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Original Article

## Factors Related to the Practice of Exclusive Breastfeeding in Different Cities of the States Minas Gerais and Bahia, Brazil

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### Abstract

**Objective:** To evaluate the factors related to the time of exclusive breastfeeding (EBF) in infants from Pará de Minas and Três Corações (Minas Gerais) and Brumado (Bahia), Brazil. **Material and Methods:** All mothers attended in public and private hospitals of these cities between June and December 2012 (n=156) were invited to answer an interview related to EBF. Data were collected: (1) at maternity ward; (2) at 4 and (3) 6 months of the infant's life. In (2) and (3), data were collected by phone. Data were recorded in the SPSS software, and descriptive analyses and association of exposure and outcome variables related to the practice of EBF were performed. The chi-square test was used, considering  $p < 0.05$ . **Results:** The total of women was in (1) 156, (2) 104 and (3) 123, and the EBF rate was 50.0%, 39.0% and 4.8%, respectively. In (1) mothers with lower schooling level have opted for EBF more frequently. In (1), the use of bottle did not interfere in EBF; on the other hand, in (2) and (3), the use of bottle has decreased the frequency of EBF ( $p < 0.05$ ). **Conclusion:** The ideal frequency of EBF recommended by WHO to the six months of the infant's life is not followed in the evaluated cities. In addition, EBF can be influenced by the use of bottle and maternal schooling level.

**Keywords:** Breast Feeding; Feeding Behavior; Bottle Feeding.

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## Introduction

The concept of EBF presupposes that the child receives only breast milk, without adding water, teas, juices and other liquids or solids (except drops or syrups of vitamins, mineral supplements or other medicines), which should be practiced at least until six months of age [1].

EBF may have a protective effect against childhood obesity [2], prevents diarrhea and acute respiratory infections, promotes correct orofacial development, and prevents the introduction of deleterious oral habits and oral breathing [3]. EBF can reduce hospital admissions due to pneumonia [4], and helps prevent anemia [5]. There are also benefits for mothers who breastfeed: easier uterine involution, less chance of developing breast cancer, makes mother feel singular pleasure when breastfeeding her child and in most cases protects mother from a new gestation. Breast milk is the cheapest and safest feeding method for infants [6]. For these reasons, the World Health Organization (WHO) [6], the United Nations Children's Fund (UNICEF) [7] and the Ministry of Health advocate the EBF practice until six months of age and complementary breastfeeding until at least two years of age.

In 2001, a national survey [8] on the prevalence of breastfeeding in Brazilian capitals and in the Federal District found that only 9.7% of mothers performed EBF until the sixth month, a rate considered to be poor by WHO. After this study, several campaigns for the dissemination of EBF were carried out, but in the last national survey [9] conducted in 2008, the prevalence of EBF in children under six months was 41% in all Brazilian capitals and in the District Federal, a percentage higher than that found in 2001, but still lower than that desired and classified as reasonable by WHO [8,9]. More recent data have not yet been released by the Ministry of Health.

Several factors such as cultural practices and beliefs, lack of maternal confidence in their ability to breastfeed, lack of knowledge of the importance of EBF for the health of both child and mother, inadequate promotion of breast milk substitutes, and wrong practices of health professionals and services are strongly related to the low EBF index [10]. However, there is still no consensus about the factors that may interfere with the practice of exclusive breastfeeding. In addition, national surveys [8,9] bring data related to Brazilian capitals and countries with extensive territory such as Brazil, concluding that cultural diversity may interfere with the practice of EBF. In smaller cities with high birth rates, the practice of EBF has not been adequately investigated.

Thus, knowing that each health professional plays an important role in guiding and encouraging mothers to comply with EBF according to WHO recommendations, the aim of this study was to investigate the factors associated with the exclusive breastfeeding (EBF) practice in three cities: Pará de Minas and Três Corações in Minas Gerais (MG) and Brumado in Bahia (BA).

## Material and Methods

### Ethical Aspects

This study was approved by the Human Research Ethics Committee of the São Leopoldo Mandic School, under protocol 2012/0065. After approval, the administrators of all public and private hospitals of the selected municipalities with signature of consent terms were contacted.

