

Factors associated with exclusive breastfeeding in the Legal Amazon and Northeast regions, Brazil, 2010

Fatores associados ao Aleitamento Materno Exclusivo na Amazônia Legal e no Nordeste, Brasil, 2010

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ABSTRACT

Objective

The objective of this study was to identify the factors associated with exclusive breastfeeding in children aged less than six months from the Brazilian Legal Amazon and Northeast regions.

Methods

The study used data from a survey that assessed prenatal and infant (<1 year) care in 2010. Sociodemographic, prenatal, delivery, and puerperium care factors with $p < 0.05$ in multivariate analysis were associated with exclusive breastfeeding.

Results

For both regions, the prevalence of exclusive breastfeeding decreased with age, which was the main variable associated with early weaning. In the Legal Amazon, exclusive breastfeeding prevailed among: mothers aged 35 years or more; mothers living in state capitals; and mothers who breastfed on the first hour of life. In the Northeast, the probability of exclusive breastfeeding was greater for mothers aged 35 years or more.

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Conclusion

The factors associated with exclusive breastfeeding were child's and mother's age in both regions; and residence location and breastfeeding in the first hour of life in the Legal Amazon, suggesting the need of differentiated strategies for the promotion of exclusive breastfeeding.

Indexing terms: Breast feeding. Epidemiologic factors. Epidemiology. Infant.

RESUMO

Objetivo

O objetivo foi identificar fatores associados ao aleitamento materno exclusivo em crianças menores de seis meses de idade, residentes na Amazônia Legal e no Nordeste do Brasil, com base nos dados da pesquisa de avaliação da atenção ao pré-natal e aos menores de um ano de idade em 2010.

Métodos

Consideraram-se fatores associadas ao aleitamento exclusivo as variáveis sociodemográficas e de assistência ao pré-natal, parto e puerpério que mantiveram $p < 0,05$ em análise multivariada.

Resultados

Em ambas as regiões, a prevalência de aleitamento materno exclusivo apresentou declínio com aumento da idade da criança, que se configurou na principal variável associada ao desmame precoce. Na Amazônia Legal, a probabilidade de aleitamento materno exclusivo foi maior para: mães com 35 ou mais anos de idade, mães que residiam nas capitais dos estados e mães que amamentaram na primeira hora de vida da criança. No Nordeste, a probabilidade de aleitamento materno exclusivo também foi maior para mães com 35 ou mais anos de idade.

Conclusão

Os fatores associados ao aleitamento materno exclusivo foram idade da criança e idade da mãe nas duas regiões, localização de moradia e mamada na primeira hora na Amazônia Legal, o que sugere a necessidade de estratégias diferenciadas para a promoção do aleitamento materno.

Termos de indexação: Aleitamento materno. Fatores epidemiológicos. Epidemiologia. Lactente.

INTRODUCTION

Exclusive breastfeeding is understood as feeding an infant breast milk only, either directly from a breast or extracted from the mother or a donor, and no other fluid or solid, except for vitamin, mineral, or medical drops or syrups¹. The actions for promoting, protecting, and supporting breastfeeding are effective and inexpensive strategies against childhood morbidity and mortality². The World Health Organization (WHO)³ recommends exclusive breastfeeding for six months and non-exclusive breastfeeding for at least two years, and the Brazilian Ministry of Health (MH)⁴ has supported the recommendation since 2001. Breastfeeding is closely related to the child's good nutritional and health statuses, and to greater resistance against infectious diseases, especially gastrointestinal infections.

Breastfeeding may reduce the preventable death rates of children less than five years of age by as much as 13% worldwide⁵. Although childhood mortality is decreasing in Brazil⁶, reducing preventable deaths is a permanent challenge, and the rates represent a public health problem that affects Brazilian regions differently⁷. In the North and Northeast regions, these rates are still high, so in 2009 the Pact for Reducing Childhood Mortality was signed in the Northeast and Legal Amazon to reduce these regional inequalities. The pact has six cores, one of them being prenatal, delivery, and newborn care qualification⁸.

Some Brazilian studies conducted at the end of the 20th century covering a period of 25 years already detected a gradual improvement in the breastfeeding practices of the children less

than one year of age, but the breastfeeding indicators varied significantly throughout the different geographic regions of the country^{9,10}. Brazil has a high percentage of mothers who start breastfeeding their children (95.0%), but exclusive breastfeeding does not reach the ideal duration, being much smaller than the recommended six months. The 2006 *Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher* (PNDS, National Child's and Mother's Demographic and Health Survey)¹¹ found an exclusive breastfeeding rate of 38.6% in children less than six months of age, with the Northeast region having the lowest median: 1.1 months. The II Breastfeeding Prevalence Survey¹² conducted in 2008 in Brazilian capitals and *Distrito Federal* found an exclusive breastfeeding rate of 41.0% in children aged less than six months, with the highest and lowest prevalences occurring in the North (45.9%) and Northeast (37.0%) regions, respectively.

