Prevalence and associated factors for early interruption of exclusive breastfeeding: meta-analysis on Brazilian epidemiological studies

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Abstract

Objectives: to summarize Brazilian studies that analyzed the risk factors for Exclusive Breastfeeding (EBF) interruption before the child's six months of life.

Methods: systematic review and meta-analysis indexed articles from Bireme, Scielo and Pubmed databases published in the period of January 2000 to December 2015.

Results: 22 articles were included in the meta-analysis. The factors related to newborns were observed, such as birth weight (OR= 1.17; CI 95%: 1.05-1.29), female gender (OR= 1.09; CI 95%; 1.04-1.13) and the use of pacifier (OR= 2.29; CI 95%; 1.68-2.91) were the main factors responsible for the increase in the occurrence of EBF interruption. The factors were related to the mother, maternal age below twenty years old (OR= 1.22; CI 95%; 1.12-1.33) low schooling level (OR= 1.28; CI 95%; 1.11-1.45), primiparity (OR= 1.17; CI 95%; 1.02-1.32) maternal employment during the postpartum period (OR= 1.26; CI 95%; 1.11-1.41), and low family income (OR= 1.22; CI 95%; 1.08-1.37) contributed significantly to the EBF interruption.

Conclusions: the meta-analysis of Brazilian epidemiological studies demonstrated evidences to conclude that below the age of twenty, low schooling, primiparity, maternal employment in the postpartum period and low family income are associated to the interruption of exclusive breastfeeding until 6 months of age. Children with low birth weight, female gender and used a pacifier had greater vulnerability to not be exclusively breastfed. In conclusion, most of these factors can be modified through appropriate public policies throughout the adequate prenatal period to promote exclusive breastfeeding.

Key words Breastfeeding, Exclusive breastfeeding, Child nutrition, Epidemiological surveys, Review
Introduction

Evidence from observational studies in several countries has reported that Exclusive Breastfeeding (EBF) in the first six months of life and Complementary Breastfeeding (CBF) for two years or more constitute a protective factor for chronic diseases later in life.1-2 The EBF early discontinuation, defined as the abandonment of breastfeeding practice and the utterly or partially replacement of breast milk with other foods before the child is six months old, entails the deprivation of these beneficial elements and may bring damages to the mother and child’s health.1-4

The EBF is characterized by a single supply of breast milk, straight from the breast or milked from other sources without providing any other liquids or solids with the exception of drops of syrup or vitamins, oral rehydration salts, mineral supplements or medicine products.1 It is emphasized that the EBF practice is recommended by the World Health Organization (WHO) and the Ministry of Health in Brazil (MHB).1,3

A national survey resulted on breastfeeding between 1999 and 2008 found that the median duration of EBF increased from 23.4 to 54.1 days in this period.5 The survey also identified a similar trend regarding to breastfeeding (BF), which had increased an average of 210 to 341.6 days. In this period, the BF and EBF rates beyond the recommendation proposed by WHO.6

Over the past decade, there have been an increasing number of studies on the interruption of exclusive breastfeeding until the age of 6 months. However, none of the meta-analyses were identified in the Brazilian epidemiological literatures relating between socio-cultural and biological risk factors for early interruption of exclusive breastfeeding. Thus, it is pertinent to aggregate evidence and systematize information on the factors of exclusive breastfeeding duration, aiming to provide information to support the planning of future studies and public policies about exclusive breastfeeding in children’s health and nutritional fields.2 Therefore, the aim of the present study was to summarize Brazilian studies which analyzed the associated factors for early interruption of exclusive breastfeeding.

Methods

Identification and selection of articles

A systematic review with meta-analysis was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses norms (PRISMA).6 on studies that evaluated the main risk factors associated to early interruption of exclusive breastfeeding in Brazil. An online search for published articles was performed in Bireme, Scielo and Pubmed, between January 2000 and December 2015, with the combination of terms used (DeSC/Mesh) in Portuguese, English and Spanish such as: "Breastfeeding", “Weaning” or “Destete” and “Brazil”.

Eligible publications were original studies, conducted in different regions in Brazil, which have studied on the factors associated to the interruption of breastfeeding in the first six months of life. The studies that analyzed exclusively the duration of total breastfeeding in the first year of life, early interruption of EBF in newborns under 1 month of age, those with cleft lip and palate, qualitative research studies, items with insufficient data for summarization, review articles, critical and theoretical essays were excluded.