#### Data Collection

The cities participating in data collection were selected by the receptivity of health administrators to consent to data collection and by their geographic location (Pará de Minas located in the vicinity of the capital of Minas Gerais, Três Corações at the southern region of the state of MG and almost on the border with the State of Minas, a city in Bahia, Brumado). Despite different local indicators, health services of the three cities and the birth records do not show great differences among them:

(1) Pará de Minas (MG): 91,989 inhabitants, territorial area of 551,247 km<sup>2</sup>; Gross Domestic Product (GDP) of R\$ 1.725,886 thousand and Human Development Index (HDI) of 0.725, considered high. Pará de Minas had, in 2009, 50 health facilities, 25 of them private and 25 public health units. In 2011, the local records of these hospitals counted 1,133 live births [11].

(2) Três Corações (MG): 78,474 inhabitants, territorial area of 828,038 km<sup>2</sup>, GDP of R\$ 1.758,842 thousand, HDI of 0.744, considered high. Três Corações had, in 2009, 50 health facilities, 25 of them private and 25 public health units. In 2011, 1,254 live births were recorded in the city [11].

(3) Brumado (BA): 69,473 inhabitants, territorial area of 2,226,796 km<sup>2</sup>, GDP of R\$ 416.697,749 thousand, HDI of 0.656, considered intermediate. In 2009, Brumado had 42 health facilities, 22 private and 20 public health units. In 2011, 1,454 live births were recorded in health care facilities in the city [11].

Thus, representing the parturient population of these three cities, all mothers attended in public and private hospitals of these cities surveyed from June to December 2012 were invited to participate in this study. Those present in the hospital within 72 hours postpartum were considered eligible. On the other hand, hospitals that refused to authorize the survey; mothers of preterm infants (born up to 35 weeks gestation) or hospitalized in Intensive Care Unit (ICU); mothers who refused to participate in the study; mothers whose children had special needs and mothers with health problems or signs of postpartum depression were excluded from the study. In total, 156 mothers were selected. The study participants signed an Informed Consent Term (ICF) and were then interviewed at the hospital (collection time 1), assessing the time of exclusive breastfeeding, maternal schooling, whether they worked or not (whether or not they have maternity leave) and time of introduction to the use of feeding bottle by infants. The same questionnaire was reapplied by telephone contact at 4 (collection time 2) and 6 months of age (collection time 3). At all collection times, a single trained interviewer applied the questionnaires so as not to interfere with parturients' responses.

For the evaluation of the time or mode of breastfeeding taken as outcome variable, the WHO classification [6] was used, which considers: Exclusive Breastfeeding – breast milk as the sole source

of food; Predominant Breastfeeding - breast milk is the main source of food, but the infant also receives other liquids (water, teas, juices, etc.). In this case, children who receive other milk and / or semi-solid foods are not included; Complete Breastfeeding: breast milk supplemented with other types of milk and / or other liquids; Complementary Breastfeeding: the infant receives breast milk and semi-solid and / or solid foods; and Non-Breastfeeding: the infant no longer receives breast milk.

Maternal schooling level was categorized as: complete or incomplete 1<sup>st</sup> to 4<sup>th</sup> grades; complete or incomplete 5<sup>th</sup> to 8<sup>th</sup> grades; complete or incomplete high school or higher education. Whether the parturient was working or not at the time of child birth was evaluated from maternity leave certification of 4 or 6 months (collection times 1 and 2). The same reasoning was applied to the identification of the use of bottle or not. These last three variables were taken as exposure factors.

### Statistical Analysis

Data were recorded in the SPSS software, and descriptive analyses and association of exposure and outcome variables related to the practice of EBF were performed. Only dichotomous and qualitative variables were used for the association analysis. Thus, variable schooling level was grouped at levels up to complete high school or complete or incomplete higher education. The others (employment bond or bottle use) were collected with affirmative or negative responses. The chi-square test was used, considering  $p < 0.05$ .

### Results

None of the mothers who were invited to participate in the study refused to respond to the interview. The total number of participants in (1) was 156 mothers, (2) 123 mothers and (3) 104 mothers. Thus, in the last collection time, when infants aged 6 months, the follow-up loss rate was 33.3%.

