according to the sociodemographic profile of mothers admitted to hospitals with more than 1000 births / year. Municipality of Rio de Janeiro, 2009.

Distal characteristics	Information from interviews					Information from medical records		
	N	%	Prevalence (%)	Crude PR	p-value	Prevalence (%)	Crude PR	p-value
Age								
20 to 46 years	618	74	56.8	1		78.5	1	
13 to 19 years	217	26	52.5	0.93	0.288	82.9	1.06	0.137
Self-reported skin color								
White	219	26.2	50.2	1		83.1	1	
Non-white	616	73.8	57.6	1.15	0.069	78.4	0.94	0.117
Schooling								
≥ Elementary school completed	555	66.5	57.5	1		79.3	1	
Incomplete elementary school	280	33.5	52.1	0.91	0.151	80.4	1.01	0.713
Paid work								
Yes	422	50.5	56.6	1		78.7	1	
No	413	49.5	54.7	0.97	0.578	80.6	1.03	0.483
Mother's income								
≥ 1 minimum wage		33.3	57.6	1		79.1	1	
< 1 minimum wage	278	66.7	55.0	0.96	0.472	79.8	1.01	0.819
Partner								
With partner	723	86.6	56.0	1		78.1	1	
Without partner	112	13.4	53.6	0.96	0.635	89.3	1.14	<0.001
Parity								
Primiparous	399	47.8	52.1	1		79.8	1	
Non-primiparous	436	52.2	58.9	1.13	0.049	79.4	0.99	0.895
Number of residents								
Up to 5	625	74.9	54.6	1		77.8	1	
6 or over	210	25.1	59.0	1.08	0.246	85.2	1.10	0.010

es of information. However, this test should be used promptly only in women with unknown serological status. Rapid HIV testing entails material costs and time-consuming procedures of often-overwhelmed health workers involved in childbirth care.

This overuse leads to delays in the return of their results, hampering actions to prevent mother-to-child transmission and delaying breastfeeding beyond the first hour of life^{7,15}. Studies conducted in 2006, at the national level and in the same municipality as this study found, respectively, proportions of 18.9%¹⁶ and 28.5%⁷ of pregnant women submitted to the rapid HIV test at admission for delivery, suggesting that submission of women to this test in hospitals has been

growing in our country, often in a non-judgmental way.

In this study, in the multiple analysis, socio-demographic and prenatal and childbirth care factors were identified as being associated with the submission to the rapid HIV test.

According to interviews, women of non-white skin color were the ones submitted the most to the rapid test. A Sentinel Study conducted in Brazil in 2006 found that black and brown women were being less tested during pregnancy¹⁶ and thus could suffer positive discrimination during hospital testing. According to the same source of information, women with low schooling had a lower prevalence of submission to the rapid HIV test. Women's low level of education

Table 2. Prevalence and crude prevalence ratio (PR) of submission to the rapid HIV test according to prenatal care and deliveries of mothers admitted to hospitals with more than 1000 births / year. Municipality of Rio de Janeiro, 2009.

Intermediate characteristics	Information from interviews					Information from medical records		
	N	%	Prevalence (%)	Crude PR	p-value	Prevalence (%)	Crude PR	p-value
Performance of prenatal care (PN)								
Yes	796	95.3	54.1	1		78.6	1	
No	39	4.7	87.2	1.61	<0.001	100	1,27	<0,001
Type of PN care service								
PHC facility	523	65.7	53.7	1		84.9		
Hospital services	273	34.3	54.9	1.02	0.743	66.7	0,79	<0,001
PN initiation								
1st trimester	531	63.6	52.2	1		77.2	1	
2nd or 3rd trimester or no PN	304	36.4	61.8	1.19	0.005	83.9	1,09	0,016
Number of PN consultations								
6 or over consultations	589	70.6	52.6	1		77.4	1	
0 to 5 consultations	245	29.4	62.9	1.19	0.005	84.9	1,10	0,008
Performing HIV test in PN								
Yes	764	91.5	53.9	1		78.4	1	
No or doesn't know or no PN	71	8.5	74.6	1.38	<0.001	93.0	1,19	<0,001
HIV serology in PN*								
Negative serology of 1 or more exams	724	86.7	53.3	1		-	-	-
No negative serology available	111	13.3	71.2	1.34	<0.001			
HIV serology in PN**								
Negative serology of 1 or more exams	568	68.0	-	-	-	71.1	1	
No negative serology available	267	32.0				97.8	1,37	<0,001
Proximal characteristics								
Delivery type								
Normal	530	63.5	57.5	1		82.2	1	
Cesarean	305	36.5	52.5	0.90	0.157	75.1	0,91	0,019
Birth at Baby-Friendly Hospital								
Yes	424	50.8	48.6	1		77.1	1	
No	411	49.2	63.0	1.30	<0.001	82.2	1,07	0,067