Given this landscape, investigation of the possible factors associated with exclusive breastfeeding in children aged less than six months is one of the requirements for promoting exclusive breastfeeding policies and programs, and identifying the occasions that most contribute to early weaning. The present study assesses this aspect in municipalities of the Legal Amazon and Northeast regions in 2010 using data from the survey "Neonatal Call: assessment of prenatal care and care of infants aged less than one year in the North and Northeast regions".

METHODS

This study is based on secondary data from the "Neonatal Call: assessment of prenatal care and care of infants aged less than one year in the North and Northeast regions" conducted in 2010 and approved by the Research Ethics Committee of *Escola Nacional de Saúde Pública Sérgio Arouca/Fundação Oswaldo Cruz* (Ensp/Fio Cruz). The cross-sectional study included mothers of children aged less than one year who received the multiple vaccines in 252 of the 256 primary municipalities

of the Pact for Reducing Childhood Mortality⁸. The municipalities are located in nine states of the Legal Amazon (*Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Roraima, Rondônia, and Tocantins*) and in eight states of the Northeast region (*Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, and Sergipe*).

The Neonatal Call used probabilistic sampling to select the children vaccinated in each planned domain: the capital of each state and all other municipalities of the state. The minimum sample size of each domain, 750 mother/child dyads, was estimated considering a delivery complication of 22.0%¹³, an error $\leq 3.5\%$, a confidence coefficient $\geq 95.0\%$, and a design correlation factor (d_{eff}) ≤ 1.5 , totaling 23,399 interviews. The mother/child dyads were selected by two-stage cluster sampling¹⁴ and probability proportional to cluster size. The first stage randomly selected the main vaccination stands in each municipality; the second stage consisted of a systematic selection of mother/child dyads at each vaccination stand, according to the study inclusion criteria. Mothers of children aged more than one year, living in other municipalities, and whose children were twins and/or adopted were excluded. A total of 16,863 mothers of children aged less than one year were interviewed, corresponding to a 3.5% to 4.4% increase in the sampling error while maintaining all other sample-size calculation criteria fixed.

A pretested form with closed questions on demographic and socioeconomic characteristics was used for collecting the following data; prenatal, delivery, and puerperium care; and child's growth and feeding; among others.

The present study included only the mothers of children aged less than six months ($n=9,090$); 30 were excluded because of missing data about the child's diet so only 9,060 forms were valid. The study sample size conforms to the sampling error criteria of 2.2, confidence coefficient of 95.0%, $d_{eff}=2.0$, considering the real prevalence of the study outcome (exclusive

breastfeeding prevalence of 39.9%), allowing stratification by region.

The study dependent variable was exclusive breastfeeding, classified as yes or no. The child was considered to be exclusively breastfed when the child was fed only breast milk and no other fluid or solid, as recommended by the WHO¹. The 24-hour dietary recall was used to identify the breastfeeding and/or feeding practices. The questionnaire included questions about the intake of breast milk, other types of milk, and other foods, including water, tea, and other fluids in the previous 24 hours. Thus, the instrument indicates whether the child was exclusively breastfed in the 24 hours before the interview^{15,16}.

The independent variables were child's characteristics (age, gender, and birth weight); mother's sociodemographic characteristics (age, education level, skin color, and location of residence); prenatal care characteristics (attending prenatal care, prenatal care location, and advice on breastfeeding during prenatal care); delivery (type of delivery and delivery location); puerperium care (breastfeeding in the first hour of life, rooming-in, and recent visit from a health agent or Family Health Strategy agent).

The study sample distribution was assessed according to sociodemographic, and prenatal, delivery, and puerperium care variables (total and by region) with a Confidence Interval of 95% (95%CI). The exclusive breastfeeding prevalence was calculated for each month of the child's age with a 95%CI for all sociodemographic, prenatal, delivery, and puerperium variables, separately and by region, according to the Chi-square test (χ^2). The exclusive breastfeeding Prevalence Ratio (PR) and respective 95%CI were calculated and stratified by region (Legal Amazon and Northeast region) by Poisson Regression adjusted for all variables. The significance level was set at 5% ($p < 0.05$).

All estimates take into consideration the study design, correcting for the clustering effect and giving individual weights proportional to

sampling probability. The weighting factor according to the number of children aged less than one year of each municipality, according to the 2010 Census, was also considered (<http://www.ibge.gov.br>). The data were treated by the software Stata version 11.0, using the `svy` command, with a significance level of 5% ($p < 0.05$) and 95%CI.