The articles in the databases were selected independently by two reviewers (M Pereira-Santos and LMR Almeida) using forms containing the eligibility criteria to select papers for full text screening. Full texts were independently assessed by these reviewers. Disagreements between both reviewers were solved by consensus.

The eligible articles were read in full, and the information on the year of the publication of the study design prevalence on exclusive breastfeeding, factors associated to early interruption and the association of measurements with the confidence intervals (CI 95%) were registered using Excel® spreadsheet forms designed to gather the information.

Study quality assessment

Both authors (M Pereira-Santos and DR Gomes) independently scored the quality of the studies according to the "Effective Public Health Practice Project: Quality Assessment Tool for Quantitative Studies – QATQS" (http://www.ephpp.ca/tools.html) scale which was included in this study.6 Five items from this scale were used to assess and classify the studies as "strong," "moderate" or "weak." These items were: 1) selection bias; 2) study design; 3) confounding factors; 4) data collection methods; and 5) type of analysis used for the outcome. At the end of the evaluation, each study received a score according to QATQS scale, it was considered strong if none of the questions had been assessed as weak; moderate, if one of the items was classified as weak; and weak, if there were one or more questions that...
Statistical analysis
The variables were associated to the measurements and the confidence intervals were summarized by using the Meta-analysis in Stata 12 (Stata Corp, College Station, TX). The results of the meta-analysis were presented as forest plots.

The summary measurement and its respective confidence interval (CI 95%) were obtained through a fixed or random-effects model, depending on the heterogeneity among the studies. Heterogeneity and inconsistency measurements were identified through Cochran’s Q statistical test. If heterogeneity was confirmed, then the random-effects model was applied with inverse variance and weight according to the results of the individual studies. The inconsistency test (I² > 50%) was used as an indicator for moderate heterogeneity.

Results
Characteristics of eligible studies
The search strategy flowchart is shown in Figure 1. 1,326 articles in the database were identified, in which 25 were selected for qualitative synthesis and 22 were included in the meta-analysis. The reasons for the exclusion of the articles were the absence of the association measurements, non-observational study designs, the EBF interruption assessment in groups of adolescent mothers and only breastfeeding analysis in the first month of life.

The main characteristics of the studies included in this review are presented in Table 1. Most articles (57.69%) were published between 2008 and 2015, with samples ranging from 168 to 35,000 participants registered in prevalence studies with a sample size over a thousand participants (42.31%). In regard to the regions where the surveys were conducted, there was a higher concentration in the Southeast region (53.85%) in Brazil (Table 1).

By classifying the studies on the design, the predominance of a cross-sectional design (64.0%) was noted as well as the predominance of the articles with methodological quality was classified as moderate (72%). The articles from the cohort studies had higher frequency of strong scores.

The variables most investigated in the studies were birth weight, pacifier use, type of birth, age and maternal schooling level, parity and maternal employment status. Therefore, these variables were included in the meta-analysis and were combined in three blocks: features related to child, maternal and family characteristics.

Meta-analysis results
In the analyzed period, the average prevalence of EBF in the first six months of a child’s life was 25% (C195%: 18.05 – 31.96), and observed the average duration of 55.41 days of EBF (C195%: 31.9 – 78.91) (Table 1).

The meta-analysis results from the factors associated to early interruption can be verified in Table 2. The factors related to newborns as birth weight and pacifier use were the main factors responsible for increasing the interruption of EBF identified in the studies. Thus, newborns with low birth weight had 1.17 more chances (CI95%: 1.06 – 1.29) early interruption of EBF, and the habit of introducing the pacifier before six months of a child’s life increased the chances to 2.30 (CI95%: 1.68-2.92) of the outcome. The newborn’s gender show statistically significant results on the EBF interruption (OR=1.09; CI95%: 1.05 – 1.14).

As for the factors related to the mother, low schooling level raised to 1.28 (OR=1.28; CI95%: 1.11-1.45) the chances of EBF interruption. A similar trend occurred in relation to maternal employment in the postpartum period (OR=1.26; CI95%: 1.11-1.41). The fact of being primiparous and at the age of twenty contributed to 1.22 (CI95%: 1.12- 1.33) and 1.17 (CI95%: 1.02-1.32) times more to interrupt the occurrence of EBF, respectively.

