

# Risk factors for the lack of adherence to breastfeeding

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## SUMMARY

**OBJECTIVE:** To evaluate the prevalence of breastfeeding in a metropolitan region in Brasil and to identify factors influencing the lack of adherence to exclusive breastfeeding for 6 months and total breastfeeding for 2 years.

**METHODS:** In this cross-sectional study, demographic and socioeconomic characteristics of mothers and children in pediatric outpatient clinics were analyzed. Logistic regression was performed using the backward stepwise method to analyze factors associated with the lack of breastfeeding compliance.

**RESULTS:** In total, 385 mothers who visited the pediatric outpatient clinics were included. Among the mothers, 38.44% reported exclusive breastfeeding for >6 months and 22.6% reported total breastfeeding for 2 years or more. The predictive factors for the lack of adherence to exclusive breastfeeding for 6 months included single mothers (OR=1.976; 95%CI 1.245–3.135; p=0.004), use of a pacifier (OR=2.25; 95%CI 1.436–3.524; p<0.001), and low birth weight (OR=2.21; 95%CI 1.192–4.102; p=0.012). Predictive factors for the lack of adherence to total breastfeeding for 2 or more years included use of a pacifier (OR=4.82; 95%CI 2.722–8.54; p<0.001), planned pregnancy (OR=0.51; 95%CI 0.305–0.875; p=0.014), and breastfeeding in the first hour of life (OR=0.36; 95%CI 0.208–0.641; p<0.001).

**CONCLUSIONS:** The prevalence of exclusive breastfeeding for 6 months and total breastfeeding for 2 years or more was insufficient in the studied population. Several factors were associated with the lower duration of exclusive breastfeeding and total breastfeeding. The use of a pacifier and no breastfeeding in the first hour were preventable factors associated with both modalities.

**KEYWORDS:** Breast feeding. Risk factors. Child.

## INTRODUCTION

Breast milk is the best and most appropriate source of nutrients, protective factors, and emotional strengthening for the infant. It plays a fundamental role in the ideal health conditions of a child with favorable repercussions throughout life, especially when offered as an exclusive food until the age of 6 months<sup>1</sup>.

Children who are breastfed for longer periods have lower morbidity and mortality related to infectious diseases, lower risk of dental malocclusion, greater intelligence, and possibly lower risk of developing overweight and long-term diabetes<sup>2</sup>.

Additionally, breastfeeding strengthens the maternal bond with the child<sup>3</sup>. Breastfeeding also protects mothers by preventing breast cancer, improving inter-gestational time, and possibly reducing the risk of diabetes and ovarian cancer<sup>2</sup>.

Breastfeeding has benefits such as strengthening the bond with the child<sup>1</sup> and reducing infant mortality<sup>4</sup>. According to the World Health Organization (WHO)<sup>5</sup>, breastfeeding should be exclusive until the age of 6 months and supplemented with other foods until the age of 2 years or more.

Exclusive breastfeeding (EBF) and total breastfeeding times have been insufficient in Brasil and other countries<sup>5</sup>. The prevalence of total breastfeeding for 2 years or more in Brasil was 31.8% in 2013, and the worldwide prevalence was 45% in 2017<sup>6,7</sup>.

The prevalence of exclusive breastfeeding for 6 months or more in all Brazilian capitals and Federal Districts was 41.3% in 2008. The median duration of EBF was 54.1 days (1.8 months), and the median total breastfeeding duration was 341.6 days

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(11.2 months)<sup>6,8,9</sup>. The global prevalence of EBF was 35.7% in 2013, while the WHO has proposed a target prevalence of 50% by 2025<sup>6,9</sup>.

Several factors, including socioeconomic conditions of the family, no breastfeeding within the first hour of life, and reduced access to education, are associated with shorter duration of breastfeeding<sup>10,11</sup>. Unconfirmed associations have been suggested with respect to factors that reduce EBF and total breastfeeding durations<sup>12</sup>.

The present study aimed to identify factors associated with the lack of adherence to EBF for 6 months and total breastfeeding for up to 2 years of age and evaluate the prevalence of these modalities in a metropolitan region in Brasil.