* Source of Information: mother's interview. **Source of information: medical records.

may lead to less knowledge about their submission to the rapid HIV test, and the inverse association found, not confirmed by medical records, could be flagging a possible information bias. National^{17,18} and regional¹⁹⁻²¹ studies have identi-

fied less HIV testing during prenatal care among low schooling women.

According to data from medical records, women without a partner and mothers living in households with six or more residents were sub-

Table 3. Adjusted prevalence ratio of submission to the rapid HIV test, with interview information, according to the sociodemographic characteristics of mothers, prenatal care and delivery in hospitals with more than 1,000 births / year. Municipality of Rio de Janeiro, 2009.

Distal characteristics	Adjusted PR	CI 95%	p-value
Self-reported skin color			
White	1		
Non-white	1.16	1.00-1.33	0.049
Schooling			
≥ Elementary school completed	1		
Incomplete elementary school	0.86	0.75-0.98	0.022
Intermediate characteristics			
Performance of prenatal care (PN)			
Yes	1		
No	1.29	1.05-1.59	0.018
Interview data on the HIV serology of PN			
Negative serology of 1 or more exams	1		
No negative serology available	1.23	1.02-1.47	0.031
Proximal characteristics			
Birth at Baby-Friendly Hospital			
Yes	1		
No	1.29	1.14-1.45	<0.001

Table 4. Adjusted prevalence ratio of the submission to the rapid HIV test, with information from medical records, according to the sociodemographic characteristics of mothers, prenatal care and delivery in hospitals with more than 1000 births / year. Municipality of Rio de Janeiro, 2009.

Distal characteristics	Adjusted PR	IC 95%	p-value
Partner			
With partner	1		
Without partner	1.13	1.04-1.22	0.002
Number of residents			
Up to 5	1		
6 or over	1.08	1.01-1.16	0.031
Intermediate characteristics			
Type of PN care service			
PHC facility	1		
Hospital services	0.81	0.74-0.88	<0.001
Medical records data on HIV serology of PN			
Negative serology of 1 or more exams	1		
No negative serology available	1.34	1.26-1.41	<0.001
Proximal characteristics			
Birth at Baby-Friendly Hospital			
Yes	1		
No	1.08	1.00-1.16	0.040

jected to the rapid HIV test. In a national study conducted between 1999 and 2000, single women were 60% more likely of not performing the

HIV test during pregnancy¹⁷. Lower prenatal testing among women without a partner may have influenced the indication of rapid testing at the

hospital. The variable number of residents in the household needs to be better explored, since we could not find any studies that investigated its association with HIV testing.

While the analysis of the submission to the rapid HIV test according to the two sources of information pointed to different distal variables associated with the outcome, the non-white skin color, living without a partner and the high number of residents in the household indicate a situation of vulnerability of the population more submitted to the rapid HIV test, even after adjusting for the serological status of prenatal care.

Since socially unfavorable conditions are also associated with less prenatal testing^{16,17,19,22,23}, it could be hypothesized that health professionals, regardless of knowledge of the result of prenatal serology, more frequently submit this group to the rapid test at childbirth.

As for the intermediate characteristics, the lack of negative serology for HIV in prenatal care was a factor associated with the outcome according to the two sources of information, while the lack of prenatal care was associated with a higher prevalence of the outcome according to interviews. These are indications from the Ministry of Health¹ for submission to the rapid HIV test. However, the magnitude of association found between these variables and the outcome was not high, and they were similar to the magnitude of association of other variables studied.

Another characteristic of prenatal care associated with the outcome was hospital follow-up, possibly due to the greater availability of prenatal examination records of these mothers, not implying a re-testing, which could explain the inverse association found by the medical records.

The only proximal variable associated with the outcome, according to both sources of information, was childbirth at a Baby-Friendly Hospital. These hospitals are undergoing staff training and changes in hospital practices that contribute to the qualification of care provided, possibly contributing to compliance with established norms¹¹, implying less hospital testing.