There was no statistically significant association for cesarean section as a delivery method and also low family income increased the chances of EBF interruption to 1.22 (CI95%: 1.08-1.37).

Discussion
The results from the this meta-analysis conducted by Brazilian observational studies published from 2000 to 2015, indicated that the associated factors of EBF interruption were low birth weight, female gender, pacifier use, maternal age less than 20 years old, less than nine years of maternal schooling, primiparity, maternal employment outside the home and low family income.

Among the features related to the child, the birth weight was analyzed in 14 studies, and recorded a statistically significant association between low birth weight and early interruption of EBF. The studies suggest that children with low birth weight have difficulty in starting and maintaining the EBF, as both the frequency and the suction pressure increase according to the increase of the gestational age and the newborn’s weight, and they are more prone to...
Figure 1
Flowchart on the search resulting in sources of information, selection and the inclusion of original articles in the systematic review.

Articles identified by search strategy
Period (2000 to December 2015)
612 in Bireme, 594 in Scielo and 120 in Pubmed= 1,326 articles

42 duplicates were removed
1,113 articles were excluded by reading the title

75 articles were excluded by reading the summary

96 articles were selected after the analysis of the summary

71 articles were excluded for not meeting the inclusion criteria

25 articles were selected for systematic review

22 articles selected for the meta-analysis
**Table 1**

Characteristics and meta-analysis study on exclusive breastfeeding in Brazil.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of studies</th>
<th>%</th>
</tr>
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<tbody>
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<td>Year of publication</td>
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</tr>
<tr>
<td>2000-2007</td>
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<tr>
<td>2008-2015</td>
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</tr>
<tr>
<td>Midwest</td>
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<tr>
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<tr>
<td>Southeast</td>
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<tr>
<td>Study design</td>
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<tr>
<td>Cohort</td>
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<tr>
<td>Sample Size</td>
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<tr>
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<td>7</td>
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</tr>
<tr>
<td>&gt;500 – 1000</td>
<td>8</td>
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<tr>
<td>&gt;1000 – 35,000</td>
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<tr>
<td>QATQS Scores</td>
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<tr>
<td>Weak</td>
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<td>16.0</td>
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<tr>
<td>Moderate</td>
<td>18</td>
<td>72.0</td>
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<tr>
<td>Strong</td>
<td>3</td>
<td>12.0</td>
</tr>
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</table>

Median EBF in Brazil: 55.41 days (CI95%: 31.9 – 78.91)

EBF Prevalence in Brazil: 25% (CI95%:18.05 –31.96)

<table>
<thead>
<tr>
<th>EBF Prevalence in Brazil</th>
<th>Number of studies</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6% – 11.9%</td>
<td>7</td>
<td>35.0</td>
</tr>
<tr>
<td>13.3% – 30.0%</td>
<td>5</td>
<td>25.0</td>
</tr>
<tr>
<td>33.2% – 58.1%</td>
<td>8</td>
<td>40.0</td>
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hospitalization in neonatal unit and become separated from their mothers. Also the female gender variable was associated to early interruption of EBF.

In this meta-analysis, the use of pacifiers was the main factor associated to EBF interruption. A meta-analysis with cohort and cross-sectional studies reported that the use of pacifiers has increased the occurrence of breastfeeding interruption (OR: 2.48; CI95%: 2.16–2.85). The use of the pacifier may be one of the EBF interruption causes, but also a marker of difficulties related to breastfeeding, as well as reducing maternal motivation to breastfeeding. In addition, mothers who have problems with breastfeeding make its use to ease the child. It is possible that pacifier use inhibits breastfeeding, sucking reduction may compromise milk production with consequent risk of weaning.

The associations between pacifier use and breastfeeding interruption are causal or not. The pacifier can be introduced prior to complete weaning from breast milk, and not the other way around. Future studies need to take into account their designs to deal with the possibility of reverse causality.

