

# Risk factors associated to weaning from breastfeeding until six months of age in São Paulo city

*Fatores de risco associados ao desmame em crianças até seis meses de idade no município de São Paulo*

*Factores de riesgo asociados al destete en niños hasta seis meses de edad en el municipio de São Paulo*

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## ABSTRACT

**Objective:** To evaluate risk factors associated to interruption of exclusive breastfeeding among children  $\leq 6$  months of age in São Paulo city in 2008.

**Methods:** A special questionnaire (Breastfeeding and Cities Project-1998) was applied to the parents/guardians of children  $\leq 6$  months of age during the National Poliomyelitis Campaign. Sample calculation used a two stage cluster sampling procedure. The following groups were compared: I (children exclusively breastfed); II (children without exclusive breastfeeding). Factors analyzed: mother's age and schooling, infant birth weight, gender, type of delivery, being born in a Baby-Friendly Hospital, presence of early breastfeeding, use of pacifier in the last 24 hours, and mother working outside home. Statistical analysis included binary logistic regression by SPSS 15.0, being significant  $p < 0.05$ .

**Results:** 724 interviews were performed with 275 (39.1%) children in Group I and 429 (60.9%) in Group II. Differences between groups were found on: use of pacifier in the last 24 hours (GI 32.3 vs. GII 59.8%;  $p < 0.0001$ ), mothers working outside home (GI 12.4 vs. GII 24.8%;  $p = 0.0002$ ) and child's age (GI  $74.1 \pm 45.3$  vs. GII  $105.8 \pm 49.5$  days;  $p < 0.0001$ ). Multivariate analysis showed significant association of non-exclusive breastfeeding in this sample with use of pacifier in the last 24 hours (OR 3.02; 95%CI 2.10-4.36); mother working outside home (OR 2.11; 95%CI 1.24-3.57), and child's age (OR 1.01, 95%CI 1.01-1.02).

**Conclusions:** In this population under six months of age, the use of pacifier in the last 24 hours was associated with not being exclusively breastfed, as well as mother work outside home and child's age. These are important factors to consider in breastfeeding promotion programs.

**Key-words:** breast feeding; weaning; risk factors.

## RESUMO

**Objetivo:** Avaliar os fatores de risco associados à ausência de aleitamento materno exclusivo (AME) em crianças  $\leq 6$  meses de vida na cidade de São Paulo, em 2008.

**Métodos:** Aplicou-se o questionário do Projeto Amamentação e Municípios-1998 (AMAMUNIC) a pais/responsáveis de crianças  $\leq 6$  meses de idade durante a Campanha Nacional de Vacinação contra Poliomielite. Cálculo da amostra por conglomerados com sorteio em dois estágios. Os fatores analisados foram idade e educação materna, peso de nascimento, sexo, tipo de parto, nascer em Hospital Amigo da Criança, presença de aleitamento materno precoce, uso de chupeta nas últimas 24 horas e mãe trabalhando fora de casa. Análise estatística por regressão logística binária com SPSS, versão 15.0, sendo significante  $p < 0,05$ .

**Resultados:** Foram realizadas 724 entrevistas, das quais 275 referiram (39,1%) aleitamento materno exclusivo (Grupo I – GI) e 429 (60,9%) sem aleitamento materno exclusivo (Grupo II – GII). Houve diferenças entre os grupos quanto ao uso da chupeta nas últimas 24 horas (GI 32,3 *versus* GII 59,8%;  $p < 0.001$ ), mães

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trabalhando fora (GI 12,4 versus GII 24,8%;  $p < 0.001$ ) e idade da criança (GI 74,1±45,3 versus GII 105,8±49,5 dias;  $p < 0,0001$ ). Na análise multivariada, houve associação entre ausência de aleitamento materno exclusivo e uso de chupeta (OR 3,02; IC95% 2,10-4,36), mãe trabalhando fora (OR 2,11; IC95% 1,24-3,57) e idade da criança (OR 1,01; IC95% 1,01-1,02).

**Conclusões:** O uso da chupeta nas últimas 24 horas associou-se à ausência de AME em crianças menores do que seis meses, seguido pelo trabalho materno fora de casa e pela idade da criança, que são importantes fatores a serem controlados em programas de promoção do aleitamento materno.