RESULTS

Of the 9,060 study children, 4,116 were from the Legal Amazon and 4,944 were from the Northeast regions; both groups had similar ages and gender distribution. Roughly 94% of the children in both regions had normal birth weight.

Most mothers from both regions were 20 to 34 years old, finished high school, were Black, lived in urban areas other than the capital, attended prenatal care at a public service, received breastfeeding advice during prenatal care, delivered at a public service, breastfed in the first hour of life, and were roomed-in with their child. In the Legal Amazon, most of the study mothers had not been visited by the health agent or Family Health Strategy agent, unlike the Northeast mothers who had (Attached 1).

The prevalence of exclusive breastfeeding on the first month of life was 72.0%, decreasing to 57.5%, 49.9%, 39.5%, 24.4%, and 11.6% from the second to the sixth months in the study Legal Amazon municipalities. In the Northeast region, exclusive breastfeeding also decreased, reaching 13.3% at six months of age but starting at 66.3%. The prevalence of exclusive breastfeeding in the Northeast sample was statistically lower than that in the Legal Amazon sample, but equal when compared on a monthly basis (Figure 1).

In the Legal Amazon municipalities, the prevalence of exclusive breastfeeding was greater among older women, reaching 48.1% in mothers aged more than 35 years; in those who breastfed the child in the first hour of life; and in those who had not been visited recently by a health agent or Family Health Strategy agent ($p < 0.05$).

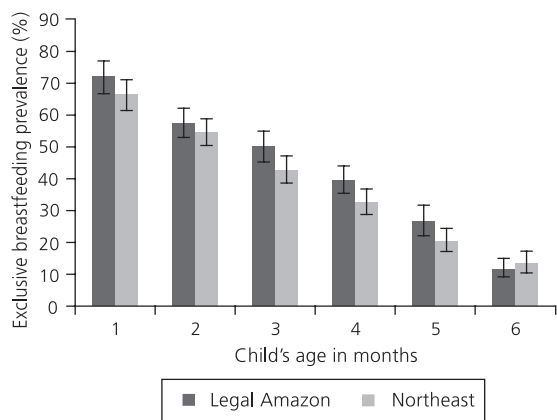


Figure 1. Distribution of the prevalence of exclusive breastfeeding and confidence interval of 95% according to the child's age in months. Children younger than six months of age living in the study municipalities of the Legal Amazon and Northeast regions. Brazil, 2010.

In the Northeast municipalities, the prevalence of exclusive breastfeeding increased with mother's age, reaching 45.6% in the mothers aged ≥ 35 years; in those who attended prenatal care; and in those who had been visited recently by a health agent or Family Health Strategy agent ($p < 0.05$) (Attached 2).

Multivariate analysis identified the child's age as the main variable associated with early weaning in both regions (Attached 3). The mother's age comes next: children whose mothers are older than 34 years are 28% and 42% more likely to be exclusively breastfed in the Legal Amazon and Northeast regions, respectively, than those of mothers aged less than 20 years. Living in the State Capital (17%) and breastfeeding in the first hour of life (16%) were protective factors only in the Legal Amazon.

DISCUSSION

The objective of this study was to investigate the factors associated with exclusive breastfeeding in children aged less than six months from primary municipalities in the Legal Amazon and Northeast regions of Brazil, since the literature has indicated that early weaning is strongly influenced by geographic region¹⁷. This

situation was confirmed by the present study: exclusive breastfeeding was associated with different factors in the two study regions. The variables associated with exclusive breastfeeding were: child's age, mother's age, location of residence, and breastfeeding in the first hour of life, but the associations varied by region.

The prevalence of exclusive breastfeeding in children aged less than six months found by the present study (39.9%) was similar to that found by the II Breastfeeding Prevalence Survey (41.0%), including variation by region¹⁶. In the present study, the prevalence of exclusive breastfeeding in the selected Northeast municipalities was lower in children aged less than six months, but equal to that of the Legal Amazon when compared by month, declining sharply with the child's age. The decreasing prevalence of exclusive breastfeeding with child's age was also observed by Pereira *et al.*¹⁸ in a study of 1,029 mothers of children aged less than six months frequenting primary health care units in the city of *Rio de Janeiro*: the prevalence of breastfeeding decreased by 17.0% per month of the child's life.

One can see that, in Latin American countries, exclusive breastfeeding duration varies greatly. Data from demographic and health surveys show that the median breastfeeding duration of four months in Bolivia was much greater than the medians in Brazil (1.4 months), El Salvador (1.4 months), Dominican Republic (0.5 months), and Haiti (0.4 months), countries with the lowest medians^{11,19}.

