



ORIGINAL ARTICLE

HIV testing in the maternity ward and the start of breastfeeding: a survival analysis^{☆,☆☆}



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KEYWORDS

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Abstract

Objective: The purpose of this study was to analyze the factors that influence of the time between birth and the beginning of breastfeeding, especially at the moment of the rapid HIV test results at hospital admission for delivery.

Methods: Cohort study of 932 pregnant women who underwent rapid HIV test admitted in the hospital for delivery in Baby-Friendly Hospitals. The survival curves of time from birth to the first feeding were estimated by the Kaplan–Meier method and the joint effect of independent variables by the Cox model with a hierarchical analysis. As the survival curves were not homogeneous among the five hospitals, hindering the principle of proportionality of risks, the data were divided into two groups according to the median time of onset of breastfeeding at birth in women undergoing rapid HIV testing.

Results: Hospitals with median time to breastfeeding onset at birth of up to 60 min were considered as early breastfeeding onset and those with higher medians were considered as late breastfeeding onset at birth. Risk factors common to hospitals considered to be with early and late breastfeeding onset at birth were: cesarean section (RR = 1.75 [95% CI: 1.38–2.22]; RR = 3.83 [95% CI: 3.03–4.85]) and rapid test result after birth (RR = 1.45 [95% CI: 1.12–1.89]; RR = 1.65 [95% CI: 1.35–2.02]), respectively; and hospitals with late onset: starting prenatal care in the third trimester (RR = 1.86 [95% CI: 1.16–2.97]).

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PALAVRAS-CHAVE

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Análise de sobrevida

Conclusions: The onset of breastfeeding is postponed, even in Baby-Friendly Hospitals, when the results of the rapid HIV test requested in the maternity are not available at the time of delivery.

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Testagem anti-HIV na maternidade e o início do aleitamento materno: uma análise de sobrevida

Resumo

Objetivo: Identificar os fatores associados ao tempo entre o nascimento e o início da amamentação em mães, especialmente o momento do resultado do teste rápido anti-HIV, na internação para o parto.

Metodologia: Estudo de coorte com 932 parturientes que realizaram teste rápido anti-HIV na internação para o parto em Hospitais Amigos da Criança. As curvas de sobrevida do tempo do nascimento até a 1ª mamada foram estimadas pelo método Kaplan-Meier, e o efeito conjunto das variáveis independentes pelo modelo de Cox, com análise hierarquizada. Como as curvas de sobrevida não foram homogêneas entre os 5 hospitais, ferindo o princípio de proporcionalidade de riscos, os dados foram desmembrados em dois grupos segundo o tempo mediano de início de aleitamento materno ao nascer em mulheres submetidas ao teste rápido anti-HIV.

Resultados: Hospitais com tempo mediano de até 60 minutos foram considerados como hospitais de início precoce do aleitamento materno e hospitais com tempo mediano superior foram considerados como hospitais de início tardio do aleitamento materno ao nascer. Foram fatores de risco comuns aos hospitais com início precoce e tardio do aleitamento materno ao nascer: parto cesáreo [RR = 1,75 (IC95%:1,38–2,22); RR = 3,83 (IC95%:3,03–4,85)] e resultado do teste rápido após o parto [RR = 1,45 (IC95%:1,12–1,89); RR = 1,65 (IC95%:1,35–2,02)], respectivamente; e nos hospitais com início tardio de aleitamento materno ao nascer: iniciar o pré-natal no 3º trimestre [RR = 1,86 (IC95%:1,16–2,97)].

Conclusões: O início do aleitamento materno vem sendo postergado, mesmo em Hospitais Amigos da Criança, quando os resultados do teste rápido anti-HIV solicitados na maternidade não estão disponíveis no momento do parto.

