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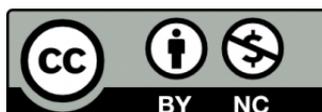
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# DETERMINANTS OF PACIFIER USE AMONG INFANTS ATTENDING AN INTERDISCIPLINARY BREASTFEEDING PROMOTION PROGRAM

## *Fatores determinantes do uso de chupeta entre crianças participantes de programa de incentivo ao aleitamento materno*

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### ABSTRACT

**Purpose:** to evaluate the introduction of pacifiers in children assisted by an interdisciplinary program of encouraging breastfeeding during the first six months of life, investigating the possible determinants of their use. **Methods:** a descriptive, exploratory, longitudinal, quantitative study, through monitoring of 120 mothers and their children. Data were collected on personal characteristics, and demographic variables related to pre-, peri-and postnatal. Bivariate analysis were performed by Chi-square and Fisher exact test and multiple regression analysis with robust adjustment Poisson standard error. **Results:** the analysis revealed that 13.33% of children using pacifiers at the end of the first month of life and 23.33% had this habit at the end of the sixth month. Pacifier use was positively associated with lack of exclusive breastfeeding for the first month (PR: 5.44, CI95%:2.38-12, 44). At the end of the sixth month, this habit was associated with absence of exclusive breastfeeding at discharge from hospital (PR: 4.91, CI95%:1.79-13, 48) and lack of exclusive breastfeeding at six months of life (PR: 2.32, CI95%:1.32-4, 08). **Conclusion:** the use of pacifiers during the first six months of life for children assisted by a program to promote breastfeeding was associated with lack of exclusive breastfeeding.

**KEYWORDS:** Habits; Pacifiers; Breast Feeding; Health Promotion; Prospective Studies

### ■ INTRODUCTION

Pacifiers are widely used in several countries, including Brazil, where it is an important cultural habit<sup>1</sup>.

Castilho e Rocha<sup>2</sup> found more deleterious effects of pacifier use than beneficial effects. Mitchell et al.<sup>3</sup> highlight the importance of using pacifiers to reduce

the risk of sudden infant death syndrome. However, studies show that the habit of sucking pacifier has led to the occurrence of anterior open-bite<sup>4</sup>, posterior crossbite<sup>5</sup>, maxillary atresia<sup>6</sup>, otitis<sup>7</sup>, and to the interruption of breastfeeding<sup>8</sup>.

Some strategies have been developed and applied in order to decrease the prevalence of harmful oral suction habits in infants. We highlight: The Brazilian Standard for Marketing of Infant Food<sup>9</sup>, that has forbidden the commercial promotion of infant milk formulas, nursing bottles and pacifiers through media advertisement; and the National Health Surveillance Agency, through Resolution RDC No. 221 of August 5th, 2002, which, in the attempt to restrict the use of pacifiers, determined the inclusion of the following inscription on the product's packaging: "The Ministry of Health warns: children who are breastfed do not need artificial nipples, nursing bottles or pacifiers. The

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Conflict of interest: non-existent

use of bottles, nipples or pacifiers negatively affects breastfeeding and their prolonged use is harmful to teeth and speech development.”

The “Ten Steps to Successful Breastfeeding” are part of the requirements that a maternity facility must comply with in order to be designated as a “Baby-friendly Hospital” (according to the strict global criteria of the WHO/UNICEF-recommended Baby Friendly Hospital Initiative). They emphasize the non-use of nipples and pacifiers during the hospital stay period of the mother-infant dyad, due to the harmful effects of these devices on breastfeeding. Step 9 says: “give no artificial nipples or pacifiers to children who are being breastfed”<sup>10</sup>.

However, despite government campaigns and the private effort of some groups of professionals who are advocates of breastfeeding, prevalence rates of pacifier use are still high<sup>11</sup>.

Thus, the objective of this study was to longitudinally evaluate the introduction of pacifiers during the first six months of life of infants participating in an interdisciplinary breastfeeding promotion program. We also investigated possible determinants of the use of pacifiers, including personal and demographic characteristics, and variables related to the prenatal, perinatal and postnatal periods.

