



# The practice of exclusive breastfeeding and factors associated with its interruption

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## Abstract

**Objective:** To investigate the prevalence of exclusive breastfeeding (EA) and factors associated with its interruption among mothers of children from 0 to 6 months of age in the municipality of Santo Antônio de Jesus -BA. **Method:** Cross-sectional study with 278 mothers, attended in health units of the municipality. Data were collected through interviews. Through hierarchical multiple analysis, a crude and adjusted prevalence ratio (PR), and their respective confidence intervals (95% CI) were calculated. **Results:** The prevalence of exclusive breastfeeding was 39.6%. The variables race/skin color (non-black), primiparity, absence of family support for breastfeeding, dissatisfaction during breastfeeding, and pacifier use were associated with interruption of the outcome. **Conclusion:** The frequency of exclusive breastfeeding was below the indicator recommended by the Ministry of Health. Among the factors that were associated with the interruption of exclusive breastfeeding are socioeconomic characteristics related to reproductive history and lifestyle, as well as conditions related to the child. More effective breastfeeding promotion measures are necessary to mitigate this outcome.

## Introduction

Exclusive breastfeeding, a condition in which the child receives only breast milk in the first six months of life, is considered the ideal method of feeding for infants, especially as it represents an effective means of intervention to reduce infant morbidity and mortality, as well as preventing chronic diseases in the long term [1]. In this sense, if breastfeeding were expanded to almost universal levels, the prevention of annual mortality in children under five years of age would be about 12%, or approximately 820,000 deaths in middle-low-income countries [2].

Although there is worldwide recognition of the advantages of breast milk over the use of artificial milk, breastfeeding rates are generally still low, even in developed countries [3-5]. The World Health Organization (WHO) [6] estimates that in developed countries, the prevalence of children who exclusively breastfeed up to the sixth month of life is 24 to 32%.

In 2008, the percentages of exclusive breastfeeding in Brazil showed a high

weaning rate, since, for children younger than six months of life, only 41% of the children continued breastfeeding, and in the northeast region, especially in Bahia, the values presented were even lower, in the order of 37% and 31.8%, respectively [7,8]. The capital of Bahia, Salvador, presented 36.5% of the children under 6 months in exclusive breastfeeding. In Jussara-BA and Vitória da Conquista - BA, for example, at 6 months of life, the prevalence of infants fed breast milk exclusively is, respectively, 22.14% and 41.68% [7]. Studies conducted in Uberlândia and São Paulo in 2008 reveal that the prevalence rates of exclusive breastfeeding in recent years have increased, although this proportion is below the exclusive breastfeeding target recommended by the Ministry of Health [9,10].

In the municipality of Feira de Santana, in Bahia, in 2001 [11], a prevalence of 38.5% of exclusive breastfeeding was observed in children younger than six months. In another study in the same municipality [12], it was highlighted that of 96.9% of the children who started breastfeeding on the first day of life, only 59.3% continued in exclusive

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breastfeeding at the end of the first month of life.

Although there is generally evidence on the main determinants associated with early weaning, such as sociodemographic, psychosocial, environmental, cultural, biological, and obstetric factors [10,13-16], studies need to identify the factors associated with the frequency and duration of exclusive breastfeeding, so that specific interventions directed to risk factors can be delineated, so as to promote the practice of exclusive breastfeeding.

Given the differences in Brazilian macroregions, and their social inequalities, the conduction of this study that was conducted in northeastern Brazil, specifically in the municipality of Santo Antônio de Jesus, located in the Recôncavo Baiano, is justified due to the lack of information on the practice of exclusive breastfeeding in this region. This research aimed to investigate the prevalence of the practice of exclusive breastfeeding, and to identify the factors associated with its interruption, among mothers of children from 0 to 6 months of age, in the municipality of Santo Antônio de Jesus -BA.

## Methods

### Study design, eligibility criteria, and sample

A cross-sectional study was conducted from June 2013 to January 2014, with 278 mothers of children aged 0 to 6 months, in 17 Health Units, randomly drawn from all urban areas in Santo Antônio de Jesus-BA. Exclusion criteria involved mothers diagnosed with diseases that made it impossible to breastfeed, mothers of children with oral cavity defects that hindered sucking, mothers of newborns diagnosed with diseases that did not allow the ingestion of human milk, as well as any other contraindication for breastfeeding.