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Introduction

Breastfeeding at birth is essential to establish mother-baby bonding and contributes to the continuation of breastfeeding and the reduction of neonatal mortality.^{1,2} Newborns are more responsive to the mother's smell, touch, and warmth; when the skin-to-skin contact is initiated soon after birth, the newborn has the capacity to seek out the nipple-areola region and latch on during the first hour of life. Three to four hours after birth, newborns enter the sleep phase, which complicates the onset of breastfeeding.³

The Baby-Friendly Hospital Initiative (BFHI) recommends "putting babies in direct contact with the mother immediately after birth for at least an hour and encourage the mother to verify whether the baby is ready to be breastfed and offer help if necessary" as the Step 4 of the "Ten Steps to Successful Breastfeeding".⁴

There are situations, however, when breastfeeding should not be practiced. In Brazil, breastfeeding by human immunodeficiency virus (HIV)-infected mothers is contraindicated due to the risk of vertical transmission through breast milk.⁵ However, the Ministry of Health (MOH) recommends that health professionals should not prohibit

breastfeeding to mothers who, although submitted to the anti-HIV test, do not have the result available, as the contraindication should be based on an HIV-reagent test, stressing that it is the responsibility of the service to establish the logistics so that the result is available in a timely manner.⁶ With this purpose, the MOH has regularized rapid HIV tests in hospitals for pregnant women not tested for HIV during prenatal care, in time for establishing vertical transmission prophylactic measures.⁷

Additionally, since 2006 the MOH has recommended repeating anti-HIV serology, with the pregnant woman's consent, near the 38th week of pregnancy⁸ whenever possible. Thus, rapid HIV tests are currently often requested in maternity wards, but often without following any criteria or standards, even for women who already had a diagnosis at the last trimester of pregnancy. This increased demand for rapid tests and the professionals' work overload has hindered how promptly results are obtained.⁹

Therefore, this study aimed to analyze the factors associated with the period between birth and the onset of breastfeeding in mothers submitted to rapid HIV test at hospital admission for delivery, especially at the moment of the rapid HIV test results.

Methods

This was a cohort study, whose initial event was delivery and whose outcome was the onset of breastfeeding. The database from the research "Gender, Power and Citizenship: is the woman a subject in decision-making regarding breastfeeding at birth when HIV status is unknown to the service?"¹⁰ was used. The target population of the study was all women submitted to rapid HIV test at hospital admission for delivery in the five Baby-Friendly hospitals belonging to the High-Risk Pregnancy System in the city of Rio de Janeiro between September 11 and December 11, 2006.

The pilot study was performed in two hospitals of the High-Risk Pregnancy System in the same city, which had agreed to become Baby-Friendly hospitals. The study indicated a prevalence of non-breastfeeding at birth of 50% among seronegative women submitted to the rapid HIV test. Based on this parameter, a sample of 700 mothers was estimated, with a statistical power of 99% and 95% confidence level.

Women included in the study were those submitted to rapid HIV test at delivery, whose children were born alive and remained in rooming-in care. The women excluded from the study were those whose infants were born with 5-min Apgar value <7 (critically low state of vitality), who were referred to the intensive care unit (ICU; or neonatal ICU [NICU]) when the mother was referred to the ICU or showed HIV seropositivity.

The interviews were performed by nurses or nursing students trained and supervised weekly by a researcher, after the informed consent had been signed, which contained details of the research and ensured confidentiality of information. The project was approved by the Health Secretariat Ethics Committee of Rio de Janeiro (Statement 82A of 31/07/2006).

A daily survey was carried out in the laboratory of each hospital to identify the pregnant women submitted to rapid HIV test and the name of these women was transcribed to a data collection form. The form was compared daily with the list of rooming-in admissions, the chart was checked, delivery data were entered into a daily plan, and eligible mothers were interviewed. The interviews were performed using a structured questionnaire, administered at least 2 h after the child's birth. If during the interview the newborn had not been breastfed yet, the interviewer returned to interview that mother again at the end of the day to collect data on the time between birth and the first feeding.

The study endpoint was obtained through the question "How long after birth was your baby breastfed for the first time?", and in an attempt to improve the mother's answer accuracy, it was sought to make her recall the time of this event based on the schedule of hospital routines. The answer was given in hours and minutes, and the first breastfeeding was considered as the moment of contact between the baby's mouth and the mother's nipple-areola region, with either the occurrence of suction or licking.

The variables were organized in a hierarchical model, with socioeconomic and demographic (distal), reproductive and prenatal care (intermediate), and hospital characteristics (proximal). The distal variables were age, educational level, ethnicity, marital status, maternal employment, and income.

The intermediate variables were: parity; prenatal care; trimester when prenatal care started; number of prenatal visits; HIV test performed during prenatal care; trimester when the pregnant woman was tested; and results of HIV testing in prenatal care.

Finally, the proximal variables were: hospital; type of delivery; gender of the baby; mother wanted to breastfeed; professional heard what the mother had to say about her and the infant; mother knew about performing rapid HIV test at the hospital; mother received explanation about the test; mother received the test result; and moment when the mother knew the test result.