## METHODS

### Study design

Cross-sectional and observational study

### Ethical aspects

The study was approved by the Ethics and Research Committee (CAAE 79849817.7.0000.0082). It was performed in accordance with the regulations of the Declaration of Helsinki.

### Participants

Mothers whose children were cared for by the pediatric outpatient clinics of *Faculdade de Medicina do ABC*, in Santo André, were selected and interviewed in 2018. The Free and Informed Consent Term was signed by all included mothers. Mothers with breastfeeding children, mothers with children over 12 years of age, and mothers under 18 years of age were excluded.

### Variables

Demographic data of mothers included color, education, marital status, family income, and number of people living in the house. Data related to gestational antecedents included number of children and abortions, type of delivery and complications, whether the pregnancy was planned, and age at the time of delivery.

Data related to children included date of birth, weight at birth, gestational age, and use of a pacifier. Mothers were asked about breastfeeding in the first hour of life and the duration of EBF and total breastfeeding in months.

Dependent variables included EBF for <6 months and total breastfeeding for <2 years.

### Sample size calculation

Sample size calculation was based on a study of risk factors for non-adherence to EBF conducted in the city of São Paulo. Considering maternal age under 20 years with a 19.6% prevalence of EBF (prevalence ratio of 0.53), the ideal sample size was 224. Considering the condition of not working away from home with a 28.2% prevalence of EBF (prevalence ratio of 1.8), the ideal sample size was 126. Adding both these results, the ideal sample size was 350 participants<sup>13</sup>.

### Statistical analysis

Qualitative variables are presented as frequency and percentage, and quantitative variables are presented as mean and standard deviation or median and percentiles (p25–p75) depending on normality. The Shapiro-Wilk test was used to analyze data distribution.

To evaluate factors associated with EBF for ≤6 months and with total breastfeeding for <2 years, logistic regression was performed using the stepwise regression method. The inclusion parameter for the variables was  $p < 0.20$ . Subsequently, variables with  $p \geq 0.05$  were excluded. The significance level was set at 5%. All analyses were performed using the Stata<sup>®</sup> software version 11.0 (StataCorp LLC, College Station, TX, USA).

## RESULTS

### Sociodemographic data

In total, 385 mothers were interviewed at the pediatric outpatient clinics of *Faculdade de Medicina do ABC*, in Santo André, Brasil. Most mothers were married (57.66%), white (47.01%), and had completed high school education (59.22%). The median number of children, median number of abortions, and median number of people living in the same home were 2, 0, and 4, respectively. The median family income was R\$ 1,547.00 (Table 1). The current average maternal age was 35 years, and the average age of the mothers at the time of delivery was 28 years.

### Child data and birth

The majority of deliveries took place at term (73.77%), and most of them were performed via cesarean section (53.51%). The median age of the mothers at the time of delivery was 28 years. Overall, 79.22% of mothers reported no complications at the time of delivery. Pregnancy was not planned in most mothers (54.03%). Low birth weight and use of a pacifier were reported in 20.63 and 48.57% of children, respectively (Table 1).

Table 1. Participants characteristics.

Characteristics	n	%
Marital status		
Married	222	57.66
Single	163	42.34
Color		
White	181	47.01
Black	52	13.51
Brown	148	38.44
Yellow	4	1.04
Education		
Illiterate	3	0.78
Incomplete elementary school	55	14.29
Complete elementary school	24	6.23
Incomplete high school	29	7.53
Complete high school	228	59.22
Did not complete higher education	5	1.3
Completed higher education	41	10.65
Time of delivery		
Preterm	71	18.44
Term	284	73.77
Post-term	30	7.79
Type of delivery		
Cesarean section	206	53.51
Normal or natural	179	46.49
Complications during delivery		
No	305	79.22
Yes	80	20.78
Low birth weight		
No	300	79.37
Yes	78	20.63