## ■ METHODS

This is a descriptive, exploratory, longitudinal, and quantitative study. Mother-infant dyads were monitored during an interdisciplinary breastfeeding promotion program conducted in Piracicaba, Sao Paulo, Brazil.

Mothers’ adherence to the program is voluntary and its access is free to the public. This program is offered by a faculty of dentistry, where the population can be treated for free. The program is advertised in healthcare centers, family health care units, gynecological clinics, and, sometimes, through the radio and newspapers. Many mothers are referred to the program by their health care providers. Those who are interested in participating may register in person or by phone.

The interdisciplinary breastfeeding promotion program begins with two meetings during the prenatal period, when pregnant women are prepared for breastfeeding. Postnatal care begins around the 15th day of life of the child. Mother and baby are monitored through nine group meetings and through individual consultations, over the first six months of the child’s life. The first three meetings are held at weekly intervals; the third to fifth meetings are held fortnightly; and the following meetings are held monthly until the child is six months old.

The study involved the entire population served by the program during the year 2004 (N = 127). The following cases were excluded from the analysis: (a) twin pregnancy (N = 4); (b) children with cleft lip and palate (N = 1); (c) children with Down syndrome (N = 2). Thus, the final sample consisted of 120 mother-infant dyads who participated in the program during the year 2004.

Data were collected by a single researcher, who was trained to ensure reliability of the data collected. The data collection instrument was previously tested, standardized and precoded in order to obtain the necessary information about the first six months of the child’s life.

Data collection was performed both during pregnancy (when the mother attended the educational lectures), and after childbirth (during the meetings of the interdisciplinary breastfeeding promotion program).

Personal and demographic data (socioeconomic level, family income, civil status, parents’ age and schooling, number of children, previous breastfeeding experience) as well as data regarding the prenatal period (beginning of prenatal care, number of prenatal consultations) were collected during the meetings through individual application of the questionnaire.

The socioeconomic level of participants was determined according to the model proposed by Kozlowiski<sup>12</sup>. This model is based upon five factors: (1) family income (2) number of residents in the household, (3) schooling level of the caregivers, (4) home ownership situation, and (5) occupation of the head of the family. We applied a scoring system to the responses that were given according to the five factors analyzed. The sum of these scores allowed us to determine individual scores and consequently rank the participants (in order of mean scores) within one of the six social classes proposed in this study (A, B, C, D, E, F). Participants ranked within classes A, B and C were considered to have high socioeconomic levels.

Information on the perinatal period (type of delivery, prematurity, birthweight, time elapsed between delivery and onset of breastfeeding, rooming-in stay and type of feeding at hospital discharge) and the postnatal period (use of pacifiers and/or nursing bottles, occurrence of breast problems, feeling of lack of milk, mother’s return to work, and breastfeeding duration) were obtained during the participation of the mother-infant dyad in the group meetings and individual consultations of the interdisciplinary breastfeeding promotion program, throughout the first six months of the infant’s life.

For purposes of this study, the following concepts were used, according to the WHO's definitions<sup>13</sup>: (EB) Exclusive breastfeeding: the infant receives breast milk directly from the breast or expressed. No other liquids or solids are given to the infant, with the exception of drops or syrups of vitamins, mineral supplements or medicines; (B) Breastfeeding: the infant receives breast milk directly from the breast or expressed, independent of the presence of other foods in the infant's diet, (W) Weaning: the infant no longer receives breast milk.

The present study was conducted according to the Ethical Rules and Guidelines of Resolution No. 196/1996 of the National Board of Health (Ministry of Health), and approved by the Committee of Ethics in Research of the Faculty of Dentistry of Piracicaba, University of Campinas (Unicamp, Protocol No.104/2003). All participating mothers signed an Informed Consent Form.

We conducted bivariate analyses using the chi-square test. Whenever there was a restriction to its use, the Fisher's exact test was employed. Next, we carried out Poisson's multiple regression analysis and used robust adjustment of standard errors. Significance level was set at 5%. All statistical analyses were performed using the SAS statistical software.

## ■ RESULTS

We observed that 98.30% of infants were breastfed and 87.50% were exclusively breastfed at the end of the first month of life. At the end of the sixth month, 92.50% of infants were still breastfed and 47.50% were exclusively breastfed.