Survival analysis¹¹ was used, in which time zero was birth and the first feeding was the final event. The analysis considered the mothers that started breastfeeding within the first 24 h. Cases where the follow-up until the outcome was not possible and those in which the occurrence of start of breast-feeding time was more than 24 h were omitted.

Survival curves, overall and by stratum, estimated by the nonparametric Kaplan-Meier method,¹² were used as an exploratory tool in the univariate analysis.

It was observed that survival curves were not homogenous in the five hospitals, affecting the principle of risk proportionality. Therefore, it was decided to divide the data into two groups, according to the median time to onset of breastfeeding at birth: hospitals with median time of up to 60 min were considered as early onset of breastfeeding at birth and those with higher median time were considered as late onset of breastfeeding at birth.

After the initial analysis, the variables that showed statistical significance of 10% at the Peto test¹² or epidemiological significance test were considered for construction of the hierarchical model. The Wald test was used to compare the different Cox regression models. The R^2 of the saturated model was used to evaluate the quality of adjustment, based on the proportion of explained variance.

In the hierarchical modeling, the block of variables in the distal level was introduced. Variables with statistical significance at the 10% level were kept in the model and incorporated into the analysis of the intermediate block. The same procedure was repeated for the analysis of the proximal block variables, resulting in a final model with three levels.^{13,14}

The Schoenfeld and Martingale tests¹² were applied to the analysis of residues. The database was built using Epi Info (Epi Info™ Centers for Disease Control and Prevention, GA, USA) software and the statistical modeling, charts, and residue analysis were performed using the R statistical package¹⁵ (*R Core Team* (2012). *R*: a language and environment for statistical computing. Vienna, Austria).

Results

During the study period there were 4895 births in selected hospitals and 1396 (28.5%) women underwent rapid HIV test. Of these, 322 women were excluded due to the presence of criteria that could impair or prevent breastfeeding at birth. Of the 1074 eligible women, 42 refused to participate (3.9%) and there was loss of 77 (7.2%) due to early discharge or other reasons. It was not possible to obtain the time until the first feeding in 23 mothers (2.1%), thus totaling 932 women

Table 1 Median time from birth to breastfeeding onset, per type of hospital conduct. Rio de Janeiro, Brazil, 2006.