Characteristics	n	%
Forceps		
No	365	94.81
Yes	20	5.19
Used pacifier?		
No	198	51.43
Yes	187	48.57
Planned pregnancy		
No	208	54.03
Yes	177	45.97
Breastfeeding in the first hour of life		
No	165	42.86
Yes	220	57.14
Exclusive breastfeeding for more than 6 months		
No	237	61.56
Yes	148	38.44
Breastfeeding for more than 2 years		
No	298	77.4
Yes	87	22.6
	<b>Median</b>	<b>Percentiles (25–75)</b>
Number of children	2	1–3
Number of abortions	0	0–0
Age at the time of delivery.	28	23–35
Number of people living in the house	4	3–5
Family income	R\$ 1,500.00	R\$ 900.00–R\$ 2,500.00

### Breastfeeding data

In total, 57.14% of mothers reported breastfeeding within the first hour after giving birth. EBF for 6 months or more and breastfeeding for 2 years or more were reported by 38.44 and 22.6% of mothers, respectively (Table 1).

### Factors associated with exclusive breastfeeding <6 months and total breastfeeding duration <2 years

Independent predictors for EBF for <6 months included marital status, gestational age, low birth weight, use of a pacifier, breastfeeding in the first hour of life, and unplanned pregnancy (Table 2).

Independent predictors for total breastfeeding duration <2 years included marital status, gestational age, use of a

pacifier, breastfeeding in the first hour, and unplanned pregnancy (Table 2).

The final predictors for EBF <6 months included marital status, use of a pacifier, breastfeeding in the first hour, and low birth weight. Single mothers had a higher risk of not completing EBF for 6 months than married ones (OR=1.976; 95%CI 1.245–3.135; p=0.004). Children who used a pacifier exhibited a two times greater risk of EBF for <6 months than those who did not use a pacifier (OR=2.25; 95%CI 1.436–3.524; p<0.001). Children with lower birth weight had a two times greater risk of EBF for <6 months (OR=2.21; 95%CI 1.192–4.102; p=0.012).

Mothers who breastfed in the first hour after birth had a lower risk of not adhering to EBF for 6 months (OR=0.048; 95%CI 0.281–0.714; p=0.001). Women with planned pregnancies

**Table 2.** Association between analyzed variables and duration of exclusive and total breastfeeding.

	Exclusive breastfeeding		p*	Total breastfeeding		p*
	<6 months	≥6 months		<2 years	≥2 years	
	n (%)			n (%)		
Marital status						
Married	120 (54.05)	102 (45.94)	<0.001	162 (72.97)	60 (27.02)	0.015
Single	117 (71.77)	46 (28.22)		136 (83.43)	27 (16.56)	
Color						
White	110 (60.77)	71 (39.22)	0.672	138 (76.24)	43 (23.75)	0.683
Black	30 (57.69)	22 (42.3)		41 (78.84)	11 (21.15)	
Brown	95 (64.18)	53 (35.81)		116 (78.37)	32 (21.62)	
Yellow	2 (50)	2 (50)		3 (75)	1 (25)	
Education						
Illiterate	1 (33.33)	2 (66.66)	0.593	3 (100)	0 (0)	0.913
Incomplete elementary school	37 (67.27)	18 (32.72)		42 (76.36)	13 (23.63)	
Complete elementary school	10 (41.66)	14 (58.33)		13 (54.16)	11 (45.83)	
Incomplete high school	20 (68.96)	9 (31.03)		25 (86.2)	4 (13.79)	
Complete high school	144 (63.15)	84 (36.84)		182 (79.82)	46 (20.17)	
Did not complete higher education	5 (100)	0 (0)		5 (100)	0 (0)	
Completed higher education	20 (48.78)	21 (51.21)		28 (68.29)	13 (31.7)	
Time of delivery						
Preterm	55 (77.46)	16 (22.53)	0.024	61 (85.91)	10 (14.08)	0.044
Term	163 (57.39)	121 (42.6)		216 (76.05)	68 (23.95)	
Post-term	19 (63.33)	11 (36.66)		21 (70)	9 (30)	
Type of delivery						
Cesarean section	134 (65.04)	72 (34.95)	0.205	165 (80.09)	41 (19.9)	0.217
Normal or natural	103 (57.54)	76 (42.45)		133 (74.3)	46 (25.98)	
Complications during delivery						
No	183 (60)	122 (40)	0.220	236 (77.37)	69 (22.62)	0.981
Yes	54 (67.5)	26 (32.5)		62 (77.5)	18 (22.5)	
Low birth weight						
No	173 (57.66)	127 (42.33)	<0.001	226 (75.33)	74 (24.66)	0.135
Yes	61 (78.2)	17 (21.79)		65 (83.33)	13 (16.66)	

Continue...