The mother's age was strongly associated with exclusive breastfeeding in both regions. The prevalence of exclusive breastfeeding was greater among older mothers even after adjustment: higher mother's age was a protective factor for exclusive breastfeeding. These results are similar to those found by Venâncio & Monteiro²⁰ in a study of 34,435 children younger than six months of age from 111 municipalities in the state of *São Paulo*, which found that the duration of exclusive breastfeeding increased with mother's age until the age group of 25 to 29 years. Saldiva *et al.*¹⁷

studied 18,929 children aged less than six months from the II National Breastfeeding Prevalence Survey and found that adolescent mothers (<age 20 years) were more likely to introduce porridge early.

Breastfeeding within the first hours after birth is important for breastfeeding maintenance, and is a recommendation of the Pan-American Health Organization²¹. After adjustment for all variables included in multiple analysis, the variable 'breastfed within the first hour after birth' remained in the model as a protective factor for children aged less than six months from the Legal Amazon region and the study state capitals.

Santos *et al.*²² studied the factors associated with preventable deaths in children aged less than four years in a cohort born in *Rio Grande do Sul* and found that not being breastfed within the first 24 hours of life was associated with a higher risk of dying from preventable causes, even after adjustment for confounders. Not being breastfed in the first 24 hours of life reduces the prevalence of breastfeeding^{23,24}. Although marginally, breastfeeding within the first hour of life is conceptually important and according to many studies, promotes breastfeeding. Therefore, promoting breastfeeding in the first 24 hours after delivery it is an essential prenatal care activity.

In adjusted data from household surveys on mother/child nutrition in the State of *Pernambuco*, Carminha *et al.*²⁵ found that living in the Metropolitan Region of *Recife* promoted exclusive breastfeeding. Living in the state capital strongly indicates access to health services and strategies that promote and encourage breastfeeding. On the other hand, Ramos *et al.*²³ and Demétrio *et al.*²⁶ pointed out that living in an urban area hinders breastfeeding.

Integrated actions covering prenatal care, delivery care, and post-delivery support work together to improve the quality of care provided to women who breastfeed²⁷.

Demétrio *et al.*²⁶ in a cohort from municipalities in the *Recôncavo* Region of *Bahia*,

(BA) found that the median duration of exclusive breastfeeding is proportionally smaller in women who do not attend prenatal care. During prenatal care health professionals have a positive influence on breastfeeding duration, both as breastfeeding educators and promoters. In this study, the Northeast region presented the highest prevalence of exclusive breastfeeding among mothers who attended prenatal care. However, after adjustment for the confounders, this association lost significance.

According to the WHO, health agents increase exclusive breastfeeding duration more effectively than any other professional²⁸. However, the present study found that exclusive breastfeeding prevalence was higher in both regions among mothers who had not been recently visited by Family Health Strategy professionals. After adjustment in multiple analysis, this factor was not associated with breastfeeding prevalence. Studies that assessed Family Health Strategy teams' knowledge about breastfeeding found that although the professionals were well informed about the advantages of breastfeeding, few knew how to manage breastfeeding appropriately in the clinical setting²⁹⁻³¹. Hence, one has to assess the efficacy of these actions, since so far they have not been enough to promote exclusive breastfeeding in the two study regions.

The main variable associated with exclusive breastfeeding was child's age: in the second month, there was a 20% risk of introducing other foods; in the sixth month, the risk increased to 80%. Considering that the country has been advancing breastfeeding since 1981 with different breastfeeding-promoting actions, the data shown herein are concerning despite the increase in exclusive breastfeeding duration from 23.4 days to 54.1 days between 1999 and 2008¹⁶. The Neonatal Call³² identified a median exclusive breastfeeding duration of 64 days (76 in the Legal Amazon and 58 in the Northeast) in children aged less than six months, confirming the exclusive breastfeeding prevalence curves shown in Attached 1.

However, this type of study is not enough to identify the causes of introducing foods early. The question is: why do mothers introduce foods early? Is it a cultural and/or social issue or is it encouraged by health professionals and/or services? Many variables associated with early weaning are cited in the literature and should be assessed by other types of studies, such as: lack of information about the importance of breastfeeding, overestimating the benefits of weaning foods, maternal work, cultural habits, and social representations, among others.

The main limitations of this study are: its cross-sectional nature does not allow differentiating between cause and effect; and the fact that data collection used a method subject to memory bias, despite its recognized advantages (the WHO warns that the 24 hours can overestimate the proportion of exclusively breastfed children since some children are given other fluids occasionally)^{15,33}. The fact that the survey was conducted on the National Immunization Day (D-day) may also have been a limiting factor because it was not possible to survey a high percentage of the population on a single day: the vaccination period was extended, especially in hardly accessible regions, but this situation was somewhat remediated because surveys on vaccination day are still a widely used and recommended strategy in Brazil³⁴.