**Palavras-chave:** aleitamento materno; desmame; fatores de risco.

## RESUMEN

**Objetivo:** Evaluar los factores de riesgo asociados a la ausencia de lactancia materna exclusiva (LME) en niños con  $\leq 6$  meses de vida en la ciudad de São Paulo, Brasil, en 2008.

**Métodos:** Se aplicó el cuestionario del Proyecto Lactancia y Municipios-1998 (AMAMUNIC) a padres/responsables de niños con  $\leq 6$  meses de edad durante la Campaña Nacional de Vacunación contra la Poliomiélitis. Cálculo de la muestra por conglomerados con sorteo en dos etapas. Los factores analizados fueron edad y educación materna, peso de nacimiento, sexo, tipo de parto, nacer en Hospital Amigo del Niño, presencia de lactancia materna precoz, uso de chupete las últimas 24 horas y madre trabajando fuera de casa. Análisis estadístico fue realizado por regresión logística binaria con el SPSS, versión 15.0, siendo significativa  $p < 0,05$ .

**Resultados:** Se realizaron 724 entrevistas, de las que 275 refirieron (39,1%) lactancia materna exclusiva (Grupo I - GI) y 429 (60,9%) sin lactancia materna exclusiva (Grupo II - GII). Hubo diferencias entre los grupos respecto al uso del chupete las últimas 24 horas (GI 32,3 vs. GII 59,8%;  $p < 0.001$ ), madres trabajando fuera (GI 12,4 vs. GII 24,8%;  $p < 0.001$ ) y edad del niño (GI 74,1±45,3 vs. GII 105,8±49,5 días;  $p < 0,0001$ ). En el análisis multivariado, hubo asociación entre ausencia de lactancia materna exclusiva y uso de chupete (OR 3,02; IC95% 2,10-4,36), madre trabajando fuera (OR 2,11; IC95% 1,24-3,57) y edad del niño (OR 1,01; IC95% 1,01-1,02).

**Conclusiones:** El uso de chupete las últimas 24 horas se asoció a la ausencia de LME en niños menores que seis meses, seguido por el trabajo materno fuera de casa y por la edad del niño, que son importantes factores a controlar en programas de promoción de la lactancia materna.

**Palabras clave:** lactancia materna; destete; factores de riesgo.

## Introduction

The World Health Organization recommends that breastmilk should be the only source of nutrition for the first 6 months of a child's life and this position is supported by growing recognition of the suitability of breastmilk for the nutritional requirements of newborn infants and older infants, its contribution to harmonious growth and development, its probable role in future quality of life and the incidence of conditions such as cardiovascular diseases, type 2 Diabetes mellitus, arterial hypertension, allergies and nutritional disorders, such as overweight and obesity<sup>(1)</sup>.

All of these findings mean that maintenance of breastfeeding is recognized as an indispensable element of programs to promote child health. However, in order to design these programs and to achieve greatest efficacy from them, it is necessary to determine and control the most common risk factors for weaning in each population group or region.

Some of the most-studied maternal risk factors for weaning are: young age, socioeconomic and educational level, previous history of not breastfeeding, lack of support and encouragement from health professionals and the local culture, smoking and going out to work<sup>(2-5)</sup>. A systematic review of studies of the causes of early weaning in developed countries published from 1976 to 2008 identified strong evidence for young age, maternal socioeconomic and educational levels, smoking, not having breastfed earlier children and lack of information or recommendations from health professionals caring for them<sup>(6)</sup>.

The most often investigated factors associated with the newborn are multiple birth or first child and/or prematurity, caesarean delivery and pacifier use<sup>(2,7,8)</sup>. Pacifier use in particular has been the subject of many publications in recent years which, since studies of pacifier use have not always historically reached homogenous conclusions, have attempted to use rigorous methodology to reach a definition of the possible interference of this variable in breastfeeding. These investigations have led to the identification of other effects of pacifier use, some of which are even positive in specific situations, such as the possibility of a protective effect against infant sudden death during the first months of life<sup>(8-12)</sup>.

This study is a reaction to the literature on the subject and the need to identify these factors in the city of São Paulo in order to provide a basis for public health policies that are better suited to the needs of children less than 1 year old.