In regard to maternal socio-demographic characteristics, low schooling level, maternal employment during the postpartum period and family income were associated to EBF interruption. Thus, the social inequalities, especially the socioeconomic level, reproduce at a health level.
The highest degree of women’s instruction seems to be a predictive factor of success on EBF practice, which may be related to the increased maternal reliance on the problems and discomforts of breastfeeding. It is most likely for mothers to receive information about the benefits of breastfeeding to generate lower external influence, and the mother may start to reject practices that damages the process of breastfeeding scientifically proven.14

Regarding the mother’s employment outside the home in the six months of postpartum, they cannot influence on the decision of EBF interruption, it is possible to suggest the imminence to return to work, which becomes inexorable the decision to include precociously other types of milk in the child’s feeding scheme, especially cow milk, constraining the success of the supplemented breastfeeding and increasing the median duration of breastfeeding.2 Therefore, the six months of maternity leave can contribute to the EBF maintenance.37 Although women in informal work cannot benefit from this paid leave period, they often have to return to work earlier, in the studies it was not possible to analyze the type of work to identify if the informality is also associated to early interruption of EBF.

As presented in this review, several factors may compromise exclusive breastfeeding. This can be verified in the reported prevalence of 25% and the median duration of 57 days of EBF. Although the identified values have shown growing trends in the last five years, these values are lower than recommended by WHO, which envisions that 90% to 100% of the children under six months of age have breast milk as exclusive food.1,38

The low prevalence of EBF recorded in this study is worrisome, since the EBF positively contributes to maternal and child’s health.4 Thus, the EBF interruption can bring harm to the health of the child, the mother and increase costs in the Brazilian Unified Health System (SUS), due to the treatment and control of diseases, which may present association to the EBF interruption.

The child’s health indicators identify a reduction of infant mortality and morbidity from diarrhea, malnutrition, respiratory diseases, however, on the other hand, these indicators show an increase in chronic diseases such as diabetes and obesity in childhood and adult life.39,40 Thus, it can be considered that the EBF may effect in later life, as noted in a meta-analysis reported that breastfeeding decreased by 26% (C195%: 22–30) the chance of overweight/obesity and checked protective action for diabetes type 2,39 and in the studies of adult intelligence and school performance show evidence of positive effects of EBF on these abilities.41,42 The same was observed in a cohort study conducted in Brazil, which show that the more enduring the period of breastfeeding in infancy, the higher the levels of intelligence and an average income in adulthood to 30 years.42

The positive aspects of EBF involving the parent woman establish interface with acceleration of postpartum weight loss, reduce incidence of anemia and reduces the chance of developing breast, ovary and endometrial cancer, as well as osteoporosis.4,43 It is noteworthy that the family economy is affected positively with BF, therefore, there is a significant reduction in spending on acquisition of formulas, bottles, artificial nipples, medicines and food to the newly born.39,44

Our results, although register growing publishing trend in 2008-2015, identify Brazilian scientific literature on the subject is centered in the South and Southeast of the country, where most research centers on breastfeeding in Brazil are located. It is worth adding that most of the studies selected for this review showed moderate quality, with few items of cohort studies. Therefore, the evidence on factors associated to exclusive breastfeeding for children under the age of six months in Brazil found in this review can be considered as moderate. This result corroborates systematic review of previous study.36

This study has some limitations. It should be considered that various factors such as factors related to the attention of prenatal delivery and postpartum care were not included in this meta-analysis due to the methodological divergence of the analyzed studies and the absence of this information. It adds that most of the studies included in this meta-analysis were a cross-sectional design, which makes it difficult to examine the risk factors for the EBF interruption. Moreover, it was not possible to perform analysis of publication bias, since most studies did not report values of simple frequency of the variables of interest, it is necessary to obtain individual statistical parameters. Therefore, we adopted the strategy to perform the meta-analysis on the measurements referred to the studies analyzed. Despite these limitations, the results of this study report the main factors associated to early interruption of exclusive breastfeeding in studies conducted in Brazil.

In this meta-analysis, both mother and child related variables contributed to the early interruption of exclusive breastfeeding. Among the maternal
variables were the age below twenty, low schooling level, primiparity, maternal employment in the postpartum period and low family income. While low birth weight, female children who used pacifiers were more likely not to be exclusively breastfed. Most of these factors can be modified through appropriate public policies throughout the prenatal period with actions to promote exclusive breastfeeding, so that the mother-child relationship can benefit from exclusive breastfeeding.

References


Early interruption of exclusive breastfeeding in Brazil


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