

# Factors associated with breastfeeding practice for at least six months in the state of Pernambuco, Brazil

## *Fatores associados à prática do aleitamento materno exclusivo por pelo menos seis meses no estado de Pernambuco*

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**ABSTRACT:** *Introduction:* Despite the scientific consensus on the benefits that breastfeeding provides for the mother, the baby, the family and the environment, and also the recommendation to breastfeed exclusively for six months, this practice is far from being achieved. *Objective:* To analyze the factors associated with exclusive breastfeeding (EBF) for at least six months, as opposed to weaning up to the second month of life in the state of Pernambuco, Brazil. *Methods:* A case-control study of 124 cases (EBF for at least six months) matched for age and sex with 248 controls (weaning up to the second month of life). Cases and controls were drawn from the III State Health and Nutrition Survey. The exposure variables selected were maternal age and education, *per capita* income, housing zone, prenatal consultations, type of delivery, professional who assisted the delivery, and prenatal breastfeeding guidance. Logistic regression was applied to variables that showed a p-value < 0.2 in the bivariate analysis, and the variables with p-value < 0.05 were included in the final model. *Results:* Of the eight groups of variables considered as possible predictors of EBF for at least six months, two remained as associated factors: maternal age between 20 – 35 years old, with odds ratio (OR) 2.5 and 95% confidence interval 95%CI 1.4 – 4.5; and maternal education of 5 – 8 years of schooling (OR 2.1; 95%CI 1.2 – 3.6). *Conclusion:* The study shows that mobilization of the public sector and stimulus to research is still needed for the success of EBF and for mother and child health.

**Keywords:** Breast feeding. Milk, human. Weaning. Health promotion. Women's health. Child health.

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**Conflict of interests:** nothing to declare – **Financing source:** none.

**RESUMO:** *Introdução:* Apesar do consenso científico sobre os benefícios que a amamentação proporciona à mãe, à criança, à família e ao próprio meio ambiente, além da recomendação para que sua prática seja realizada de forma exclusiva nos seis primeiros meses de vida, essa conduta está longe de ser alcançada. *Objetivo:* Analisar os fatores associados à amamentação exclusiva (AME) por pelo menos seis meses, em contraponto ao desmame total até o segundo mês de vida no estado de Pernambuco. *Método:* Estudo caso-controle reunindo 124 casos (AME por pelo menos seis meses) pareados por idade e sexo com 248 controles (desmame total até o segundo mês). Casos e controles foram oriundos da III Pesquisa Estadual de Saúde e Nutrição. Foram selecionadas como variáveis de exposição: idade e escolaridade materna, renda familiar, zona de moradia, consultas pré-natais, tipo de parto e profissional que o assistiu e orientação sobre amamentação no pré-natal. Foi aplicada regressão logística nas variáveis que apresentaram um valor de  $p < 0,2$  nas análises bivariadas, adotando para a inclusão no modelo final o nível de significância  $p < 0,05$ . *Resultados:* Dos 8 agrupamentos de variáveis consideradas como possíveis preditoras do AME por pelo menos 6 meses, mantiveram-se como fatores associados a idade materna entre 20 – 35 anos, sendo a *odds ratio* (OR) 2,5 e o intervalo de confiança de 95% (IC95%) 1,4 – 4,5; e a escolaridade de 5 – 8 anos de estudo (OR 2,1; IC95% 1,2 – 3,6). *Conclusão:* O estudo mostra que ainda são necessárias mobilizações dos poderes públicos e estímulo às pesquisas em prol do sucesso do AME e da saúde materno-infantil.

*Palavras-chave:* Aleitamento materno. Leite humano. Desmame. Promoção da saúde. Saúde da mulher. Saúde da criança.