Variables	Hospitals with late breastfeeding onset			Hospitals with early breastfeeding onset		
	N (%)	Median (95% CI)	Peto test	N (%)	Median (95% CI)	Peto test
Maternal characteristics						
Ethnicity						
White	94 (24%)	360 (264–456)	0.468	158 (31%)	30 (20–30)	0.0111 ^a
Non-white	304 (76%)	380 (360–480)		349 (69%)	30 (30–40)	
Years of schooling						
Illiterate	9 (2%)	368 (120–Inf)	0.568	10 (2%)	90 (10–Inf)	0.201
1–4 years	22 (6%)	296 (240–600)		42 (8%)	30 (20–50)	
5–8 years	125 (31%)	392 (345–540)		185 (37%)	30 (30–40)	
More than 9 years	242 (61%)	380 (302–475)		270 (53%)	30 (30–40)	
Marital status						
Has a partner	347 (87%)	376 (355–456)	0.763	445 (88%)	30 (30–30)	0.34
Does not have a partner	51 (13%)	360 (273–720)		62 (12%)	38 (30–55)	
Maternal age						
Up to 19 years	104 (26%)	312 (241–420)	0.21	141 (28%)	30 (30–49)	0.852
20–29 years	257 (65%)	395 (360–480)		328 (65%)	30 (30–35)	
30 or older	37 (9%)	600 (258–840)		38 (7%)	30 (20–60)	
Work and income						
No income	198 (50%)	355 (279–420)	0.0734 ^a	212 (42%)	30 (30–35)	0.316
Up to 1 MW	114 (28%)	395 (345–523)		134 (26%)	40 (30–60)	
>1 MW 1	86 (22%)	513 (360–600)		161 (32%)	30 (30–30)	
Prenatal characteristics						
Parity						
Primipara	163 (41%)	360 (284–442)	0.319	193 (39%)	30 (30–40)	0.791
Multipara	184 (46%)	420 (360–540)		242 (48%)	30 (30–35)	
Grand multipara (4 or more)	51 (13%)	360 (210–540)		67 (13%)	30 (30–60)	
Trimester when prenatal care was initiated						
First trimester	153 (41%)	322 (246–402)	0.618	159 (35%)	30 (25–30)	0.39
Second trimester	178 (48%)	420 (360–540)		234 (52%)	30 (30–40)	
Third trimester	40 (11%)	420 (300–720)		60 (13%)	30 (20–60)	
Number of prenatal consultations						
0	26 (7%)	450 (284–720)	0.994	52 (11%)	33 (30–60)	0.22
1–3	36 (9%)	420 (273–548)		62 (12%)	50 (30–60)	
4–6	120 (30%)	384 (352–540)		163 (33%)	30 (30–30)	
7 or more	216 (54%)	360 (300–456)		221 (44%)	30 (30–40)	
Anti-HIV testing in prenatal period						
No	72 (18%)	360 (284–535)	0.342	114 (22%)	35 (35–45)	0.236
Yes	316 (79%)	380 (322–456)		385 (76%)	30 (30–30)	
Does not know	10 (3%)	573 (352–Inf)		8 (2%)	60 (30–Inf)	
Trimester when anti-HIV test was performed						
First trimester	124 (39%)	360 (240–442)	0.333	111 (29%)	30 (30–35)	0.215
Second trimester	118 (38%)	400 (311–540)		184 (47%)	30 (30–40)	
Third trimester	67 (21%)	420 (320–600)		80 (21%)	30 (25–50)	
Does not know	7 (2%)	810 (383–Inf)		11 (3%)	15 (10–Inf)	
Previous status (medical file)						
Negative	280 (71%)	360 (322–420)	0.39	394 (78%)	30 (30–30)	0.588
Ignored	115 (29%)	459 (311–585)		113 (22%)	30 (30–60)	
Hospital characteristics						
Knows of the rapid testing in the hospital						
No	67 (17%)	360 (258–600)	0.755	158 (31%)	30 (25–30)	0.207
Yes	331 (83%)	376 (360–445)		349 (69%)	30 (30–40)	
Received explanation about the rapid test						
No	203 (52%)	316 (260–383)	0.0347 ^b	301 (61%)	30 (30–30)	0.116
Yes	188 (48%)	420 (365–535)		191 (39%)	30 (30–45)	

Table 1 (Continued)

Variables	Hospitals with late breastfeeding onset			Hospitals with early breastfeeding onset		
	N (%)	Median (95% CI)	Peto test	N (%)	Median (95% CI)	Peto test
<i>Knows the result of the rapid test</i>						
Yes	242 (62%)	420 (360–523)	0.117	181 (37%)	35 (30–50)	0.104
No	149 (38%)	320 (255–390)		311 (63%)	30 (30–30)	
<i>When mother learned the result of the rapid test</i>						
Before delivery and does not know	229 (58%)	302 (240–375)	9.2e–05 ^c	373 (76%)	30 (30–30)	0.000652 ^c
After delivery	167 (42%)	486 (402–600)		115 (24%)	50 (30–60)	
<i>Type of birth</i>						
Normal	282 (71%)	240 (198–300)	0 ^c	343 (68%)	30 (30–30)	1.59e–05 ^c
Cesarean section	116 (29%)	924 (853–1140)		164 (32%)	50 (38–60)	
<i>Newborn gender</i>						
Female	208 (52%)	336 (275–420)	0.072 ^a	237 (47%)	30 (30–38)	0.904
Male	189 (48%)	422 (360–560)		266 (53%)	30 (30–40)	
<i>Mother wanted to nurse the baby in the delivery room</i>						
No	196 (50%)	360 (300–480)	0.773	187 (37%)	35 (30–50)	0.000886 ^c
Yes and not sure	199 (50%)	396 (360–490)		320 (63%)	30 (25–30)	
<i>Professionals listen to the mother</i>						
Yes	284 (71%)	382 (320–480)	0.884	407 (80%)	30 (30–30)	0.313
Not sure and no	114 (29%)	360 (300–510)		100 (20%)	35 (30–60)	

CI: confidence interval.

^a 0.05 < p < 0.1.^b p < 0.05.^c p < 0.001.

for the analysis. Of these, 27 cases were omitted, who had time until onset of breastfeeding longer than 24 h, and thus the number of events was restricted to 905.