Regarding the use of pacifiers, we found that 13.33% of infants used pacifiers at the end of the first month of life and 23.33% had this habit by the end of the sixth month. Among those infants who were using pacifiers at six months of age, 57.14% of them had started using it during the first month

of life. The crying of the infant was the justification given by 89.28% of mothers for the use of pacifiers.

A bivariate analysis of the use of pacifiers according to personal and demographic characteristics is presented in Table 1.

Table 2 shows a bivariate analysis of the use of pacifiers according to characteristics of the prenatal and perinatal periods.

Table 3 presents a bivariate analysis of the use of pacifiers according to characteristics of the postnatal period. We found, through the bivariate analysis, that the use of pacifiers at the end of the infant's first month of life had been influenced by the type of breastfeeding and by the use of nursing bottles. Moreover, it was possible to observe that the use of pacifiers at the end of the sixth month was influenced by the following factors: number of children, type of breastfeeding at hospital discharge, occurrence of breast problems, type of breastfeeding at the end of the sixth month, and use of nursing bottles.

The prevalence ratio (adjusted with Poisson's regression model) for infants who used pacifiers at the end of the first and sixth months of life is presented in Table 4.

The prevalence of pacifier use at the end of the first month was 5.44 times higher (CI95%: 2.38-12.44) among infants who were not exclusively breastfed in the first month of life than among infants who were exclusively breastfed in this period. The prevalence of pacifier use at the end of the sixth month was 4.91 times higher (CI95%:1.79-13.48) among infants who were not exclusively breastfed during the first six months of life than among infants who were exclusively breastfed during this period. Moreover, we found that the prevalence of pacifier use at the end of the sixth month was 2.32 times higher (CI95%:1.32-4.08) among infants who were not breastfed at hospital discharge than among infants who were exclusively breastfed at hospital discharge.

**Table 1 – Bivariate analysis of the use of pacifiers according to personal and demographic characteristics**

Personal and Demographic Characteristics	Sample		Infants who used pacifiers					
			At the end of the 1st month			At the end of the 6th month		
	N	%	N	%	P	N	%	p
Father's schooling								
≤ 8 years	31	25.83	4	12.90	1.0000	5	16.13	0.3309
> 8 years	89	74.17	12	13.48		23	25.84	
Mother's schooling								
≤ 8 years	20	16.67	2	10.00	1.0000	3	15.00	0.4012
> 8 years	100	83.33	14	14.00		25	25.00	
Socioeconomic level*								
High	68	56.67	6	8.82	0.1110	16	23.53	0.9537
Low	52	43.33	10	19.23		12	23.08	
Father's age								
< 30 years	57	47.50	10	17.54	0.1968	16	28.07	0.2432
≥ 30 years	63	52.50	6	9.52		12	19.05	
Mother's age								
< 30 years	88	73.33	12	13.64	1.0000	22	25.00	0.4741
≥ 30 years	32	26.67	4	12.50		6	18.75	
Mother's civil status								
Married/Stable union	109	90.83	14	12.84	0.6402	25	22.94	0.7171
Single/Separated/ Divorced	11	9.17	2	18.18		3	27.27	
Primiparity								
Yes	75	62.50	12	16.00	0.4061	22	29.33	0.0448
No	45	37.50	4	8.89		6	13.33	
Previous breastfeeding experience†								
Yes	23	19.17	1	4.35	0.3029	2	8.70	0.0977
No	97	80.83	15	15.46		26	26.80	

\* Socioeconomic level is based upon five factors: (1) family income, (2) number of residents in the household, (3) caretaker's schooling level, (4) home ownership situation and (5) occupation of the head of the household.

† Mother who breastfed at least one child for at least six months.

For the bivariate analysis, we used Chi-square tests or Fisher's exact tests, in cases where the frequency for one of the categories was less than 5 (significance level = 5%).