None of the mothers were illiterate; 5 had complete 1<sup>st</sup> to 4<sup>th</sup> grades, 7 incomplete 1<sup>st</sup> to 4<sup>th</sup> grades; 32 mothers had complete 5<sup>th</sup> to 8<sup>th</sup> grades and 13 incomplete 5<sup>th</sup> to 8<sup>th</sup> grades; 49 mothers had complete high school and 32 incomplete high school. Only 12 mothers had complete higher education and 6 mothers reported not having completed higher education. Still in the maternity ward (collection time 1), only 30.7% (about 48 mothers) of participants reported having employment bond, with maternity leave of 4 months approximately 26% of mothers and 6 months approximately 28.8%.

Only two infants (1.3%) used bottle in the maternity ward, while 69 (56.1%) and 64 (61.5%) infants had the first contact with feeding bottle at 4 and 6 months, respectively.

The EBF rate found in (1), (2) and (3) was 50.0%, 39.0% and 4.8%, respectively. Mothers who reported following EBF in the maternity ward said to follow the recommendations of WHO, Unicef and the Ministry of Health, and almost all infants no longer received breast milk as their sole source of nutrition at six months of age (Table 1).

**Table 1. Absolute and relative frequency distribution of children born in public and private institutions of Pará de Minas, Três Corações (Minas Gerais) and Brumado (Bahia), according to the type of food received at the maternity ward until 72 hours postpartum (time 1); at 4 (time 2) and 6 months of life (time 3).**

Type of Food	Time 1	Time 2	Time 3
	N (%)	N (%)	N (%)
Exclusive breastfeeding	78 (50%)	48 (39%)	5 (4.8%)
Predominant breastfeeding	3 (2.0%)	14 (11.4%)	0 (0%)
Complete breastfeeding	74 (47.3%)	26 (21.1%)	3 (2.9%)
Complementary breastfeeding	1 (0.7%)	12 (9.8%)	65 (62.5%)
Non-breastfeeding	0 (0%)	23 (18.7%)	31 (29.8%)

\*OMS classification<sup>14</sup>; \*\*Considering at time (1) n = 156; at (2) n = 123 and at (3) n = 104.

Table 2 shows data collected at the first evaluation time. With the increase of maternal schooling level, the practice of EBF decreases. The introduction of feeding bottle in the infant's nutritional habits and the fact that the mother worked did not interfere in the EBF at the time of birth.

**Table 2. Influence of explanatory variables (maternal schooling, employment bond at child birth and use of bottle still in the maternity ward up to 72 hours postpartum) on EBF practice (n = 156).**

Variables		Exclusive Breastfeeding		Total	p-value
		Yes N (%)	No N (%)	N (%)	
Maternal schooling	Up to incomplete high school	52 (58.6%)	37 (41.4%)	89 (100%)	0.016
	Up to complete high school and / or complete or incomplete higher education	26 (38.5%)	41 (61.5%)	67 (100%)	
Employment bond	Yes	24 (52.3%)	21 (47.7%)	45 (100%)	>0.05
	No	54 (49.1%)	57 (50.9%)	111 (100%)	
Bottle use	Yes	0 (0%)	2 (100%)	2 (100%)	>0.05
	No	78 (50.7%)	76 (49.3%)	154 (100%)	

At the second collection time, we observed that contact with the bottle interfered with the EBF practice (Table 3).

**Table 3. Influence of explanatory variables (maternal schooling, employment bond at child birth and use of bottle up to the first 4 months of life) on EBF practice (n = 123).**

Variables		Exclusive Breastfeeding		Total	p-value
		Yes N (%)	No N (%)	N (%)	
Maternal schooling	Up to incomplete high school	27 (40.9%)	39 (59.1%)	66 (100%)	>0.05
	Up to complete high school and / or complete or incomplete higher education	21 (36.8%)	36 (63.2%)	57 (100%)	
Employment bond	Yes	17 (52.3%)	15 (47.7%)	32 (100%)	>0.05
	No	31 (34%)	60 (66%)	91 (100%)	
Bottle use	Yes	0 (0%)	59 (100%)	59 (100%)	<0.001
	No	48 (75%)	16 (25%)	64 (100%)	

Similarly to what was observed at time (2), six-month-old children who had contact with the bottle were no longer fed by EBF at the third evaluation time (Table 4). In addition, EBF practice was influenced by maternal schooling.