To define the sample size, epi info Version 6.04 was used. In addition, a prevalence of 37% of the practice of exclusive breastfeeding in the population of mothers of children younger than six months [16] was assumed as a reference for the sample calculation. An error of 6% and a 95% confidence interval were also adopted. The effect of the sampling design was also corrected, with the use of the correction factor equal to 1.5. The minimum estimated size was 246 participants.

The study was approved by the Research Ethics Committee of the State University of Feira de Santana, under CAAE no. 11908313.0.0000.0053. All participants signed a free and informed consent form.

### Data collection

Data were collected using a questionnaire, applied through direct interviews, by a properly trained nurse. Data were collected on socioeconomic-demographic characteristics, lifestyle, reproductive history, and child-related characteristics, as well as information on the children's diet, according to a food recall of the 24 hours prior to the questionnaire's application.

### Variables

The dependent variable was exclusive breastfeeding, categorized according to the WHO definition [7], in which the child receives only breast milk without the introduction of any other type of solid or liquid food. The interruption of exclusive breastfeeding was defined as when the infants fit the other definitions of feeding: predominant breastfeeding, when

in addition to breast milk, there is the introduction of other liquid foods; supplemented breastfeeding, when in addition to breast milk, solid and semisolid foods are introduced, and, non-breastfeeding, when breastfeeding is not practiced.

In addition, socioeconomic and demographic characteristics: maternal education level, maternal age, maternal skin color, primiparity, marital status, maternal work outside the home, and family income were investigated. Related to reproductive history and lifestyle, the following characteristics were included: planned pregnancy, previous experience of breastfeeding, smoking, alcohol consumption, prenatal care, number of prenatal consultations, trimester that prenatal care started, guidance on breastfeeding during prenatal care, childbirth or postpartum, type of delivery, institution encouraged breastfeeding, breastfeeding in the first hour after delivery, absence of support from family members for breastfeeding, dissatisfaction with breastfeeding and breast changes. And, for factors related to the child: sex, birth weight, absence of medical or nursing follow-up, intercurrent during and/or after birth, non-nutritive sucking habit (pacifier use).

### Data analysis

Descriptive analysis was performed with an estimate of absolute and relative frequencies, socioeconomic-demographic characteristics, reproductive history, lifestyle, and factors related to the child according to the interruption of the practice of exclusive breastfeeding. Pearson's Chi-square test was also used, with a significance level of 5%. Prevalence ratios (PR) were estimated using a hierarchical Poisson model with robust variance and 95% confidence interval.

In stage I – distal hierarchical level, the variables maternal education level (elementary and high school), maternal age ( $\leq 18$  years and  $> 18$  years), maternal skin color (non-black and black), parity (primiparity and multiparity), marital status (with partner and without partner), paid work (yes and no), family income ( $\leq 1$  minimum wage and  $>1$  minimum wage) were included and the association of each of them with the outcome (interruption of exclusive breastfeeding) measured. In this stage, adjustment was made for variables with statistical significance ( $p \leq 0.10$ )

For stage II – intermediate hierarchical level, the following variables were considered predictors and were based on yes or no answers: planned pregnancy; smoking habit; alcohol consumption; guidance on breastfeeding in prenatal care, delivery or puerperium; institution encouraged breastfeeding; breastfeeding in the first hour after delivery; absence of family support for breastfeeding; dissatisfaction with the act of breastfeeding and breast changes. The following variables were also used: number of prenatal consultations ( $< 6$  consultations and  $\geq 6$  consultations); trimester that prenatal care began (2nd and 3rd trimester and 1st trimester); delivery (cesarean or vaginal) and, type of childbirth institution (private and public). In this stage, the adjustment was made for the variables with statistical significance ( $p \leq 0.10$ ), and the significant variables of the previous stage were also included.

In stage 3 – proximal hierarchical level, the predictors were characteristics of the child: gender (male and female); birth weight ( $< 2500$ g and  $\geq 2500$ g); absence of medical or nursing follow-up (yes and no) and, intercurrent during and/

or after birth and non-nutritive sucking habit (pacifier use). Adjustment was made for the variables of stages I and II that presented statistical significance at the level of 5% ( $p \leq 0.05$ ).