## INTRODUCTION

There is already broad consensus on the benefits of breastfeeding to nutritional, immunological, cognitive, psychological, economic and social features for children, their mothers and families, and the community itself, also favoring the idea of environmental preservation, a new reference for human development nowadays<sup>1-3</sup>. Accrued scientific knowledge, as well as recommendations by international expert committees, allows us to affirm that exclusive breastfeeding in the first months of life dramatically reduces child mortality rates<sup>4-6</sup>, optimizes physical and mental development, and protects children against major diseases that can manifest in later periods of life: adolescence and maturity<sup>7</sup>.

On a global scale, however, according to latest scientific data, the prevalence of breastfeeding in children with less than 6 months of life — a normative recommendation — was only 37% between 2006 and 2010<sup>8</sup>. On the other hand, estimative by national research on demography and health confirmed a tendency to the increase of this practice in Brazil<sup>9,10</sup>. In Pernambuco, the prevalence of exclusive breastfeeding at 6 months of age increased from 1.9% to 8.5% in

2006<sup>11</sup>, still a long way from meeting recommendations though<sup>6</sup>. In Brazil, literature shows that some factors may influence positively in successful exclusive breastfeeding. As to the mother, age between 20 and 35 years, schooling of 9 years or more, housekeeping, natural labor, household income  $\geq 1$  minimum wage, prenatal orientation about breastfeeding, and 6 or more prenatal consultations. Living in urban areas, starting prenatal in the first trimester of pregnancy, and being assisted by a health professional at delivery time are also important factors<sup>11-23</sup>.

Sticking to these and other principles, the aim of this study was to assess the hypothesis of biological, social, economic, demographic and obstetrical features related to the mother involved in exclusive breastfeeding for at least six months compared to the same exposure variables applied to mothers of children in total weaning until the end of the second month of life in Pernambuco, purposing the protection, promotion and support of exclusive breastfeeding for at least six months.

## METHODS

This is a retroanalytical, case-control, population-based study anchored in a prevalence survey whose purpose was to find factors possibly associated with exclusive breastfeeding with mothers of children up to 6 months of age in Pernambuco, Brazil, 2006. Data from the III State Health and Nutrition Survey (III PESN) were used<sup>11</sup>, and exclusive breastfeeding for at least 6 months was considered case, and total weaning until the second month of life was control, with a clear separation of both conditions for conceptual and methodological reasons. Important to underlie that the use of the desirable condition as case, disagreeing with traditional methods of conventional case-control studies, is an unusual strategy that is little used in epidemiological research.

The database of III PESN made available a group of 132 children as cases and 342 as possible controls, to which inclusion criteria (all children with history of exclusive breastfeeding for at least six months and total weaning up to the second month of age; complete questionnaires validated at the III PESN database) and exclusion criteria (incomplete questionnaires in both groups, children adopted at birth, and other situations not meeting the pairing by gender and age) were applied. These procedures resulted in 129 cases and 336 controls. Pairing by age was based on differences of up to one month for children aging 6 to 12 months, two months for children aging 1 to 2 years, and three months for children aging 3 years to 59 months. Gender (male/female) being used as preliminary pairing criteria is self-explanatory. Final sample was composed of 124 cases and 248 controls, in a proportion of one case for two controls. Being children of mothers aging less than 20 years or more than 35 years was basic exposure criteria, and being children of mothers aging 20 to 35 years non-exposure criteria, being drawn

up a sample with 80% power to detect odds ratio (OR)  $\geq 2.0$ , and significance level at 0.05; expected exposure proportion among controls was 0.35, and correlation coefficient between cases and controls was 0.20, in compliance with the purposes of the study. The expected exposure proportion values among controls were obtained from the III PESN database<sup>11</sup>, while the value of correlation coefficient between cases and controls was that suggested by Dupont<sup>24</sup>. Calculation of 80% detection power was made in the software PASS2005.