The study objective was to investigate risk factors associated with absence of exclusive breastfeeding (EB) in children  $\leq 6$  months old in the city of São Paulo, Brazil.

## Method

This was an observational cross-sectional study conducted in August of 2008 during the second phase of the National Poliomyelitis Vaccination Campaign in the city of São Paulo and is part of the II Research of Breastfeeding Predominance in Brazilian Capitals and Federal District (II Pesquisa de Prevalência de Aleitamento Materno nas Capitais Brasileiras e Distrito Federal) coordinated by the Brazilian Ministry of Health<sup>(13)</sup>. This research project was approved by the Research Ethics Committee at the São Paulo Municipal Health Department (Secretaria Municipal de Saúde) and by the Brazilian National Ethics Commission (Comitê Nacional de Ética em Pesquisa).

For this survey a questionnaire was administered to mothers or carers of children  $\leq 1$  year old who were brought to vaccination stations, irrespective of whether these were located in Health Centers or were mobile stations in the community. The questionnaire employed was developed in 1998 by the Instituto de Saúde-São Paulo (AMAMUNIC) and contains closed questions about intake of breastmilk and other foods during the previous 24 hours, in addition to recording characteristics of the mothers and their children<sup>(13)</sup>.

The database from the previous immunization campaign was consulted in order to calculate the number of interviews needed and then two-stage cluster sampling by lots was conducted at each Basic Healthcare Center. The first stage was to select vaccination stations and the second, systematic, stage was to select the children to be recruited at each vaccination station. Children were excluded from the study if the adult accompanying them, parent or carer, did not know what they had been fed during the previous 24 hours or refused to provide this information.

Fifty-seven supervisors and two health professionals/Basic Healthcare Center plus 346 interviewers (student volunteers from technical schools/universities) were trained for the project.

For the present study, only children  $\leq 6$  months of age were included. They were classified into one of two groups: Group I (GI – on EB) and Group II (GII – EB absent). The definition of EB was a diet exclusively of breastmilk, with no other solid or liquid foods.

The risk factors for absence of EB analyzed were: maternal age in full years (less than 20 or greater than or equal to 20); mother's educational level (categorized as illiterate, primary

education or high school/higher education); caesarean delivery; sex of child; birth weight (BW) in grams; born at a hospital that participates in the Baby Friendly Initiative; early breastfeeding (Early BF) – within the first hour of life; age of child in days on day of interview; pacifier use in previous 24 hours; mother's employment status (categorized into does not go out to work, on maternity leave or does go out to work).

The results were input using software specially developed for this project. The sample size was calculated on the basis of the 1999 EB prevalence in infants less than 6 months old in the city of São Paulo, increased by 2 to 10%, on the basis of the hypothesis that the rate would have increased since 1999. The resulting sample size was then multiplied by 1.5 to cover possible losses resulting from the cluster sampling method. This figure was then increased by a further 5 to 10% to allow for missing responses. The result was then doubled because the data collection covered children up to 12 months old, giving a final result of 1,225.

The chi-square test or Fisher's exact test were used to compare groups. Factors that were significantly different between groups were input into a binary logistic regression analysis, using the Wald stepwise backward technique and odds ratios (OR) and 95% confidence intervals (95%CI) were calculated. The software employed was SPSS version 15.0. The significance level was set at  $p < 0.05$ .

## Results

A total of 1,398 interviews were conducted, corresponding to 114% of the required number. Of these, 724 interviewees were the parents or guardians of children aged  $\leq 6$  months, but 20 were excluded due to missing data. The final number of complete interviews was therefore 704, and the results were allocated to the two study groups as follows: GI – 275 (39.1%) and GII – 429 (60.9%).

Maternal characteristics are shown in Table 1. Mean age was 26 full years and did not differ between the two groups. Educational level was predominantly high school/higher education in both groups (65%) and did not differ between the groups.