The median time until the onset of breastfeeding was 90 min (95% CI: 63–120), with a probability of 48% to breast-feed within the first hour after delivery.

The median time to the onset of breastfeeding for white mothers (60 min; 95% CI: 40–65), with 1–4 years of schooling (60 min; 95% CI: 36–120) and maternal income >1 minimum wage (60 min; IC 95%: 40–110) was lower than their corresponding matches, with statistical significance in the Peto Test (p < 0.001, p = 0.046, p = 0.089, respectively). Maternal age showed no statistical significance when analyzed by categories in the Kaplan–Meier test (p = 0.313), but it did when analyzed continuously (p = 0.049), and showed a linear association with time when a spline was performed, with a p -value of the linearity of p = 0.051, vs. p = 0.470 in the non-linear association.

The prenatal variables did not show survival curves with a statistically significant difference in the Peto test, but in relation to hospital variables, the following factors postponed the start of breastfeeding: hospital length of stay (p < 0.001); mother knew about the performance of the rapid HIV test (120 min; 95% CI: 90–135); mother received explanation about the test (120 min; 95% CI: 105–180); mother knew the test result (180 min; 95% CI: 120–210); mother knew the test result after delivery (240 min; 95% CI: 180–348); mother was submitted to a cesarean section (110 min; 95% CI: 120–360); mother did not want to put the baby at the breast at birth (120 min; 95% CI: 95–174); and mother reported that the hospital staff had not listened to her (136 min; 95% CI: 110–189).

In the survival curves stratified by hospital, as shown in Fig. 1, it is seen that the time until the first feeding showed distinct patterns. Hospitals 2, 3, and 4 had an early onset of breastfeeding at birth in the case of women submitted to the rapid HIV test, whereas hospitals 1 and 5 had a late onset of breastfeeding, leading to the division of the database according to the median time. The median time was analyzed for these two groups of hospitals (Table 1).

For hospitals with late onset of breastfeeding at birth the median time was 375 min. In hospitals with early onset of breastfeeding the median time was 30 min, representing a period more than 10-fold shorter.

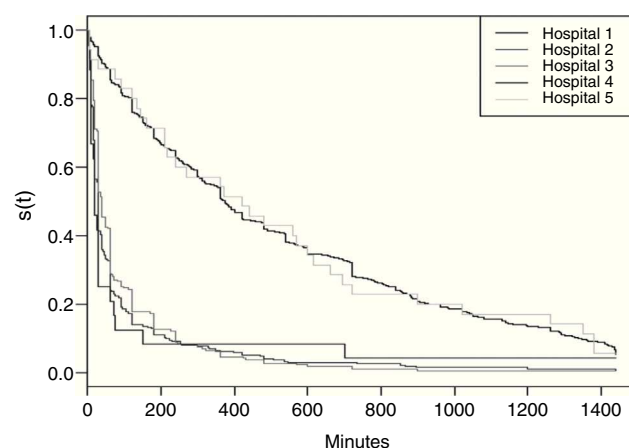


Figure 1 Survival curve of time to breastfeeding onset in Baby-Friendly Hospitals of the high-risk system. Rio de Janeiro, Brazil, 2006.

Table 2 Hierarchical model of factors associated with time to breastfeeding onset in hospitals with early-onset breastfeeding at birth. Rio de Janeiro, Brazil, 2006.