To assess exposure factors, the variables that could be hypothetically associated with the outcome (mothers' age and schooling, household per capita income, residential area, number of prenatal consultations, presence of a professional assisting delivery, type of delivery, and prenatal orientation about breastfeeding) were selected by paired analysis. In the first phase (statistical screening), the categories presenting a p-value below 0.2 were indicated at bivariate analysis. Afterwards, the factors hypothetically associated with the outcome were grouped by a simplified model of adjustment (logistic regression), thus forming two groups of past history, as shown in Figure 1. For the multivariate analysis, it has been agreed that factors presenting a p-value below 0.05 would be accepted, with a 95% confidence interval (95%CI) and 80% power. Data were assessed in software Stata 12.1 SE.

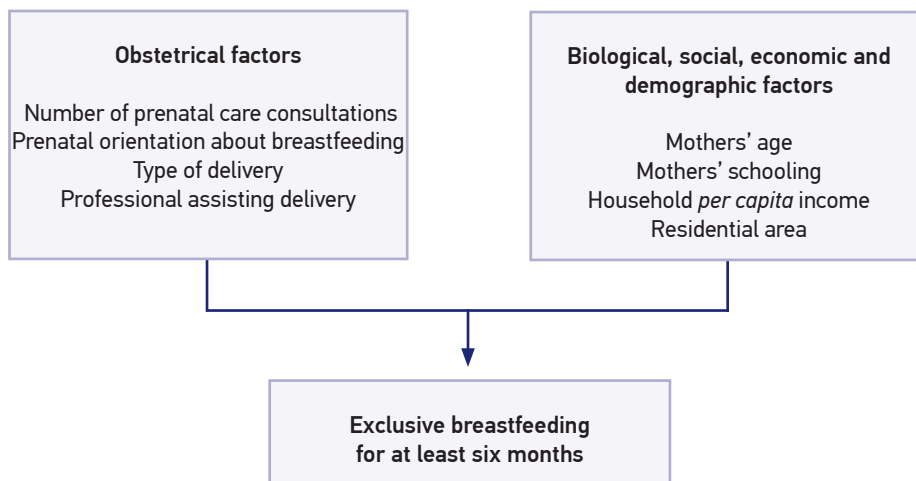


Figure 1. Explanatory ideogram on factors related to mothers and hypothetically associated with exclusive breastfeeding for at least six months.

The study was approved by the Research Ethics Committee of Instituto de Medicina Integral Professor Fernando Figueira, protocol 3006-12, at a regular meeting on June 12, 2012.

## RESULTS

Table 1 shows the results of descriptive and analytical variables grouped by categories and ordered by explanatory model after bivariate and multivariate analyses (logistic regression). The condition with the lowest chance of being related to the outcome (exclusive breastfeeding until 6 months of age) was used as reference group (1.0) in statistical analyses.

Out of the possible groups of biological, obstetrical, social, economical, geographical variables, access to service, health actions and different exposure categories between cases and controls, only mother's age and schooling were significant at statistical screening (crude OR). Prenatal orientation about breastfeeding reached the threshold ( $p = 0.058$ ) at bivariate analysis, being selected for the adjustment phase at multivariate analysis, along with the number of prenatal care consultations. As to the other categories (household income, residential area, type of delivery, and professional assisting delivery), no differences of exposure were found between cases and controls.

Upon logistic regression, represented by p-value adjustment, only mothers' age (20 to 35 years – OR = 2.5; IC95% 1.4 – 4.5), and schooling (5 to 8 years of study – OR = 2.1; IC95% 1.2 – 3.6) were maintained for the final model.

## DISCUSSION

It is well established that breastfeeding in humans is not only biologically but also socially and culturally determined, that is, a behavior in accordance with the historical context, times and habits. The cultural process of breastfeeding has crossed centuries, civilization cycles, religions, local economic and corporate interests, influences of international markets<sup>2,3,25</sup>, and reached an almost consensual recognition in the scientific community 50 or 60 years ago, when the benefits of breastfeeding, especially in the first six months of life, were proven<sup>1,6</sup>. Nowadays, this position is assumed as reference for public policies all over the world<sup>6,8,9</sup> making incontestable the need for implementation and dissemination of actions aimed at the promotion of successful breastfeeding according to international standards.