Table 2 shows that there were also no statistical differences between the groups in terms of having been born at a Baby Friendly Initiative hospital, type of delivery, sex of infant, BW or Early BF. Pacifier use in the previous 24 hours was present in 89 (32.3%) in GI and 253 (59.8%) in GII, and the lower frequency in the EB group was statistically significant ( $p < 0.001$ ). It can also be observed from Table 2 that mothers who go out to work were much more frequent

**Table 1** - Maternal characteristics broken down by presence (Group I) or absence (Group II) of exclusive breastfeeding

Characteristic	Group I	Group II	p-value
Age (years)			0.3720
<20	31 (12.2%)	56 (15.1%)	
≥20	223 (87.8%)	316 (84.9%)	
Educational level			0.4100
Illiterate	5 (1.9%)	11 (2.9%)	
Primary education	77 (30.1%)	127 (33.9%)	
Secondary education/higher education	174 (68%)	237 (63.2%)	
Goes out to work			0.0002
No/maternity leave	219 (87.6%)	276 (75.2%)	
Yes	31 (12.4%)	91 (24.8%)	

**Table 2** - Characteristics of children aged ≤ 6 months of age broken down by presence (Group I) or absence (Group II) of exclusive breastfeeding

Characteristic	Group I	Group II	p-value
Born in BFI hospital			0.423
Yes	57 (21.6%)	106 (24.8%)	
No	207 (78.4%)	321 (75.2%)	
Caesarean delivery			0.956
Yes	129 (47.6%)	203 (48%)	
No	142 (52.4%)	220 (52%)	
Sex			0.400
Male	132 (48.0%)	221 (51.5%)	
Female	143 (52.0%)	208 (48.5%)	
Birth weight (g)			0.136
mean±SD	3,228.1±571.3	3,177.7±583.3	
Early BF			0.629
Yes	148 (57.6%)	241 (59.8%)	
No	109 (42.4%)	162 (40.2%)	
Pacifier ≤24 h			<0.001
Yes	89 (32.4%)	253 (59.8%)	
No	186 (67.6%)	170 (40.2%)	
Age (days)			<0.001
mean±SD	74.1±45.3	105.8±49.5	

BFI: Baby Friendly Initiative; BF: breastfeeding; SD: standard deviation

**Table 3** - Factors associated with exclusive breastfeeding by multiple logistic regression

Factor	OR (β)	95%CI	p-value
Age of child	1.012	(1.008-1.016)	<0.001
Pacifier <24h	3.025	(2.098-4.360)	<0.001
Mother goes out to work	2.108	(1.244-3.574)	<0.001
Birth weight	1.000	(0.999-1.000)	<0.001

OR: Odds Ratio; 95%CI: 95% confidence interval

in GII (24.8%), with a significant difference ( $p=0.0002$ ) in relation to GI. Infant's age in days was also significantly different; the children in GII were older ( $p<0.0001$ ).

After multivariate analysis, the following variables maintained their significance: pacifier use in the previous 24 hours: OR 3.02(95%CI 2.10-4.36;  $p<0,001$ ); mother going out to work (OR 2.10; 95%CI 1.24-3.57;  $p=0.006$ ) and age of child (OR 1.01; 95%CI 1.01-1.02;  $p<0,001$ ) (Table 3). Higher birth weight figures in the model as a protective factor for EB.

## Discussion

Breastfeeding continuation during the first years of life has been widely advocated in the programs and recommendations of public healthcare organizations and by the many different scientific societies involved in child health worldwide. The World Health Organization in particular supports breastfeeding continuation up to at least 2 years of age, while the American Academy of Pediatrics recommends it until at least the end of the first year of life<sup>(14,15)</sup>. The prevalence of exclusive breastfeeding up to 6 months of age observed here for the city of São Paulo was 39.1%, which is higher than in previous surveys, such as the one from 1999, when the result for exclusive breastfeeding in the first 4 months of life was 24.9%<sup>(16)</sup>. Analysis of factors associated with absence of EB in the first 6 months showed that pacifier use in the previous 24 hours was the most significant risk factor, followed by mothers going out to work and the infant's age, while heavier birth weight was associated with protection of EB continuation.

Many different analyses of the factors associated with weaning have been conducted in many different countries and regions and this has contributed to the identification of factors that, although common, have a specific influence on local breastfeeding patterns depending on the cultural and economic environments, social organizations, healthcare systems and religious beliefs.