The final hierarchical model was composed of variables that presented statistical significance ( $p \leq 0.05$ ) in the three stages. In stages I, II, and III, as well as in the final model, the association was evaluated considering the interruption of exclusive breastfeeding as the outcome. For data analysis procedures, Stata® version 15 software was used.

## Results

The sample of this investigation consisted of 278 mothers, with a minimum age of 14 years and a maximum of 42 years, mean age of 26.3 years  $\pm$  5.83 standard deviation (SD) and median of 26 years, and their respective children from 0 to 6

months of age. The prevalence of exclusive breastfeeding in the sample was 39.6%. It is also worth observing that the practice of mixed or complementary breastfeeding was in the order 94.2%.

Table 1 shows the distribution of sample characteristics, such as socioeconomic-demographic determinants, variables related to reproductive history, and the newborns, according to the interruption of exclusive breastfeeding. Among the factors investigated, the following variables presented statistically significant differences: primiparity ( $p=0.02$ ), non-black maternal skin color ( $p=0.04$ ), births in institutions that did not encourage breastfeeding ( $p<0.01$ ), dissatisfaction regarding breastfeeding ( $p=0.02$ ), no follow-up of the child's development by a doctor or nurse ( $p=0.04$ ) and non-nutritive sucking habit - pacifier use ( $p<0.01$ ).

**Table 1.** Number (n) and percentage (%) of socioeconomic-demographic determinants, variables related to reproductive history and newborns, according to the interruption of exclusive breastfeeding, Santo Antônio de Jesus, BA (n=278).

Characteristics	Interruption of exclusive breastfeeding**		p*
	No %(n)	Yes%(n)	
<b>Maternal education level</b>			
≤ Elementary	36.05 (53)	63.95 (94)	0.20
≥ High school	43.51 (57)	56.49 (74)	
<b>Maternal age</b>			
≤ 18 years	47.37 (9)	52.63 (10)	0.47
> 18 years	39.00 (101)	61.00 (158)	
<b>Skin color</b>			
Black	41.70 (103)	58.30 (144)	0.04
Non-black	22.58 (7)	77.42 (24)	
<b>Parity</b>			
Primiparity	31.18 (53)	68.82 (117)	<0.01
Multiparity	52.78 (57)	47.22 (51)	
<b>Status Marital</b>			
Without partner	41.86 (18)	58.14 (25)	0.73
With partner	39.15 (92)	60.85 (143)	
<b>Paid work</b>			
Yes	26.92 (7)	73.08 (19)	0.16
No	40.87 (103)	59.13 (149)	
<b>Family income</b>			
≤ 1 minimum wage ***	38.71 (12)	61.29 (19)	0.91
> 1 minimum wage	39.68 (98)	60.32 (149)	
<b>Planned pregnancy</b>			
No	42.33 (69)	57.67 (94)	0.26
Yes	35.65 (41)	64.35 (74)	
<b>Smoking habit</b>			
No	40.46 (106)	59.54 (156)	0.22
Yes	25.00 (4)	75.00 (12)	
<b>Alcohol consumption</b>			
Yes	35.48 (55)	64.52 (100)	0.11
No	44.72 (55)	55.28 (68)	