Current discussions say that, as historical process, it is subjected to countless interests, conducts, influences and circumstances, so theoretical consensus is somewhat impaired by dissention in practice<sup>25</sup>. This study is an illustration of this fact, as we can

Table 1. Characteristics of groups and analysis of gross and adjusted associations in children less than 5 years old, according to their history of exclusive breastfeeding for at least six months (cases) and total weaning until 2 months of age (controls) in Pernambuco, Brazil, 2006.

Variables	Cases n (%)	Controls n (%)	OR <sub>c</sub> (95%CI)	p-value	OR <sub>a</sub> (95%CI)	p-value
Mothers' age (years)				0.001		0.002
< 20 or ≥ 36	19 (1.3)	79 (31.9)	1.0		1.0	
20 – 35	105 (84.7)	169 (68.1)	2.6 (1.5 – 4.6)		2.5 (1.4 – 4.5)	
Mothers' schooling				0.010		0.021
≤ 4	42 (33.9)	120 (48.6)	1.0		1.0	
5 – 8	51 (41.1)	67 (27.1)	2.2 (1.3 – 3.7)		2.1 (1.2 – 3.6)	
≥ 9	31 (25.0)	60 (24.3)	1.4 (0.8 – 2.5)		1.3 (0.7 – 2.3)	
Household per capita income (MW)				0.407		
≤ 0.24	61 (50.8)	105 (43.4)	1.0			
0.25 – 0.49	39 (32.5)	90 (37.2)	0.7 (0.4 – 1.2)			
0.50 – 2.4	20 (16.7)	47 (19.4)	0.7 (0.4 – 1.3)			
Residential area				0.227		
MAR	39 (31.5)	60 (24.2)	1.3 (0.8 – 2.2)			
Urban	28 (22.6)	72 (29.0)	0.8 (0.5 – 1.3)			
Rural	57 (46.0)	116 (46.8)	1.0			
Number of prenatal consultations				0.136		0.703
0 – 3	8 (6.7)	31 (13.8)	1.0		1.0	
4 – 5	24 (20.0)	44 (19.6)	2.1 (0.8 – 5.7)		1.5 (0.5 – 4.6)	
6 or more	88 (73.3)	149 (66.5)	2.3 (0.9 – 5.4)		1.5 (0.8 – 4.0)	
Prenatal orientation about breastfeeding				0.058		0.172
Yes	109 (87.9)	184 (79.7)	1.8 (0.9 – 3.3)		1.6 (0.8 – 3.1)	
No	15 (12.1)	47 (20.3)	1.0		1.0	
Type of delivery				0.877		
Natural/forceps	84 (67.7)	166 (66.9)	1.0 (0.7 – 1.6)			
Cesarean	40 (32.3)	82 (33.1)	1.0			
Professional assisting delivery				0.849		
Physician	81 (65.3)	155 (64.0)	1.0 (0.7 – 1.6)			
Nurse/midwife	43 (34.7)	87 (36.0)	1.0			

Source: III State Health and Nutrition Survey, 2006<sup>9</sup>.

OR<sub>c</sub>: crude odds ratio; OR<sub>a</sub>: adjusted odds ratio; MW: minimum wage; MAR: metropolitan area of Recife.

see that, despite advances achieved in the past 9 years, between 1997 and 2006, when breastfeeding at least for six months increased from 1.9 to 8.5% in Pernambuco<sup>11</sup>, this practice is still an exception to recommendations. Even the case-control methodology used in our study was aimed at exceptions.

The analysis shows that all 8 groups of factors investigated and selectively established through the population-base survey on food and nutrition, only 2 (mothers' age between 20 and 35 years, and mothers' schooling of 5 to 8 years of study) remained statistically significant in the final model of logistic regression (or result differentiation). Higher educational levels (9 years of study or more) is reported only in one quarter of mothers, which makes it little significant. It is also noteworthy that mothers who breastfeed their children for less than two months (controls) are also part of the higher schooling group.