We must consider some limitations of this study. This is a cross-sectional study, where information was collected during the period of admission to delivery, and time relationship between exposure and outcome is not always well established. An adequate indication of the HIV test not yet referred is women falling under vulnerability criteria (such as being an STD carrier, a user or partner of injecting drug users in unsafe sex), even when tested during pregnancy³.

This variable was not included in the analysis because of the difficulty in accessing the information about which women would fit into this profile. However, these vulnerability conditions are uncommon, so they would not explain the high proportions found of submission to rapid HIV testing.

Another issue to be pointed out is that there was no agreement on more than one third of the information regarding the submission to the rapid HIV test, comparing data from interviews and mothers' medical records. This inconsistency suggests the occurrence of incomplete records²⁴ and possible flaws in the counseling of mothers by the health staff²⁵. The Ministry of Health recommends that women be consulted if they want to undergo rapid HIV testing through counseling⁴. By reason of the greater proportion of women tested identified in the medical records in relation to the interviews, many participants were probably not even informed of the submission to the test, which impairs women's autonomy and guidance on HIV and vertical transmission prevention²⁵.

We can conclude that the ministerial protocols for HIV testing during pregnancy and hospitalization in force at the time of the study^{3,4} were not followed to satisfaction. The main input of this study was the identification of a range of factors associated with the submission to the rapid HIV test at admission for childbirth which included not certifying the hospital as a Baby-Friendly facility, type of service of prenatal care and sociodemographic characteristics variables, such as skin color, living with a partner and the number of residents of the household. These characteristics should not be subject to discrimination for testing, which should be guided by the recommended indications, such as the failure to perform prenatal care and the lack of a negative HIV serology test for prenatal care.

Awareness and qualification of health team involved in childbirth care is recommended, so that the HIV serology is requested when appropriate, and process of delivering the results is swift and adequate care is provided to all women during delivery. Primary care should also be qualified, with emphasis on early pregnancy screening for prenatal care and increased use of the rapid HIV test. Thus, the timely implementation of measures to prevent mother-to-child HIV transmission would be improved, and so many women would not need to be tested in the maternity ward, guarding them against unnecessary stress while awaiting the outcome of the rapid

HIV test, and providing breastfeeding at birth, which has been postponed when the rapid test result is not available before giving birth^{7,15}.

Collaborations

MIC Oliveira was the main responsible for the outline and design of the study, for data analysis and interpretation and paper writing. DM Gomes was responsible for reviewing literature on the subject and participated in data analysis and interpretation, as well as paper writing. KS Silva participated in data analysis and interpretation and paper critical review.