Characteristics	Interruption of exclusive breastfeeding**		p*
	No %(n)	Yes%(n)	
<b>Number of prenatal consultations †</b>			
< 6 consultations	49.15 (29)	50.85 (30)	0.11
≥ 6 consultations	37.85 (81)	62.15 (133)	
<b>Trimester that prenatal care began</b>			
2nd and 3rd trimester or none	47.54 (29)	52.46 (32)	0.15
1st trimester	37.33 (81)	62.67 (136)	
<b>Guidance on breastfeeding in prenatal care, delivery or puerperium</b>			
No	43.48 (40)	56.52 (52)	0.34
Yes	37.63 (70)	62.37 (116)	
<b>Delivery</b>			
Cesarean	43.50 (77)	56.50 (100)	0.07
Vaginal	32.67 (33)	67.33 (68)	
<b>Type of childbirth institution</b>			
Private	45.76 (27)	54.24 (32)	0.28
Public	38.07 (83)	61.93 (135)	
<b>Institution encouraged breastfeeding †</b>			
Yes	38.16 (87)	61.84 (141)	0.30
No	46.00 (23)	54.00 (27)	
<b>Breastfeeding in the first hour after delivery</b>			
No	39.13 (18)	60.87 (28)	0.94
Yes	39.66 (92)	60.34 (140)	
<b>Absence of family support for breastfeeding</b>			
Yes	24.49 (12)	75.51 (37)	0.01
No	42.79 (98)	57.21 (131)	
<b>Dissatisfaction with the act of breastfeeding</b>			
No	41.47 (107)	58.53 (151)	0.02
Yes	15.00 (3)	85.00 (17)	
<b>Breast changes</b>			
Yes	34.48 (40)	65.52 (76)	0.14
No	43.21 (70)	56.79 (92)	
<b>Newborn sex</b>			
Male	44.62 (58)	55.38 (72)	0.10
Female	35.14 (52)	64.86 (96)	
<b>Birth weight</b>			
< 2500g	28.89 (13)	71.11 (32)	0.11
≥ 2500g	41.63 (97)	58.37 (136)	
<b>Absence of medical or nursing follow-up</b>			
No	42.02 (100)	57.98 (138)	0.04
Yes	25.00 (10)	75.00 (30)	
<b>Intercurrence during and/or after birth</b>			
Yes	26.67 (4)	73.33 (11)	0.29
No	40.30 (106)	59.70 (157)	
<b>Non-nutritive sucking habit (pacifier use)</b>			
Yes	27.37 (26)	72.63 (69)	<0.01
No	45.90 (84)	54.10 (99)	

† Variable with missing data; \* P value: significance level ≤ 0.05;

\*\*Exclusive breastfeeding from 0 to 6 months; \*\*\* Minimum wage value at the time of data collection: R\$ 678.00.

**Table 2.** Prevalence ratio (PR) and its respective 95% confidence interval (95% CI) between the variables studied and the interruption of exclusive breastfeeding at the three hierarchical levels, Santo Antônio de Jesus, BA (n=278).

Variables	PR	CI 95%	p*
<b>Stage I - distal hierarchical level: maternal sociodemographic characteristics</b>			
Maternal education level: elementary	0.99	0.81-1.22	0.98
Maternal age: ≤ 18 years	0.79	0.50-1.26	0.33
Non-black maternal skin color	1.45	1.17-1.80	<0.01
Parity: primarity	1.54	1.22-1.94	<0.01
Marital Status: without partner	0.85	0.64-1.14	0.29
Paid work: no	1.25	0.96-1.62	0.08
Family income: ≤ 1 minimum wage	1.02	0.74-1.41	0.86
<b>Stage II - intermediate hierarchical level: reproductive history and maternal lifestyle</b>			
Non-black maternal skin color	1.32	1.07-1.65	<0.01
Parity: primarity	1.52	1.22-1.89	<0.01
Paid work: no	1.25	0.94-1.65	0.11
Planned pregnancy: no	0.87	0.71-1.06	0.16
Smoking habit: yes	1.24	0.87-1.78	0.22
Alcohol consumption: yes	1.04	0.93-1.17	0.41
Number of prenatal consultations: < 6	1.00	1.00-1.00	<0.01
Trimester that prenatal care began: 2, 3 or none	0.88	0.67-1.15	0.37
Guidance on breastfeeding in prenatal care, delivery or puerperium: no	0.97	0.76-1.26	0.87
Type of childbirth institution: private	1.00	0.99-1.00	0.11
Institution encouraged breastfeeding: no	0.77	0.55-1.07	0.12
Breastfeeding in the first hour after delivery: no	1.00	0.76-1.33	0.96
Absence of family support for breastfeeding	1.36	1.11-1.33	<0.01
Dissatisfaction with the act of breastfeeding	1.53	1.17-2.02	<0.01
Breast changes: yes	1.18	0.98-1.43	0.07
<b>Stage III - proximal hierarchical level: newborn characteristics</b>			
Non-black maternal skin color	1.35	1.09-1.68	<0.01
Parity: primiparity	1.51	1.21-1.89	<0.01
Absence of family support for breastfeeding	1.28	1.04-1.58	<0.01
Dissatisfaction with the act of breastfeeding	1.58	1.22-2.05	<0.01
Breast changes: yes	1.09	0.90-1.31	0.35
Newborn sex: male	0.87	0.72-1.05	0.17
Birth weight: < 2500g	1.14	0.91-1.43	0.22
Absence of medical or nursing follow-up	1.18	0.95-1.46	0.12
Intercurrence during and/or after birth: yes	1.09	0.79-1.52	0.57
Non-nutritive sucking habit (pacifier use)	1.28	1.06-1.53	<0.01