**Table 4. Influence of explanatory variables (maternal schooling, employment bond at child birth and use of bottle up to the first 6 months of the life) on EBF practice (n = 104).**

Variables		Exclusive Breastfeeding		Total	p-value
		Yes N (%)	No N (%)	N (%)	
Maternal schooling	Up to incomplete high school	1 (1.1%)	91 (98.9%)	92 (100%)	<0.001
	Up to complete high school				
	and / or complete or incomplete higher education	4 (33.3%)	8 (66.7%)	12 (100%)	
Employment bond	Yes	1 (3.3%)	29 (96.7%)	30 (100%)	>0.05
	No	4 (5.4%)	70 (94.6 %)	74 (100%)	
Bottle use	Yes	0 (0%)	69 (100%)	69 (100%)	0.001
	No	5 (14.3%)	30 (85.7%)	35 (100%)	

## Discussion

EBF is fundamental for the infant's health, being a key factor for the reduction of infant mortality. However, its practice has not yet been performed as established by WHO [1]. Thus, it is important to know the factors that are associated with EBF practice. Additionally, we believe that the breastfeeding habit may suffer regional cultural influence, and Brazil is a continental dimension country, with a wide variety of beliefs and habits. Thus, we investigated the factors associated with EBF practice in Brumado, Pará de Minas and Três Corações, cities of the state of Minas Gerais and Bahia with different social indicators, but with similar health services and birth records [11].

The second data collection time was performed when infants completed 4 months of age, the time of the end of the period of maternity leave under Brazilian legislation and also the beginning of the introduction of other foods, recommended by some pediatricians. The third and final data collection time was performed when infants completed 6 months of age, a period determined by WHO [6], Unicef [7] and Ministry of Health to EBF practice and maternity leave benefit offered by most private and public companies.

At all collection times, none of the mothers refused to respond to questionnaires when contacted. Thus, the loss of participants in this study, although being 33.3%, especially at the last collection time, reached a value accepted in systematic reviews [12,13] as follow-up loss rates for inclusion of longitudinal studies. We believe that this difficulty was caused by the loss of contact with selected mothers, who could not be reached by contact phones or changed their address. Previous data on EBF in the municipality of Itaúna (also in the State of MG), identified variables that interfered with this practice. In this longitudinal study, 246 mothers present at the maternity ward were interviewed with monthly follow-up done by telephone contact or home visit for 12 months. At the end of the research, a large sample loss was observed (61.50%) [14]. This loss was greater than that found in the present study; however, the follow-up was performed for a longer period. The difference among studies published in Brazil and worldwide regarding the loss of participants is directly related to the type of study proposed by the authors, the form of interviews (telephone contact or home visit) and the time participants were followed, which indicates that the longer the study period, the greater the sample loss percentage [12,13,15,16].



In spite of the present expectation of working with a population strategy where all parturients from the cities involved in data collection were invited to participate, further investigations involving a larger number of participants are necessary, even at national level, especially in Brazil, which is a country of great socio-economic-cultural adversities. Ethnicity has been pointed out as a significant predictor of how breastfeeding is performed in large continents such as Asia or Africa [16,17]. Thus, within the limitations of the present study, we have found explanatory variables that have been discussed in the EBF practice, but larger studies can increase knowledge in this area.

In the present study, at birth, a small percentage of children used the feeding bottle (1.3%), but this percentage increased considerably at four and six months of life. Thus, we found a significant association between EBF and bottle feeding. The introduction of pacifier or bottle makes the child to lose interest in breast milk, because the suction movement to perform it requires a greater effort, the opposite of what occurs in the suction of the bottle. Such an occurrence has been named as "confusion of nipples", and it is difficult to find a causal relationship involved in this phenomenon, since other social and psychological characteristics of mothers and infants can also interfere with EBF [18].