Based on the logistic regression analysis, we may say that in 2006 there were barely any clear elements of statistical differentiation between "exemplary" and "problematic" mothers. Mothers' age and schooling, therefore, as factors favoring exclusive breastfeeding for at least six months, do not distinguish these two clearly different conditions, always taking into account the limitations of the study, mentioned in another discussion topic. It is acceptable that the advances between 1997 and 2006 have occurred because of these and other conditions not here identified or considered.

As the first State to prohibit the exhibition of advertisements on industrialized food, especially powered milk, in public maternity hospitals<sup>26</sup>, and also the first holding a hospital named "Children friendly" by the United Nations in the country due to actions in favor of breastfeeding, Pernambuco has been pioneer in defending this practice, and has even anticipated the approval of an International Code to guide the publicity of some food considered as "substitutes" of breastfeeding<sup>27</sup>. As a Pioneer implementing legislative and administrative actions in favor of breastfeeding, including programs of study in graduate and post-graduate health courses and demands in research, Pernambuco was expected to have moved forward in international goals as regards breastfeeding.

In fact, our findings are quite below expectations. It is also surprising that hypothetically relevant factors, according to few studies on breastfeeding analysis, did not have the expected statistical association confirmed. Then, it is important to make comparisons with current studies and data, paying attention to agreements and disagreements regarding the categories analyzed in this paper.

Recent studies have reported influence of factors and practices associated with breastfeeding duration. Data assessed by Damião<sup>14</sup>, based on two surveys performed in 1998 and 2000 on feeding practices for children less than one year old in Rio de Janeiro, showed an association of mothers' age (> 35 years old) with exclusive breastfeeding,

disagreeing with our findings, which indicate less chances of exclusive breastfeeding among more mature women, just like among younger women (< 20 years old).

There is also disagreement with the study by Gigante et al.<sup>15</sup>, where exclusive breastfeeding for at least six months was higher as the age of the mothers increased. From another point of view (birth weight), Maia e Souza<sup>28</sup> reported, in Acre, mothers' age between 20 and 35 years as protection factor concerning birth weight, unlike among women aging 12 to 19 years and more than 35 years, and it represented a risk factor, as well as in the case of our study on exclusive breastfeeding. This indicates that the group of mothers aging 20 to 35 years represents a biological range with fewer risks<sup>28</sup>.

Our finding that younger women (< 20 years old) breast-fed their children for shorter periods agrees with results found by Chaves et al.<sup>16</sup> and França et al.<sup>29</sup>. Longer periods of breastfeeding by adult women may be explained by their broader experience and knowledge on the theme<sup>29</sup>. Henry et al.<sup>30</sup> concluded that mothers' age is associated with shorter periods of exclusive breastfeeding among adolescents, for in this phase of life insecurity and lack of self-confidence lead them to early weaning. They also pointed that mothers with lower educational levels start prenatal care at later stages of pregnancy, which also influences the decision of the best way of feeding their children.

The greater degree of vulnerability of women with low schooling may also be related to poor access to support in the family and social network, as well as to other factor contributing with this practice such as health care services, and to the formal labor market, which keeps them from enjoying legal benefits such as maternity leave<sup>17,31</sup>.

The study by Pereira et al.<sup>18</sup>, performed in basic health units of Rio de Janeiro, showed, by logistic regression, an association between the mothers' schooling and the duration of breastfeeding. Therefore, mother with lower educational levels tended to introduce other food earlier, as also found by Bueno et al.<sup>19</sup>. In a multivariate analysis, Damiano<sup>14</sup> showed a positive association of breastfeeding with maternal schooling (OR = 1.93 and  $p = 0.001$  for complete high school) and a negative association with maternal professional occupation. In the study by Gigante et al.<sup>15</sup>, no statistically significant differences were found regarding schooling and breastfeeding.