	Model 1 RR (95% CI)	Model 2 RR (95% CI)	Model 3 RR (95% CI)
<i>Ethnicity</i>			
White	1.00	1.00	1.00
Non-white	1.271 (1.050–1.541) ^a	1.284 (0.990–1.566) ^b	1.203 (0.952–1.520)
<i>Years of schooling</i>			
12 years or more	1.00	1.00	1.00
8–11 years	1.087 (0.700–1.690)	0.988 (0.606–1.534)	1.115 (0.694–1.792)
4–7 years	1.260 (0.808–1.965)	1.159 (0.702–1.808)	1.303 (0.798–2.128)
1–3 years	0.783 (0.466–1.317)	0.740 (0.406–1.280)	0.955 (0.528–1.724)
Illiterate	2.326 (1.095–4.926) ^a	0.415 (0.120–0.949) ^b	0.477 (0.174–1.307)
<i>Trimester when prenatal care was started</i>			
First trimester		1.00	1.00
Second trimester		1.025 (0.837–1.308)	1.072 (0.813–1.414)
Third trimester		1.536 (0.913–1.989) ^a	1.857 (1.163–2.967) ^a
<i>Number of prenatal consultations</i>			
0		NA	NA
1–3		1.099 (0.761–1.330) ^b	1.096 (0.744–1.613) ^b
4–6		0.783 (0.076–1.306) ^b	0.798 (0.607–1.047) ^b
7 or more		1.00	1.00
<i>Trimester when anti-HIV test was performed</i>			
First trimester		1.00	1.00
Second trimester		1.009 (0.767–1.288)	1.004 (0.771–1.309)
Third trimester		0.920 (0.644–1.216)	0.931 (0.672–1.290)
Does not know		0.537 (0.258–1.111) ^b	0.425 (0.194–0.932) ^a
<i>Moment of rapid test result</i>			
After delivery			1.454 (1.116–1.894) ^a
Before delivery/does not know			1.00
<i>Type of delivery</i>			
Cesarean section			1.750 (1.381–2.217) ^c
Vaginal			1.00
<i>Wanted to breastfeed</i>			
Yes			0.820 (0.657–1.022) ^b
No			1.00
<i>Outputs of the models</i>			
-2 log likelihood	–2666.361	–1809.438	–1780.633
R ²	0.039	0.065	0.145

CI, confidence interval; RR, relative risk.

^a $p < 0.05$.^b $0.05 < p < 0.1$.^c $p < 0.001$.

Based on the univariate analysis using the Kaplan–Meier method and epidemiological criteria, variables were analyzed using the proposed hierarchical model.

Model 3, after adjustment by the hierarchical model of factors related to the time of breastfeeding start in hospitals with early onset of breastfeeding, had a covariance explanation power of 14.5%.

In this sense, factors that postponed the start of breastfeeding were: starting prenatal care in the third quarter; knowledge after delivery of the result of the rapid HIV test in the hospital; and cesarean delivery.

In the hierarchical model for hospitals with late onset of breastfeeding, when the proximal level variables were introduced, the variables in the distal level lost

statistical significance and, therefore, their effect appeared to be mediated by the variables in that level (Table 2).

In the final model for hospitals with late onset of breastfeeding at birth, factors that negatively interfered with the outcome were: having received the result of the rapid test performed in the maternity after birth; and cesarean delivery. The inclusion of variables in the proximal level improved the model fit by 30% (Table 3).

Risk factors for the outcome in hospitals with early onset of breastfeeding at birth were: starting prenatal care in the third trimester; moment of rapid test result after delivery; and cesarean delivery. For hospitals with late onset of breastfeeding the risk factors were: moment of rapid test result after delivery; and cesarean delivery.

Table 3 Hierarchical model of factors associated with time to breastfeeding onset in hospitals with late-onset breastfeeding at birth. Rio de Janeiro, Brazil, 2006.

	Model 1 RR (95% CI)	Model 3 RR (95% CI)
<i>Years of schooling</i>		
8–11	0.735 (0.417–1.366)	0.667 (0.369–1.205)
4–7	0.738 (0.413–1.406)	0.759 (0.415–1.389)
1–3	0.468 (0.245–1.022) ^a	0.509 (0.249–1.038) ^b
Illiterate	0.751 (0.321–1.880)	0.737 (0.307–1.770)
Maternal age	1.016 (1.000–1.028) ^a	1.011 (0.995–1.027)
<i>Moment of rapid test result</i>		
After delivery		1.649 (1.346–2.020) ^c
Type of birth: cesarean section		3.831 (3.030–4.854) ^c
<i>Outputs of the models</i>		
I-likelihood	–2075.282	–1980.664
R ²	0.022	0.326

CI: confidence interval; RR: relative risk.

^a $p < 0.05$.

^b $0.05 < p < 0.1$.

^c $p < 0.001$.

Discussion

The variable “moment of anti-HIV rapid test result after delivery” showed similar consistency and magnitude in both models, regardless of the hospital characteristic of early or late onset of breastfeeding at birth. This fact shows the delay in the test result has similar impact and same-intensity influence on breastfeeding postponement at birth.

In a study that dichotomized breastfeeding onset (first hour of life and after the first hour), not knowing whether the rapid HIV test was performed at the hospital and not knowing the results also showed to be factors that delayed breastfeeding at birth.⁹

In a recently published systematic review,¹⁵ it was observed that the only study that investigated the rapid HIV test in relation to breastfeeding is the result of the same database that gave origin to this article.