A position paper published by the European Society for Pediatric Gastroenterology, Hepatology and Nutrition's Committee on Nutrition<sup>(1)</sup> points out that mothers who opt for breastfeeding in industrialized nations have higher educational and socioeconomic levels, probably because they are better informed about the benefits of breastfeeding for mother and child. In developing countries the opposite is true, which is likely to be a consequence of the greater influence that public breastfeeding promotion policies have on certain sections of the population.

The heterogeneous nature of the city of São Paulo's population means that the improvement in breastfeeding continuation observed over time is probably a reflection both of what occurs in developed countries and also what is observed in developing ones. In line with this, the results of this study included a higher proportion of mothers over 20 and a majority with high school/higher education. It is however possible that the methodology employed resulted in selection of mothers with these characteristics, since they tend to be the same mothers who seek the best for their children and value basic healthcare actions, such as attending

vaccination campaigns, even if the sample was representative of the city's many different neighborhoods.

With relation to the infants' characteristics, there was a predominance of infants with birth weights over 2,500g in both groups – greater than 90% – and approximately half were born by vaginal delivery, were male and were breastfed in their first hour of life, in both groups. Additionally, around 22% in both groups were born in hospitals participating in the Baby Friendly Initiative. While the homogeneous distribution of these characteristics across the groups may reflect the general population, it may have contributed to the fact that these factors, identified in other publications as associated with weaning<sup>(2,3,6,7)</sup>, were not significant in the population analyzed here.

The identification that pacifier use in the previous 24 hours was the greatest risk factor in the multivariate regression analysis is a result that requires interpretation in a wider context, since this is the variable that has been most investigated over recent years and yet there is still no consensus in the literature. Conflicting results have even been reported in a systematic review<sup>(11)</sup> and a meta-analysis<sup>(17)</sup>, both recent. In the first, the authors concluded that there was high level evidence from four randomized clinical trials that did not demonstrate adverse effects from pacifier use on duration or exclusivity of breastfeeding, even though many observational studies<sup>(2,3,8,9,18)</sup> including the meta-analysis cited earlier<sup>(18)</sup>, have associated it with reduced duration of exclusive breastfeeding and of other modes of breastfeeding.

The undesirable effects and the benefits of pacifier use were dealt with in detail in a recent review published in Brazil<sup>(19)</sup>. The authors accepted the positive effects of pacifier use, especially in specific situations, but called attention to the possibility that they could be overvalued for prevention of infant sudden death, since the negative effects on breastfeeding could also reduce the possible protection against these events attributed to breastfeeding. However, a multi-center, randomized clinical trial conducted by Argentinean researchers and published recently<sup>(10)</sup> found no difference in EB rates at 3 months between a group that was given pacifiers after 2 weeks' breastfeeding and a group that was not given pacifiers. Furthermore, introduction of a pacifier did not interfere in lactation duration. These authors concluded that pacifiers introduced after breastfeeding was established did not change breastfeeding prevalence or duration.

Our study detected a strong association between pacifier use and absence of EB. However, since this is an observational study that used a questionnaire that only asked about the previous 24 hours, these results are not sufficient to state that the association observed is definitive.



On the other hand, the changes to the family environment caused by modern lifestyles have resulted in mothers going out to work becoming an important factor for weaning, as shown in the results reported here and as is found uniformly in the scientific literature<sup>(2,7,20)</sup>.

Increasing age of the child, which also reflects breastfeeding duration, is recognized as a risk factor for weaning because it is related to the compound effect of the other risk factors for weaning accumulating over time.

The confirmation of the protective effect of heavier birth weight is absolutely in line with previously published data, particularly with relation to prematurity, which is recognized as a factor that makes breastfeeding continuation less likely.

Analysis of the results of this study and of others of the same subject in the literature leads to the conclusion that the difficulties observed in attributing the specific effect that each of these factors has on weaning is not only the result of a need for larger-scale studies with more robust methodology. It is necessary to accept the perspective that breastfeeding is much more than just a choice, it is the result of the combined action of multiple cultural, social, behavioral and, primarily, family variables. This is why breastfeeding promotion programs must be supported by wide scale programs designed to control

the most common risk factors in each location and must include the participation of health professionals who are better trained to counsel and support mothers with their problems and insecurities with relation to breastfeeding. The results of this study suggest that in complex cities such as São Paulo, control of the factors identified here should be prioritized in programs to promote breastfeeding.

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