**Table 2 – Bivariate analysis of the use of pacifiers according to characteristics of the prenatal and perinatal periods**

Characteristics of the Prenatal and Perinatal periods	Sample		Infants who used pacifiers					
			At the end of the 1st month			At the end of the 6th month		
	N	%	N	%	p	N	%	P
<b>Prenatal Period</b>								
Beginning of Prenatal care								
Before the 4th month	108	90.00	14	12,96	0.6615	24	22,22	0.4715
After the 4th month	12	10.00	2	16,67		4	33,33	
Number of consultations								
< 6	8	6.67	1	12,50	1.0000	1	12,50	0.6792
≥ 6	112	93.33	15	13,39		27	24,11	
<b>Perinatal Period</b>								
Type of delivery								
Normal	39	32.50	5	12.82	1.0000	9	23.08	0.9632
C-section	81	67.50	11	13.58		19	23.46	
Prematurity*								
Yes	6	5.00	0	0.00	1.0000	1	16.67	1.0000
No	114	95.00	16	14.04		27	23.68	
Low birthweight†								
Yes	3	2.50	0	0.00	1.0000	1	33.33	0.5528
No	117	97.50	16	13.68		27	23.08	
Rooming-in stay								
Yes	113	94.17	15	13.27	1.0000	25	22.12	0.3519
No	7	5.83	1	14.29		3	42.86	
Beginning of breastfeeding after delivery								
< 4 hours	55	45.83	5	9.09	0.2833	9	16.36	0.0968
≥ 4 hours	65	54.17	11	16.92		19	29.23	
Exclusive breastfeeding at hospital discharge								
Yes	115	95.83	15	13.04	0.5175	24	20.87	0.0104
No	5	4.17	1	20.00		4	80.00	

\* Infants born before the 37<sup>th</sup> gestational week.

† Infants born weighing less than 2500g.

For the bivariate analysis, we used Chi-square tests or Fisher's exact tests, in cases where the frequency for one of the categories was less than 5 (significance level = 5%).

**Table 3 - Bivariate analysis of the use of pacifiers according to characteristics of the postnatal period**

Characteristics of the postnatal period	Sample				Infants who used pacifiers					
	1st month		6th month		At the end of the 1st month			At the end of 6th the month		
	N	%	N	%	N	%	p	N	%	P
Occurrence of breast problems*										
Yes	43	35.83	51	42.50	5	11.63	0.7846	7	13.73	0.0324
No	77	64.17	69	57.50	11	14.29		21	30.43	
Mothers who returned to work*										
Yes	4	3.33	45	37.50	0	0.00	1.0000	11	24.44	0.8236
No	116	96.67	75	62.50	16	13.79		17	22.67	
Exclusive maternal breastfeeding†										
Yes	105	87.50	57	47.50	9	8.57	<.0001	4	7.02	<.0001
No	15	12.50	63	52.50	7	46.67		24	38.10	
Feeling of lack of milk*										
Yes	10	8.33	43	35.83	2	20.00	0.6213	14	32.56	0.0742
No	110	91.67	77	64.17	14	12.73		14	18.18	
Use of nursing bottle†										
Yes	16	13.33	43	35.83	6	37,50	0.0023	19	44.19	<.0001
No	104	86.67	77	64.17	10	9.62		9	11.69	

\* Variables evaluated during the first month for the analysis of the use of pacifiers at the end of the first month and during the first six months of a child's life for the analysis of the use of pacifiers at the end of the sixth month.

† Variables evaluated at the end of the first month for the analysis of the use of pacifiers at the end of the first month and at the end of the sixth month for the analysis of the use of pacifiers at the end of the sixth month.

For the bivariate analysis, we used Chi-square tests or Fisher's exact tests, in cases where the frequency for one of the categories was less than 5 (significance level = 5%).