Cesarean delivery was negatively associated with the onset of breastfeeding and, thus, persisted as a barrier to breastfeeding at birth.^{16–18} Some authors consider cesarean section a risk factor for the continuation of breastfeeding at one and 3 months after birth.¹⁹

The median time to onset of breastfeeding in vaginal birth was 60 min, and for cesarean section, the median time was 210 min. According to hospital conduct, the median time to the onset of breastfeeding for a vaginal delivery in hospitals with early onset is 30 min, whereas in hospitals with late onset of breastfeeding this time is 240 min, an 8-fold longer period.

The median time to the first feeding for cesarean delivery also showed differences by hospital conduct. In hospitals with late onset, the median was 924 min and in hospitals with early onset, the median was 50 min, an almost 18-fold shorter period.

The variable “intention to breastfeed in the delivery room” was significantly associated with the outcome only

in hospitals with early onset of breastfeeding at birth, suggesting that the mother’s decision to breastfeed is weakened even in Baby-Friendly Hospitals, where the lack of staff awareness still persists in the autonomy of the woman regarding the hospital institution.

Based on the final models, it was verified that there are common factors, regardless of the pattern of median time until the onset of breastfeeding, such as the moment of the rapid test result and the type of delivery.

In hospitals with late onset of breastfeeding, the analyses suggest that almost 30% of the time variation is predictable by hospital variables. In hospitals with early onset of breastfeeding at birth, a small portion of data variability is explained by the model ($R^2 = 0.145$), but the proximal variables still showed greater weight regarding the outcome. Residual analysis of the final models showed good fit of the models.

In hospitals with early onset of breastfeeding, 74% of women were able to start breastfeeding within the newborn’s first hour of life, whereas in hospitals with late onset, only 15% started breastfeeding within 1 h of birth. Therefore, the postponement of the onset of breastfeeding becomes evident as established practice, even in Baby-Friendly Hospitals, and hospital protocols are described in the literature as a barrier to the onset of breastfeeding.²⁰

In spite of the characteristics of these hospitals, which in essence are breastfeeding supporters, the postponement of breastfeeding is supported by knowledge not reported in the literature. Thus, although they are Baby-Friendly Hospitals, they can be classified as having early- or late-onset of breastfeeding at birth.

The study has limitations, as it was not possible to analyze factors that, according to a systematic review on the theme,¹⁵ can influence the onset of breastfeeding, such as: area of residence, information on breastfeeding during prenatal care, home birth, and prematurity. Moreover, as all

assessed mothers were submitted to the rapid test, it was not possible to investigate the influence of the test alone, which would add more information to the analysis.

Despite these limitations, this study is an important tool to improve vertical transmission prevention strategies and the Baby-Friendly Hospital Initiative, as well as humanization strategies in care and the establishment of these policies.

The only prenatal care variable associated with the time to onset of breastfeeding was the beginning of prenatal care in the third trimester, in hospitals with early onset of breastfeeding at birth. Women who started a late prenatal appear to constitute a risk clientele for the practice of breastfeeding, even in hospitals with practices that promote early onset of breastfeeding. Therefore, it can be observed that greater efforts are needed to carry out good-quality prenatal care, with early identification of pregnant women and a more thorough assessment for cesarean delivery.

It is crucial to define standards regarding the practice of breastfeeding for unknown HIV status, counseling practices and consent, and definition of responsibilities for providing results in a timely manner.

A more recent study conducted in 15 maternity hospitals in Rio de Janeiro in 2009 showed that the proportion of mothers submitted to the rapid test when admitted at the hospital for delivery was still high, and that not knowing the results of the HIV testing before delivery increased by more than 2-fold the chance of late onset of breastfeeding,²¹ showing that this scenario has not shown a positive evolution with time.

After the implementation of the Baby-Friendly Hospital Initiative, there were significant advances in breastfeeding practices. Thus, the proposed challenge is the establishment of guarantees to evaluate interventions that may be related to the postponement of breastfeeding, such as inadequate operationalization of the rapid HIV test.

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Conflicts of interest

The authors declare no conflicts of interest.