The feeding bottle, in addition to negatively influencing the child's orofacial development, is associated with a greater chance of developing deleterious oral habits and malocclusions, also negatively influencing the EBF practice [19,20]. Still according to the authors, mothers with nipple traumas offer bottles to their children with the intention of spacing feedings, which can lead to lower milk production, increasing bottle use and replacing EBF.

An increase in bottle feeding can be observed as the child develops. Thus, other authors have shown that, at seven days of life, 21.3% of infants already use the bottle and at 30 days of life, this percentage increases to 46.9%, and the influence and support of maternal grandmother are usually related to the introduction of the feeding bottle [19]. The influence of maternal and paternal grandparents on bottle feeding for infants and consumption of water, teas and other types of milk has also been demonstrated in a recently published systematic review [21,22]. In the present study, grandmother influence as an exposure variable was not evaluated.

The association between maternal schooling and EBF was also investigated. Sons of mothers who had incomplete high school had higher EBF rate, as opposed to infants with mothers who had completed higher education. However, this phenomenon occurred only at the initial data collection time [23]. This result has a connection with a conceptual evolution: mothers with higher schooling level usually leave their homes to work every day, leaving their children to the care of others, such as grandparents, babysitters or in educational institutions, making it impossible to perform EBF. Mothers with lower schooling level may report lower family income, which may encourage EBF, which is independent of financial resources, showing a favorable relationship between exclusive breastfeeding and mothers with low schooling level. Conversely, there are authors who show that



maternal schooling can also positively influence EBF. They believe that mothers with higher education levels are more aware about, know and seek the benefits of EBF [24,25].

The fact that mothers work outside their home can double the risk of early introduction of cow's milk or other foods other than breast milk into the child's diet, thereby impairing EBF [26,27]. However, the present study has not found a significant association between maternal work and EBF practice because data collection was done in cities with a small territorial extension, which, in contrast to what occurs in large cities, favors the commuting of mothers or infants at different times, which increases the likelihood of mother to breastfeed her child even if she has returned to perform her duties at work.

Even with numerous scientific evidence of the superiority of breast milk in relation to other types of milk on the market, the prevalence of mothers who perform EBF according to WHO recommendations is still very low [6]. In the present study, only 50% of mothers interviewed still in the maternity ward, practiced EBF. This is considered a good rate by WHO. On the other hand, at 4 and months of age of infants, only reasonable numbers or far below those recommended by WHO were found (39%). Up to 6 months, WHO considers 90 to 100% of mothers who practice EBF as a very good rate, good from 50 to 89%, reasonable from 12 to 49% and poor from 0 to 11% [28].

Government campaigns to encourage EBF are necessary, in according to other studies that corroborates our findings, where the frequency of EBF is lower than recommended, and other types of food are offered before the sixth month of the infant's life [14,29-31]. Thus, the disclosure of harms related to the early introduction of other foods such as teas, water, and other types of milk, usually offered in bottles, is gaining prominence [32]. Additionally, the medical indication of dietary supplements (formulas) in the first months of life and other types of foods (liquid, semi-solid and solids) from the four months of the infant's life also have a negative influence on EBF.

A study carried out in Porto Alegre (Rio Grande do Sul) pointed out as a strategy to increase EBF indexes in the region, the need for updating and greater dissemination of the dietary guidelines published by the Ministry of Health in the guide "Ten Steps of Healthy Eating for Children Younger than Two Years" [33]. Motivation strategies for the establishment of healthy feeding practices should be initiated from breastfeeding, as long as it is individualized for different populations, considering the social, economic, cultural and emotional influences inherent to each of them [34].

Educational campaigns, financial investment, political support, federal government actions on the importance and encouragement of EBF are fundamental to protect, support, promote and increase EBF rates. Specific strategies related to reduced bottle insertion and control the marketing of breast milk substitutes are also needed to increase the benefits of EBF [35].

## Conclusion

The ideal frequency of EBF recommended by WHO until the six months of the infant's life is not followed in cities of the state of Minas Gerais and Bahia. In addition, EBF is influenced by the

use of bottle and the schooling level of mothers. Specific strategies related to decreased bottle insertion, especially after four months of life are of great value for greater adherence to EBF.

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