Although the study findings may represent the children from the study municipalities and other similar children, the 2.2% sampling error and 95.0%CI does not allow extrapolation to all children in the Brazilian Legal Amazon and Northeast regions.

CONCLUSION

In a heterogeneous country like Brazil, one should expect different regional breastfeeding practices, and this study confirmed that the factors associated with exclusive breastfeeding are influenced by the geographic region of the country. The factors associated with exclusive breastfeeding in children aged less than six months were child's age, mother's age, residence

location, and being breastfed in the first hour of life, but distinctively by region.

Higher child's age was a risk factor for non-exclusive breastfeeding in both regions. In the study Legal Amazon municipalities, the probability of exclusive breastfeeding was greater among mothers aged 35 years or more. A similar situation was observed in the Brazilian Northeast. Breastfeeding in the first hour after birth and living in the state capital promote exclusive breastfeeding only in the Legal Amazon region.

These findings may be useful for defining differentiated breastfeeding promotion strategies according to the most common characteristics of each region. Strategies that should be assessed for promoting exclusive breastfeeding are the prenatal, delivery, and puerperal care that aim to reduce the early feeding of fluids or foods to children aged less than six months and to improve the processes that change hospital routines in the main maternity hospitals of the Legal Amazon and Northeast regions. Moreover, health professionals need to be better qualified with respect to managing exclusive breastfeeding until age six months as recommended by the WHO and MH, because of the strong reduction in the prevalence of exclusive breastfeeding.

CONTRIBUTORS

ACM NEVES helped to design the methods, tabulate the data, analyze the results, and write the manuscript. EC MOURA helped to design the methods, analyze the data, and review the manuscript. W SANTOS helped to tabulate the data and analyze the results. KMB CARVALHO helped to review the manuscript.

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ATTACHED 1

Sample distribution (n and %) and 95% confidence interval according to sociodemographic, prenatal, delivery, and puerperium variables. Study municipalities in the Legal Amazon and Northeast regions, Brazil, 2010

(1 of 2)

Variables	Region						Total		
	Legal Amazon			Northeast			n	%	95%CI
	n	%	95%CI	n	%	95%CI			
<i>Child's age (months)</i>									
0	543	13.1	(11.7-14.5)	626	12.2	(11.12-13.5)	1,169	12.6	(11.7-13.5)
1	778	18.9	(17.3-20.6)	960	20.7	(19.2-22.2)	1,738	20.0	(18.9-21.1)
2	735	18.0	(16.5-19.6)	889	17.4	(16.1-18.9)	1,624	17.7	(16.7-18.7)
3	750	18.1	(16.7-19.7)	890	18.2	(16.8-19.7)	1,640	18.2	(17.1-19.2)
4	646	16.6	(15.14-18.2)	773	15.7	(14.4-17.1)	1,419	16.1	(15.1-17.1)
5	664	15.3	(13.9-16.8)	806	15.8	(14.5-17.1)	1,470	15.6	(14.6-16.6)
<i>Child's gender</i>									
Male	2,122	51.4	(49.3-53.4)	2,492	50.9	(49.1-52.7)	4,614	51.1	(49.7-52.5)
Female	1,992	48.6	(46.6-50.7)	2,450	49.1	(47.3-50.9)	4,442	48.9	(47.5-50.3)
<i>Child's birth weight</i>									
Low	247	5.9	(5.0-6.9)	318	6.6	(5.7-7.5)	565	6.3	(5.7-7.0)
Normal	3,817	94.1	(93.1-95.0)	4,531	93.4	(92.5-94.3)	8,348	93.7	(93.0-94.3)
<i>Mother's age (years)</i>									
<20 years	899	22.2	(20.6-23.9)	984	20.6	(19.1-22.1)	1,883	21.2	(20.1-22.4)
20-34 years	2,905	71.4	(69.5-73.2)	3,424	70.0	(68.3-71.7)	6,329	70.6	(69.3-71.8)
≥35 years	270	6.4	(5.5-7.5)	458	9.4	(8.4-10.5)	728	8.2	(7.5-8.9)
<i>Mother's education level</i>									
0-7 years	1,070	26.9	(25.2-28.6)	1,342	26.9	(25.3-28.5)	2,412	26.9	(25.7-28.1)
8-10 years	1,266	31.6	(29.8-33.5)	1,357	28.2	(26.6-29.9)	2,623	29.6	(28.4-30.9)
≥11 years	1,745	41.5	(39.6-43.4)	2,200	44.9	(43.1-46.7)	3,945	43.5	(42.2-44.8)
<i>Mother's race</i>									
White	740	17.4	(16.0-19.0)	1,082	20.7	(19.3-22.1)	1,822	19.3	(18.3-20.4)
Brown/Black	3,210	79.0	(77.4-80.6)	3,667	76.3	(74.7-77.7)	6,877	77.4	(76.3-78.5)
Native/Yellow	147	3.5	(2.9-4.3)	175	3.1	(2.6-3.7)	322	3.3	(2.8-3.7)
<i>Residence location</i>									
Not capital	1,688	55.7	(55.7-55.7)	2,656	61.0	(61.0-61.0)	4,344	58.8	(58.8-58.8)
Capital	2,428	44.3	(44.3-44.3)	2,288	39.0	(39.0-39.0)	4,716	41.2	(41.2-41.2)
<i>Prenatal care</i>									
No	63	1.8	(1.3-2.5)	69	1.5	(1.1-2.0)	132	1.6	(1.3-2.0)
Yes	4,053	98.2	(97.5-98.7)	4,875	98.5	(98.0-98.9)	8,928	98.4	(98.0-98.7)
<i>Prenatal service</i>									
Public	3,254	82.5	(81.0-83.9)	3,852	80.1	(78.7-81.5)	7,106	81.1	(80.0-82.1)
Private	736	17.5	(16.1-19.0)	953	19.9	(18.5-21.3)	1,689	18.9	(17.9-20.0)
<i>Prenatal advice on breastfeeding</i>									
No	1,276	31.1	(29.3-33.0)	1,256	26.8	(25.2-28.4)	2,532	28.6	(27.4-29.8)
Yes	2,840	68.9	(67.0-70.7)	3,688	73.2	(71.6-74.8)	6,528	71.4	(70.2-72.6)
<i>Delivery</i>									
Surgical	1,923	47.7	(45.7-49.8)	2,398	49.1	(47.2-50.9)	4,321	48.5	(47.2-49.9)
Vaginal	2,048	52.3	(50.2-54.3)	2,376	50.9	(49.1-52.8)	4,424	51.5	(50.1-52.8)
<i>Delivery facility</i>									
Public	3,191	78.6	(77.0-80.1)	3,836	78.5	(77.0-80.0)	7,027	78.6	(77.5-79.6)
Private	783	19.3	(17.9-20.9)	883	19.1	(17.8-20.6)	1,666	19.2	(18.2-20.3)
Other	58	2.1	(1.5-2.8)	109	2.3	(1.9-2.8)	167	2.2	(1.9-2.6)