\* P-value: significance level ≤ 0.05.

**Table 3.** Adjusted prevalence ratio (PR) and its respective 95% confidence interval (95% CI) between each variable and the interruption of exclusive breastfeeding, Santo Antônio de Jesus, Bahia, Brazil (n=278).

Variables	RP	IC 95%	P*
Non-black Maternal skin color	1.34	1.09-1.65	<0.01
Parity: primiparity	1.49	1.20-1.85	<0.01
Absence of family support for breastfeeding	1.30	1.06-1.59	<0.01
Intercurrence during and/or after birth: yes	1.54	1.21-1.96	<0.01
Non-nutritive sucking habit (pacifier use)	1.31	1.10-1.57	<0.01

\* P-value: significance level ≤ 0.05.

The findings of the hierarchical analysis were described in Tables 2 and 3. Of the variables studied in each stage, non-black maternal skin color (PR= 1.34; CI 95%: 1.09-1.65), primiparity (PR= 1.49; CI95%: 1.20-1.85), lack of family support for breastfeeding (PR= 1.30; CI95%: 1.07-1.60), dissatisfaction with breastfeeding (PR= 1.55; CI95%: 1.22-1.96) and non-nutritive sucking habit - pacifier use (PR= 1.32; CI95%: 1.11-1.57) remained associated with the interruption of exclusive breastfeeding, even after adjustment for other variables.

## Discussion

According to the main findings of the study, it was observed that the prevalence of exclusive breastfeeding of children under or equal to six months was approximately 40% in the sample studied, corroborating the frequency found in a survey of the prevalence of exclusive breastfeeding in Brazilian municipalities in 2010, specifically for the Northeast region, which was around 37% [7]. The national prevalence of exclusive breastfeeding in that study was 41% [7], close to that obtained in the present study.

The frequency of exclusive breastfeeding is still much lower than the ideal, according to WHO parameters, and can be considered as only reasonable, being in the range below 50% [7]. In the present study, it was also detected that almost all of the participating children were breastfed. It may be considered an important finding, since, although most of the children were not in exclusive breastfeeding, a significant portion of them were on mixed or complementary breastfeeding (94.2%), a condition that is relevant for the promotion of the child's health [17].

Among the main findings of the present study, it was found that there was an association between the interruption of exclusive breastfeeding and the following factors: non-black maternal skin color, primiparity, absence of family support for breastfeeding, dissatisfaction in the act of breastfeeding, intercurrent during and/or after birth and non-nutritive sucking habit - pacifier use, with adjustment for the other variables considered in the final model.

Previous studies on factors associated with exclusive breastfeeding support the findings found in the sample of the municipality of Santo Antônio de Jesus – Bahia. There is variability according to the peculiarity of the samples investigated, such as the socioeconomic-demographic characteristics of each population [11,12,18].

Regarding the primiparity factor, in the present study, primiparous mothers breastfed less frequently than multiparous mothers. A similar result was also described in another study [19], where it was observed that the children of multiparous mothers were four times more likely to be breastfed exclusively than those of primiparous mothers. In addition, it is known that the higher risk of weaning of children at six months of age was associated with primiparity [16]. Reinforcing this evidence, multiparity was highlighted as one of the variables positively associated with breastfeeding [11].

Mothers of first children often experience fear, insecurity, and doubts about the management of breastfeeding, since, although milk production is something natural, the practice of breastfeeding is an act that must be learned [20]. In this sense, women without prior preparation can perform the

breastfeeding technique inadequately, leading to breast diseases, such as nipple fissures, breast engorgement, mastitis, as well as contributing to early weaning [21]. Thus, health teams need preparation to teach, encourage, and support the practice of exclusive breastfeeding, especially for primiparous women [22,23].