References

1. World Health Organization. Evidence for the ten steps to successful breastfeeding. Division of child health and development. Geneva: World Health Organization; 1988.
2. Boccolini CS, Carvalho ML, Oliveira MI, Pérez-Escamilla R. Breastfeeding during the first hour of life and neonatal mortality. *J Pediatr (Rio J)*. 2013;89:131–6.
3. Moore E, Anderson GC. Randomized controlled trial of very early mother–infant skin-to-skin contact and breastfeeding status. *J Midwifery Womens Health*. 2007;52:116–25.
4. WHO – World Health Organization. Baby-friendly hospital initiative: revised, updated and expanded for integrated care. Section 2. Strengthening and sustaining the baby-friendly hospital initiative: a course for decision-makers. Geneva: World Health Organization; 2009.
5. Ministério da Saúde. Recomendação para profilaxia da transmissão vertical do HIV e terapia anti-retroviral em gestantes. Brasília: Ministério da Saúde; 2004.
6. Ministério da Saúde, Secretaria de Vigilância em Saúde, Secretaria de Atenção à Saúde. Manual normativo para profissionais de saúde de maternidades da Iniciativa Hospital Amigo da Criança – referência para mulheres HIV positivas e outras que não podem amamentar. Brasília: Ministério da Saúde; 2004.
7. Brasil. Ministério da Saúde Institui, no âmbito do Sistema Único de Saúde, o Projeto Nascer-Maternidades. Portaria nº 2104, 19 novembro de 2002.
8. Ministério da Saúde. Manual técnico pré-natal e puerpério: atenção qualificada e humanizada. Brasília: Ministério da Saúde; 2006.
9. Oliveira MI, Silva KS, Gomes Junior SC, Fonseca VM. Resultado do teste rápido anti-HIV após o parto: uma ameaça à amamentação ao nascimento. *Rev Saude Publica*. 2010;44:60–9.
10. Universidade Federal Fluminense. Gênero, Poder e Cidadania: a mulher é sujeito no processo decisório da amamentação ao nascimento quando o status de HIV é ignorado pelo serviço? Edital MCT/CNPq/PR-SMP no. 045/2005 – Relações de Gênero, Mulheres e Feminismos. Processo no. 403015/2005-7.
11. Bustamante-Teixeira MT1, Faerstein E, Latorre Mdo R. Técnicas de análise de sobrevivência. *Cad Saude Publica*. 2002;18:579–94.
12. Carvalho MS, Andreozzi VL, Codeço CT, Barbosa MTS, Shimakura SE. Análise de sobrevivência: teoria e aplicações em saúde. 1st ed. Rio de Janeiro: Editora Fiocruz; 2005.
13. Victora CG, Huttly SR, Fuchs SC, Olinto MT. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. *Int J Epidemiol*. 1997;26:224–6.
14. Carvalho ML, Valente JG, Assis SG, Vasconcelos AG. Modelo preditivo do uso de cocaína em prisões do Estado do Rio de Janeiro. *Rev Saude Publica*. 2005;39:824–31.
15. Esteves TM, Daumas RP, Oliveira MI, Andrade CA, Leite IC. Fatores associados à amamentação na primeira hora de vida: revisão sistemática. *Rev Saude Publica*. 2014;48:697–703.
16. Theofilogiannakou M, Skouroliahou M, Gounaris A, Panagiotakos D, Markantonis SL. Breast-feeding in Athens, Greece: factors associated with its initiation and duration. *J Pediatr Gastroenterol Nutr*. 2006;43:379–84.
17. Cakmak H, Kuguoglu S. Comparison of the breastfeeding patterns of mothers who delivered their babies per vagina and via cesarean section: an observational study using the LATCH breastfeeding charting system. *Int J Nurs Stud*. 2007;44:1128–37.
18. Nakao Y, Moji K, Honda S, Oishi K. Initiation of breastfeeding within 120 minutes after birth is associated with breastfeeding at four months among Japanese women: a self-administered questionnaire survey. *Int Breastfeed J*. 2008;3:1.
19. Boccolini CS, Carvalho ML, Oliveira MI, Leal MC, Carvalho MS. Fatores que interferem no tempo entre o nascimento e a primeira mamada. *Cad Saude Publica*. 2008;24:2681–9.
20. Moore ER, Anderson GC, Bergman N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochane Database Syst Rev*. 2012:5.
21. Esteves TM [Thesis] Fatores associados ao início tardio da amamentação. Rio de Janeiro: ENSP/FIOCRUZ; 2014.