ATTACHED 1

Sample distribution (n and %) and 95% confidence interval according to sociodemographic, prenatal, delivery, and puerperium variables. Study municipalities in the Legal Amazon and Northeast regions, Brazil, 2010

(2 of 2)

Variables	Region						Total		
	Legal Amazon			Northeast			n	%	95%CI
	n	%	95%CI	n	%	95%CI			
<i>Breastfeeding in the first hour of life</i>									
No	1,198	30.8	(29.0-32.7)	1,780	40.1	(38.3-42.0)	2,978	36.3	(35.0-37.7)
Yes	2,755	69.2	(67.3-71.0)	2,980	59.9	(58.0-61.7)	5,735	63.7	(62.3-65.0)
<i>Rooming-in</i>									
No	469	11.9	(10.6-13.5)	614	12.5	(11.3-13.8)	1,083	12.3	(11.4-13.3)
Yes	3,469	88.1	(86.5-89.4)	4,121	87.5	(86.2-88.7)	7,590	87.7	(86.7-88.6)
<i>Recent visit from health/FHS agent</i>									
No	2,229	54.9	(53.1-56.7)	2,189	45.6	(44.0-47.3)	4,418	49.5	(48.2-50.7)
Yes	1,834	45.1	(43.3-46.9)	2,708	54.4	(52.7-56.0)	4,542	50.5	(49.3-51.8)

Note: FHS: Family Health Strategy; 95%CI: Confidence Interval of 95% .

ATTACHED 2

Exclusive breastfeeding prevalence (%) and 95% confidence interval according to sociodemographic, prenatal, delivery, and puerperium care. Study municipalities in the Legal Amazon and Northeast regions, Brazil, 2010

(1 of 2)