Regarding the skin color factor, among mothers who declare themselves black, the practice of exclusive breastfeeding was more prevalent than that observed in the group composed of non-black women. This data, although finding support in a previous study [24], should be viewed with caution, since there may be distortions resulting from both self-reference and by the small number of women who declared themselves non-black, and this fact may generate considerable bias with regard to the measure of association. This cautious interpretation is justified, especially when compared to the robust findings of the National Survey of Demography and Health, conducted in 2006, which indicate that the median practice of exclusive breastfeeding, in months, in Brazil, is higher among non-black women [25].

For breastfeeding to be successful for the appropriate time, and a pleasurable act, the mother must have the support of the family and health professionals [26,27]. All are fundamental to the process of exclusive breastfeeding to occur in a peaceful way [1,26-28]. In this study, in addition to the support of health professionals, both satisfaction in breastfeeding and family support were also favorable characteristics for the practice of exclusive breastfeeding.

This support can generate satisfaction in breastfeeding, which can be decisive for good breastfeeding practice since many studies prove that family participation, especially of the father and grandmother, are important factors for the success of breastfeeding [26]. A well-supported woman reduces anxiety, tiredness, pain, doubts, and fears about breastfeeding, thus favoring her balanced hormonal production of oxytocin and prolactin, important for adequate milk production [1,26,29]. It is also known that the presence and help of the husband at home contribute positively to the practice of breastfeeding [30]. In addition, the spouse's approval and attitudes towards breastfeeding are strongly considered by women in the decision to breastfeed or not [27].

There was also an association between non-nutritive sucking habits and the interruption of exclusive breastfeeding practice. This statement is supported by previous research [15,18,20,31]. The action of the muscles exerted during breastfeeding has the function of satisfying the child's sucking demand, in addition to feeding it [31]. In contrast, children who are nursed by bottle receive a much higher flow of milk than that offered in natural breastfeeding, so the child is satisfied, in terms of the food aspect, in less time and less effort [31]. However, emotional pleasure in relation to the sucking impulse is not reached; thus, the child looks for substitutes such as a pacifier [31].

These results suggest that, to better understand the effect of factors involved in the interruption of exclusive breastfeeding, it becomes essential to take into consideration the mediating role of other factors, such as reproductive history and maternal sociodemographic characteristics.

It is emphasized that this study, like all scientific research, has its limitations. The most important is represented by the

type of design employed - cross-sectional, in which the results found do not allow for inference on a causal relationship. However, products of cross-sectional studies such as those presented here, in addition to showing the scenario of the practice of exclusive breastfeeding in the sample investigated, can support policies and strategies for health promotion and protection, with intervention in the main exposure factors that contributed to the outcome studied, that is, the early interruption of exclusive breastfeeding.

## Conclusion

The findings show that the prevalence of exclusive breastfeeding was around 39.6% in children younger than six months in the municipality of Santo Antônio de Jesus-BA, which is considered reasonable by the WHO. Among the factors studied, the following were associated with interruption of exclusive breastfeeding: non-black maternal skin color, primiparity, absence of family support, dissatisfaction with the act of breastfeeding, and presence of non-nutritive sucking habits - pacifier use. Some of the contributing factors for the early interruption of exclusive breastfeeding are modifiable through a change in the attitude of municipal management and the commitment of health professionals to encourage breastfeeding.

Finally, we emphasize the importance of surveys that investigate health indicators that support health promotion policies and practices and that signal intervention measures in the probable risk factors to recover the practice of breastfeeding, whose impact can contribute to the reduction of infant morbidity and mortality.

## Approval of the Research Ethics Committee

Ruling No. 281,434, CAAE 11908313.0.0000.0053 on 05/23/2013 of the State University of Feira de Santana.

## Other authors

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## Responsibility of authorship

MSM, JETB, AAM, GSO, DSA, JKS contributed to the research design, writing and final review of the article.

SSC, ISGF, ACMGF, JSPS, GOV contributed to the formulation of the research question, research design, data analysis, writing and final review of the article.

MSXR, JSS, contributed to the writing and final review of the article.

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