Table 2. Continuation.

	Exclusive breastfeeding		p*	Total breastfeeding		p*
	<6 months	≥6 months		<2 years	≥2 years	
Forceps						
No	227 (62.19)	138 (37.8)	0.275	285 (78.08)	80 (21.91)	0.173
Yes	10 (50)	10 (50)		13 (65)	7 (35)	
Used pacifier?						
No	105 (53.03)	93 (46.96)	<0.001	131 (66.16)	67 (33.83)	<0.001
Yes	132 (70.58)	55 (29.41)		167 (89.3)	20 (10.69)	
Planned pregnancy						
No	138 (66.34)	70 (33.65)	0.036	171 (82.21)	37 (17.78)	0.014
Yes	99 (55.93)	78 (44.06)		127 (71.75)	50 (28.24)	
Breastfeeding in the first hour of life						
No	122 (73.93)	43 (26.06)	<0.001	142 (86.06)	23 (13.93)	<0.001
Yes	115 (52.27)	105 (47.72)		156 (70.9)	64 (29.09)	
	Median (95%CI)		p**	Median (95%CI)		p**
Number of children	2 (2–2)		0.536	2 (2–2)		0.812
Number of abortions	0 (0–0)		0.905	0 (0–0)		0.544
Age at the time of delivery	28 (26–29)		0.563	28 (26–29)		0.304
Number of people living in the house	4 (4–4)		0.237	4 (4–4)		0.151
Family income	R\$ 1,300.00 (R\$ 1,100.00– R\$ 1,500.00)	R\$ 1,550.00 (R\$ 1,500.00– R\$2,000.00)	0.104	R\$ 1,375.00 (R\$ 1,145.49–R\$ 1,500.00)	R\$ 2,000.00 (R\$ 1,500.00– R\$ 2,000.00)	0.024

CI: confidence interval; \* $\chi^2$  test; \*\*Wilcoxon rank-sum (Mann-Whitney) test.

had a lower prevalence of early weaning (OR=0.665; 95%CI 0.424–1.042; p=0.075) (Table 3).

The final predictors for lower adherence to breastfeeding for 2 years or more included pacifier use, unplanned pregnancy, and no breastfeeding within the first hour after birth. Children using a pacifier exhibited a five times greater risk of breastfeeding for <2 years than those who did not use a pacifier (OR=4.82; 95%CI 2.722–8.54; p<0.001). There was a tendency for single mothers to breastfeed for <2 years (OR=1.714; 95%CI 0.99–2.967; p=0.054). Mothers with planned pregnancies (OR=0.517; 95%CI 0.305–0.875; p=0.014) and those who breastfed in the first hour after birth (OR=0.365; 95%CI 0.208–0.641; p<0.001) had a lower prevalence of early weaning (before 2 years of age) (Table 3).

## DISCUSSION

The main observation in the present study was that the percentage of mothers who followed EBF for 6 months and total breastfeeding for 2 years was unsatisfactory. Several factors are associated with reduced breastfeeding duration, some of which are modifiable. The use of a pacifier was a common factor for early interruption of both modalities of breastfeeding.

The prevalence of EBF for >6 months was 38.44%, which was considerably lower than the WHO target of 50% for 2025<sup>9</sup>. The prevalence of breastfeeding for 2 years or more was 22.6%.