Variables	Region						Total		
	Legal Amazon			Northeast			%	95%CI	<i>p</i> *
	%	95%CI	<i>p</i> *	%	95%CI	<i>p</i> *			
<i>Child's age (months)</i>			<0.001			<0.001			<0.001
0	72.0	(66.5-76.8)		66.3	(61.3-70.9)		68.7	(65.0-72.1)	
1	57.5	(52.8-62.0)		54.5	(50.3-58.7)		55.7	(52.5-58.8)	
2	49.9	(45.1-54.8)		42.7	(38.5-47.0)		45.7	(42.5-49.0)	
3	39.5	(35.3-43.9)		32.5	(28.6-36.6)		35.4	(32.5-38.4)	
4	26.4	(21.9-31.5)		20.4	(17.0-24.2)		23.0	(20.1-26.0)	
5	11.6	(9.0-14.8)		13.3	(10.3-17.1)		12.6	(10.5-15.1)	
<i>Child's gender</i>			0.595			0.310			0.267
Male	42.1	(39.3-44.9)		37.1	(34.7-39.7)		39.2	(37.3-41.1)	
Female	43.1	(40.3-46.0)		39.0	(36.5-41.5)		40.7	(38.8-42.6)	
<i>Child's birth weight</i>			0.736			0.116			0.133
Low	41.1	(33.2-49.5)		38.6	(36.7-40.5)		36.0	(31.0-41.4)	
Normal	42.6	(40.5-44.7)		32.8	(26.4-39.8)		40.2	(38.9-41.6)	
<i>Mother's age (years)</i>			0.014			0.004			<0.001
<20 years	37.4	(33.4-41.6)		33.5	(29.6-37.6)		35.2	(32.3-38.1)	
20-34 years	43.7	(41.3-46.1)		38.4	(36.3-40.6)		40.6	(39.0-42.2)	
≥35 years	48.1	(40.2-56.0)		45.6	(39.7-51.7)		46.4	(41.6-51.2)	
<i>Mother's education level</i>			0.409			0.114			0.064
0-7 years	40.3	(36.5-44.2)		35.7	(32.3-39.2)		37.6	(35.1-40.2)	
8-10 years	42.7	(39.1-46.2)		37.0	(33.8-40.4)		39.5	(37.1-42.0)	
≥11 years	43.7	(40.6-46.8)		40.1	(37.4-42.8)		41.5	(39.5-43.5)	
<i>Mother's race</i>			0.105			0.087			0.056
White	47.0	(42.2-51.9)		38.1	(34.3-42.1)		41.4	(38.4-44.5)	
Brown/Black	41.4	(39.2-43.7)		37.5	(35.4-39.5)		39.1	(37.6-40.7)	
Native/Yellow	45.0	(34.8-55.6)	0.074	48.5	(39.3-57.9)		46.9	(40.1-54.0)	
<i>Residence location</i>						0.680			0.312
Not capital	41.0	(37.9-44.2)		38.3	(35.8-40.9)		39.4	(37.4-41.4)	
Capital	44.5	(42.3-46.8)		37.6	(35.5-39.8)		40.7	(39.1-42.3)	
<i>Prenatal care</i>			0.537			<0.001			0.044
No	47.5	(32.2-63.4)		13.1	(6.5-24.5)		29.0	(20.2-39.8)	
Yes	42.5	(40.5-44.5)		38.4	(36.6-40.2)		40.1	(38.7-41.4)	
<i>Prenatal service</i>			0.845			0.127			0.303
Public	42.4	(40.2-44.7)		37.6	(35.5-39.6)		39.6	(38.1-41.1)	
Private	41.9	(37.5-46.5)		41.0	(37.1-45.0)		41.3	(38.4-44.4)	
<i>Prenatal advice on breastfeeding</i>			0.676			0.335			0.244
No	43.2	(39.7-46.8)		39.5	(36.1-42.9)		41.1	(38.7-43.6)	
Yes	42.3	(39.9-44.7)		37.5	(35.4-39.6)		39.4	(37.8-41.0)	
<i>Delivery</i>			0.662			0.087			0.113
Surgical	42.9	(40.0-45.9)		39.8	(37.2-42.4)		41.0	(39.1-43.0)	
Vaginal	42.0	(39.2-44.9)		36.6	(34.0-39.2)		38.8	(36.9-40.8)	

ATTACHED 2

Exclusive breastfeeding prevalence (%) and 95% confidence interval according to sociodemographic, prenatal, delivery, and puerperium care. Study municipalities in the Legal Amazon and Northeast regions, Brazil, 2010

(2 of 2)

Variables	Region						Total			
	Legal Amazon			Northeast			%	95%CI	p*	
	%	95%CI	p*	%	95%CI	p*				
<i>Delivery facility</i>			0.662						0.168	0.694
Public	43.2	(40.9-45.5)		37.3	(35.3-39.3)		39.7	(38.2-41.3)		
Private	39.8	(35.5-44.3)		41.6	(37.5-45.9)		40.9	(37.9-44.0)		
Other	37.1	(23.6-53.0)	0.362	37.6	(27.0-49.6)		37.4	(28.8-46.9)		
<i>Breastfeeding in the first hour of life</i>									0.190	0.003
No	37.9	(34.3-41.8)		36.6	(33.7-39.7)		37.1	(34.8-39.5)		
Yes	44.4	(42.0-46.9)		39.2	(36.9-41.5)		41.5	(39.8-43.2)		
<i>Rooming-in</i>			0.005						0.641	0.245
No	38.7	(32.6-45.1)		36.9	(31.8-42.4)		37.6	(33.7-41.8)		
Yes	42.9	(40.8-45.1)		38.3	(36.4-40.3)		40.2	(38.8-41.7)		
<i>Recent visit from health/FHS agent</i>			0.213						0.024	0.001
No	44.4	(41.8-47.0)		40.3	(37.8-43.0)		42.2	(40.4-44.1)		
Yes	40.0	(37.0-43.2)		36.2	(33.7-38.7)		37.6	(35.7-39.6)		
			0.033							

Note: *Chi-square test.