References

1. Brasil. Ministério da Saúde (MS). *Transmissão vertical do HIV e sífilis: estratégias para redução e eliminação*. Brasília: MS; 2014.
2. Domingues RMSM, Szwarcwald CL, Souza Jr PRB, Leal MC. Prenatal testing and prevalence of HIV infection during pregnancy: data from the "Birth in Brazil" study, a national hospital-based study. *BMC Infectious Diseases* 2015; 15:100.
3. Brasil. Ministério da Saúde (MS). *Pré-natal e puerpério: atenção qualificada e humanizada – manual técnico*. Brasília: MS; 2006.
4. Brasil. Ministério da Saúde (MS). *Recomendações para profilaxia da transmissão vertical do HIV e terapia anti-retroviral em gestantes*. Brasília: MS; 2007. Série: Manuais nº 46.
5. Brasil. Ministério da Saúde (MS). *Protocolo para a prevenção de transmissão vertical de HIV e sífilis – manual de bolso. Programa Nacional de Controle de Doenças Sexualmente Transmissíveis e AIDS*. Brasília: MS; 2007.
6. Brasil. Ministério da Saúde (MS). *Recomendações para profilaxia da transmissão vertical do HIV e terapia anti-retroviral em gestantes - manual de bolso. Programa Nacional de DST e Aids*. Brasília: MS; 2010.
7. Oliveira MIC, Silva KS, Gomes-Júnior SC, Fonseca VM. Resultado do teste rápido anti-HIV após o parto: uma ameaça à amamentação ao nascimento. *Rev Saude Publica* 2010; 44(1):60-69.
8. Gomes DM, Oliveira MIC, Fonseca SC. Avaliação da testagem anti-HIV no pré-natal e na assistência ao parto no Rio de Janeiro, Brasil. *Rev Bras Saude Matern Infant* 2015; 15(4):413-423.
9. Santos EM, Reis AC, Westman S, Alves RG. Avaliação do grau de implantação do programa de controle da transmissão vertical do HIV em maternidades do "Projeto Nascer". *Epidemiol Serv Saude* 2010; 19(3):257-269.
10. Oliveira MIC, Hartz ZMA, Nascimento VC, Silva KS. Avaliação da implantação da iniciativa hospital amigo da criança no Rio de Janeiro, Brasil. *Rev Bras Saude Matern Infant* 2012; 12(3):281-295.
11. Figueiredo SF, Mattar MJG, Abrão ACFV. Iniciativa Hospital Amigo da Criança – uma política de promoção, proteção e apoio ao aleitamento materno. *Acta Paul Enferm* 2012; 25(3):459-463.
12. Cochran WG. Sampling techniques. Wiley Series. In: *Probability and statistics*. Hoboken: IE-Wiley; 1977. p. 50-64.
13. Victora CG, Huttly SR, Fuchs SC, Olinto MTA. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. *Int J Epidemiol* 1997; 26:224-227.
14. Coutinho LMS, Scazufca M, Menezes PR. Métodos para estimar razão de prevalência em estudos de corte transversal. *Rev Saude Publica* 2008; 42(6):992-998.
15. Esteves TM, Daumas RP, Oliveira MI, Andrade CA, Leite I da C. Fatores associados ao início tardio da amamentação em hospitais do Sistema Único de Saúde no Município do Rio de Janeiro, Brasil, 2009. *Cad Saude Publica* 2015; 31(11):2390-2400.
16. Szwarcwald CL, Barbosa Júnior A, Souza Júnior PRB, Lemos KRV, Frias PG, Luhm KR, Holcman MM, Esteves MA. HIV testing during pregnancy: use of secondary data to estimate 2006 test coverage and prevalence in Brazil. *Braz J Infect Dis* 2008; 12(3):167-172.
17. Rodrigues CS, Guimarães MDC, César CC. Missed opportunities for congenital syphilis and HIV perinatal transmission prevention. *Rev Saude Publica* 2008; 42(5):851-858.
18. Souza Junior PRB, Szwarcwald CL, Barbosa Junior A, Carvalho MF, Castilho EA. Infecção pelo HIV durante a gestação: estudo sentinela parturiente, Brasil, 2002. *Rev Saude Publica* 2004; 38(6):764-772.
19. Veloso VG, Portela MC, Vasconcellos MTL, Matzenbacher LA, Vasconcelos ALR, Grinsztejn B, Bastos FI. HIV testing among pregnant women in Brazil: rates and predictors. *Rev Saude Publica* 2008; 42(5):859-867.
20. Rosa H, Goldani MZ, Scanlon T, Silva AAM, Giugliani EJ, Agranonik M, Tomkins A. Barriers for HIV testing during pregnancy in Southern Brazil. *Rev Saude Publica* 2006; 40(2):220-225.
21. Morimura MCR, Mendes MDC, Souza AI, Alencar LCA. Frequência de testagem rápida para o HIV durante a admissão para o parto em puérperas no Instituto Materno Infantil Prof. Fernando Figueira, IMIP. *Rev Bras Saude Matern Infant* 2006; 6(Supl. 1):569-576.
22. Soares ML, MIC Oliveira, Fonseca VM, Brito AS, Silva KS. Preditores do desconhecimento do status sorológico de HIV entre puérperas submetidas ao teste rápido anti-HIV na internação para o parto. *Cien Saude Colet* 2013; 18(5):1313-1320.
23. Ramos VOX, Lacerda HR, Ximenes RAA. Unawareness of HIV status in pregnancy, delay in testing and conflict between information on antenatal card and interview in Recife, Brazil. *Int J STD AIDS* 2009; 20:493-498.
24. Domingues RMSM, Hartz ZMA, Leal MC. Avaliação das ações de controle da sífilis e do HIV na assistência pré-natal da rede pública do município do Rio de Janeiro, Brasil. *Rev Bras Saude Matern Infant* 2012; 12(3):269-280.
25. Passos SCS, Oliveira MIC, Gomes-Júnior SCS, Silva KS. Aconselhamento sobre o teste rápido anti-HIV em parturientes. *Rev Bras Epidemiol* 2013; 16(2):278-287.

Article submitted 24/09/2015

Approved 09/05/2016

Final version submitted 11/05/2016