EBF for <6 months was associated with low birth weight in this and in other studies. Other studies that corroborate this finding have suggested that newborns with low birth weight spend more time in the intensive care unit or have sucking or

**Table 3.** Logistic regression for exclusive breastfeeding for 6 months and total breastfeeding for 2 years.

Characteristics	OR (95%CI)	p
<b>Exclusive breastfeeding for 6 months</b>		
Marital status		
Single	Ref	0.004
	1.976 (1.245–3.135)	
Pacifier		
Yes	Ref	<0.001
	2.25 (1.436–3.524)	
Planned pregnancy		
Yes	Ref	0.075
	0.665 (0.424–1.042)	
Breastfeeding in the first hour of life		
Yes	Ref	0.001
	0.048 (0.281–0.714)	
Low birth weight		
Yes	Ref	0.012
	2.21 (1.192–4.102)	
<b>Total breastfeeding for 2 years</b>		
Marital status		
Single	Ref	0.054
	1.714 (0.99–2.967)	
Pacifier		
Yes	Ref	<0.001
	4.82 (2.722–8.540)	
Planned pregnancy		
Yes	Ref	0.014
	0.517 (0.305–0.875)	
Breastfeeding in the first hour of life		
Yes	Ref	<0.001
	0.365 (0.208–0.641)	

swallowing difficulties. Moreover, they receive infant formulas earlier than other newborns<sup>14,15</sup>. Maternity hospitals associated with *Faculdade de Medicina do ABC* participate in the initiative of the Ministry of Health, which prioritizes the use of human milk in nutritional therapy for hospitalized newborns.

Studies have demonstrated the relationship between the use of a pacifier and the reduction of EBF observed in the present study. This finding might be attributed to the fact that the use of a pacifier results in a reduced number of feeds per day, leading to reduced milk production. Moreover, owing to the so-called nozzle confusion, the child can no longer breastfeed correctly because of the pacifier<sup>16,17</sup>. A correlation was observed between increased EBF and a reduction in the use of pacifiers in Brasil, a modifiable element that influences the duration of breastfeeding<sup>18</sup>.

Single mothers exhibited shorter EBF time of up to 6 months, suggesting that social and family support influence breastfeeding duration<sup>15</sup>.

In contrast, mothers who breastfed within the first hour after the birth of their child were more likely to complete EBF for 6 months, which may be attributed to the fact that the interaction between the mother and child in the first hour of life contributes to a greater connection and production of oxytocin, which is essential for milk ejection<sup>19</sup>. This association has already been described in medical literature<sup>20</sup>.

A trend toward reduced duration of EBF was observed in cases of unplanned pregnancy ( $p=0.075$ ). A similar finding has been reported in another study and is probably attributed to the fact that mothers who were not prepared for pregnancy were not prepared for breastfeeding as well<sup>21</sup>.

Shorter EBF duration (<6 months) and shorter total breastfeeding duration were associated with the use of pacifiers, as previously reported<sup>22</sup>. A possible explanation for this finding is that the pacifier reduces the number of feeds per day, which leads to reduced milk production<sup>23</sup>. Similarly, women who breastfed during the first hour after the birth of their child exhibited a greater tendency to follow the recommended breastfeeding duration, which can be justified by the greater emotional bond built in the early stages of life, an association described in previous studies<sup>11,21</sup>.

There was a lower tendency for single mothers to breastfeed for 2 or more years. This finding was also associated with exclusive breastfeeding and has been verified in previous studies, reiterating the importance of aggregating social and family elements<sup>24,25</sup>.

## Limitations

The present study had some limitations. It was a cross-sectional and observational study. Hence, we could not establish cause-and-consequence relationships. Moreover, the collected

information was reported by mothers, which may have led to recall bias. No data were collected about the professions of the mothers or the presence of maternity leave, which might be among the causal factors of early interruption of EBF.

Future prospective studies with larger sample sizes should be performed to prove the hypotheses suggested in this cross-sectional study.

## CONCLUSIONS

The prevalence of EBF for 6 months and total breastfeeding for up to 2 years was insufficient in the studied population. Several factors were associated with reduced breastfeeding duration in both the modalities, some of which being modifiable.

Therefore, paying attention to factors that limit breastfeeding may contribute to an increase in the prevalence of breastfeeding in the future.

## AUTHORS' CONTRIBUTIONS

**KCT:** Conceptualization, Data Curation, Formal Analysis, Writing – Original Draft

Writing – Review & Editing. **LRS:** Conceptualization, Data Curation, Writing – Original Draft, Writing – Review & Editing.

**LSM:** Conceptualization, Data Curation, Writing – Original Draft, Writing – Review & Editing. **ROSS:** Conceptualization, Formal Analysis, Writing – Original Draft, Writing – Review & Editing.

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