FHS: Family Health Strategy; 95%CI: Confidence Interval of 95% .

ATTACHED 3

Exclusive breastfeeding Prevalence Ratio (PR) and respective 95%CI adjusted for all variables according to sociodemographic, prenatal, delivery, and puerperium variables. Study municipalities of the Legal Amazon and Northeast regions, Brazil, 2010

(1 of 2)

Variables	Legal Amazon			Northeast		
	PR	95%CI	<i>p</i>	PR	95%CI	<i>p</i>
<i>Child's age (months)</i>			0.000			0.000
0	1			1		
1	0.77	(0.69-0.87)		0.81	(0.73-0.91)	
2	0.68	(0.60-0.78)		0.65	(0.57-0.74)	
3	0.53	(0.46-0.62)		0.47	(0.40-0.55)	
4	0.37	(0.30-0.45)		0.30	(0.24-0.36)	
5	0.16	(0.12-0.21)		0.20	(0.15-0.27)	
<i>Child's gender</i>			0.266			0.598
Male	1			1		
Female	1.06	(0.96-1.16)		1.03	(0.93-1.13)	
<i>Child's birth weight</i>			0.910			0.437
Low	1			1		
Normal	1.01	(0.82-1.25)		1.09	(0.88-1.35)	
<i>Mother's age (years)</i>			0.012			0.001
<20 years	1			1		
20-34 years	1.14	(1.00-1.30)		1.14	(1.00-1.31)	
≥35 years	1.28	(1.03-1.58)		1.42	(1.17-1.71)	
<i>Mother's education level (years)</i>			0.470			0.128
0-7 years	1			1		
8-10 years	1.02	(0.89-1.16)		1.07	(0.93-1.22)	
≥11 years	1.06	(0.93-1.20)		1.10	(0.97-1.25)	
<i>Mother's race</i>			0.106			0.840
White	1			1		
Brown/Black	0.91	(0.80-1.04)		0.97	(0.86-1.09)	
Native/Yellow	0.83	(0.61-1.12)		1.18	(0.97-1.44)	
<i>Residence location</i>			0.004			0.725
Not capital	1			1		
Capital	1.17	(1.05-1.30)		0.98	(0.90-1.08)	
<i>Received prenatal care</i>						
No	1			1		
Yes	omitted			omitted		
<i>Prenatal care service</i>			0.999			0.827
Public	1		0.999	1		
Private	1.00	(0.85-1.18)	0.663	1.02	(0.88-1.18)	
<i>Prenatal advice on breastfeeding</i>						0.986
No	1			1		
Yes	0.98	(0.88-1.08)	0.548	1.00	(0.90-1.12)	
<i>Delivery</i>						0.101
Surgical	1			1		
Vaginal	0.97	(0.87-1.08)	0.198	0.92	(0.83-1.02)	
<i>Delivery facility</i>						0.734
Public	1			1		
Private	0.89	(0.75-1.06)		1.03	(0.88-1.20)	
Other	0.76	(0.45-1.28)		1.05	(0.69-1.60)	

ATTACHED 3

Exclusive breastfeeding Prevalence Ratio (PR) and respective 95%CI adjusted for all variables according to sociodemographic, prenatal, delivery, and puerperium variables. Study municipalities of the Legal Amazon and Northeast regions, Brazil, 2010

(2 of 2)

Variables	Legal Amazon			Northeast		
	PR	95%CI	<i>p</i>	PR	95%CI	<i>p</i>
<i>Breastfeeding in the first hour of life</i>			0.012			0.063
No	1			1		
Yes	1.16	(1.03-1.30)		1.10	(0.99-1.21)	
<i>Rooming-in</i>			0.925			0.739
No	1			1		
Yes	1.01	(0.85-1.200)		0.98	(0.89-1.09)	
<i>Recent visit from health/FHS agent</i>			0.449			0.733
No	1			1		
Yes	0.96	(0.86-1.07)		0.98	(0.85-1.13)	

Note: FHS: Family Health Strategy; 95%CI: Confidence Interval of 95% .