For a long period, variables not proven related to exclusive breastfeeding in the present study were considered protection factors. In contradiction, some studies have found statistical significance in these factors as regards negative outcomes in lactation. In the study by Santos et al.<sup>20</sup>, variables of household per capita income, prenatal consultations, and type of delivery were correlated to exclusive breastfeeding, being shown that most women assisted in prenatal care adopted exclusive breastfeeding for longer periods, while cesarean delivery was more related to early weaning. Adhesion



to this practice was also proven to be positively associated with higher household incomes, as described by Gigante et al.<sup>15</sup>.

Also concerning type of delivery and residential area, Lima et al.<sup>21</sup> showed a higher percentage of children exclusively breast-fed in the rural rather than urban area, and also found a statistically significant association between this practice and natural delivery (where exclusive breastfeeding lasted 212,1 days on average), while in children born by cesarean delivery the average was 169,5 days. Pereira et al.<sup>18</sup>, like our group of authors, did not find significant associations between type of delivery and number of prenatal consultations. However, regarding professional assisting delivery, the findings of our research are similar to those of Caminha et al.<sup>11</sup> and Bittencourt et al.<sup>13</sup> studies, in which this variable was not proven associated with exclusive breastfeeding until the child's fourth month of age.

We can say that our study, as other national<sup>9,32,33</sup> and international<sup>9,34</sup> ones, and even research promoted by reputable institutions such as National Health and Nutrition Examination Surveys (NHANES), United Nations Children's Fund (UNICEF), and National Demographic and Health Survey (PNDS), used a model widely used in different countries of Latin America, probably presents bias and even a methodological incongruence by using questionnaires as means of data collection about children less than 5 years old, in a field study on breastfeeding. As the outcome (early weaning or long-term exclusive breastfeeding) often occurs in a short period of children's lives — the first months of life —, we can establish a situation where independent variables (household income, mothers' age etc.) collected after the outcome could present a formal logic problem: answers notified before the registration of prediction factors. In other words, despite the impropriety of the relation background/consequence, characteristic of cross-sectional studies, one wonders whether one, two, three, four or five years earlier factors would be the same or as intense as the ones analyzed here.

The solution would be to perform further cohort studies based on incidence indicators, and starting from exposure factor to the outcomes. NHANES have been working on biennial surveys on breastfeeding<sup>34</sup>. PNDS has reduced, in Brazil and in other countries, the comprehension of retrospective data collection to three rather than five years before the outcome<sup>9</sup>.

This would be a palliative solution, though, and the problem would not be essentially solved. This relevant limitation thus impairs our results' consistency, and also preserves external comparability and internal inferences, once the same limitations would be true for both cases and controls. To this it should be added that other starting points have been attempted, including birth weight and mothers' occupation (professional, housekeeper, student or unemployed), but the sample size did not support statistical tests' requirements.

## CONCLUSION

Despite undeniable advances in recommendations, the results found in the past 10 years in Pernambuco are still unsatisfactory as regards targets. However, the range of factors that should compose an explanatory model of changes occurred and, more precisely, the understanding of breastfeeding promotion as the United Nations postulate (namely the World Health Organization and Unicef)<sup>8</sup> shows that hypothetical reasons have not shed light on the issue. Reasons are probably way more diffuse and interactive, once the influences are not well-known.

Finally, the validity of a process that it temporarily favorable to recommendations is clear, as it is not possible to consistently isolate the real relevance of each factor. This would be a multifactor convergence where one can especially identify a possible effect of some variables such as mothers' age and schooling.

This would justify further studies on the theme, including follow-up of cohorts composed of mothers and their children on the topic of exclusive breastfeeding for at least six months, and the need for mobilization of public authorities, of the research sector, and of social media means for the sake of an important achievement in child health: promotion of breastfeeding according to national and international standards.

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Received on: 10/24/2013

Accepted on: 02/18/2014