**Table 4 – Prevalence ratio adjusted with Poisson's regression model for infants who used pacifiers at the end of the 1<sup>st</sup> and 6<sup>th</sup> months**

Variable	Used pacifiers at the end of the 1st month		Adjusted values *		
	N	%	PR	CI95%	P
Exclusive maternal breastfeeding					
Yes	9	8.57	Reference		
No	7	46.67	5.44	2.38-12.44	<0.0001
Variable	Used pacifiers at the end of the 6th month		Adjusted values *		
	N	%		N	%
Exclusive maternal breastfeeding					
Yes	4	7.02	reference		
No	24	38.10	4.91	1.79-13.48	0.0020
Exclusive breastfeeding at hospital discharge					
Yes	24	20.87	reference		
No	4	80.00	2.32	1.32-4.08	0.0034

\* Poisson's regression; PR: Prevalence Ratio

## ■ DISCUSSION

Data from the present study allow us to observe that, although the dyads participated in an interdisciplinary breastfeeding promotion program during the first six months of the child's life, and received information about the consequences of nonnutritive oral sucking habits, they still offered pacifiers to their infants. In the study conducted by Victora et al.,<sup>14</sup> it was observed that 85% of infants used pacifiers at the end of the first month of life. Among infants born at a Child-Friendly Hospital, it was found that 61.6% used pacifiers at the end of the first month of life.<sup>15</sup> Mascarenhas et al.<sup>16</sup> suggest that, although the population is instructed to avoid the use of pacifiers, we should consider that its use is a cultural habit that is difficult to control and eradicate. Therefore, it is possible to affirm that the institutional rules (that try to discourage the use of pacifiers by using a professional and scientific rhetoric) are not achieving their goals because they collide with the beliefs of the women served by the program, who disregard prohibitions and maintain their reasons for offering this device<sup>17</sup>.

The use of nursing bottles, according to the bivariate analysis, influenced the use of pacifier at the end of the first and sixth months of the child's life. Marques et al.<sup>18</sup> found that the use of pacifiers at seven days of life was associated with the use of nursing bottles at the end of the first month. These results are confirmed by França et al.<sup>19</sup>, who found that nursing bottles were largely used in the first month of life, especially among infants who used pacifiers.

The causal relationship between the use of pacifiers and the use of nursing bottles is not yet fully established. According to Cunha et al.<sup>20</sup>, the use of pacifiers may result in a decreased number of breastfeedings, consequently reducing breast stimulation and milk production, and leading the mother to offer milk formula to the infant in order to satisfy its hunger. On the other hand, some authors suggest that the replacement of breastfeeding by formula may be detrimental to the development of oral sensory-motor system structures - due to lack of proper stimulation of orofacial structures. In addition, it may lead to deleterious oral sucking habits, such as the use of pacifiers<sup>21</sup>.

The occurrence of breast problems also influenced the use of pacifiers at the end of the sixth month of live, according to the bivariate analysis. Lamounier<sup>1</sup> states that pacifiers may be used as a mechanism to reduce and space out breastfeedings, especially by mothers who have difficulties with breastfeeding.

In accordance with the bivariate analysis, pacifier use at the end of the sixth month was also influenced by primiparity. According to Tomasi et al.<sup>22</sup>, the greatest use of pacifier among first-borns may indicate that less-experienced mothers become more anxious because of the crying of the baby and, therefore, are more receptive to advice and recommendations for the use of pacifiers. The results achieved by Victora et al.<sup>14</sup> show that mothers who more strongly tried to offered pacifiers to their infants were also those who tried to exert a greater control over the breastfeeding behavior, had anxious reactions to the infant's crying, seemed to worry about their social appropriateness and were more sensitive to social criticism, which suggests lack of self-confidence.

It can be said that there is a relationship of complicity between mother and pacifier, with the goal of calming down the infant when he cries or is restless<sup>17</sup>. These findings corroborate the results of the present study, since a significant number of mothers justified offering pacifiers to infants because of their crying. Tomasi et al.<sup>22</sup> state that mothers attribute a "child calming" function to pacifiers, which justifies the early introduction of these devices.

According to Poisson's multiple regression analysis, the use of pacifiers was positively associated with: the absence of exclusive breastfeeding at the end of the first month, the absence of exclusive breastfeeding at hospital discharge, and the absence of exclusive breastfeeding at the end of the sixth month of life.

Literature data show a relationship between use of pacifiers and interruption of exclusive breastfeeding<sup>8</sup> or abandonment of breastfeeding<sup>23</sup>. However, its mechanism of action remains unclear.<sup>24</sup> Some authors suggest that the use of pacifier may lead to early weaning<sup>15</sup>, whereas others believe that it is the early termination of exclusive breastfeeding that leads to the use of pacifiers<sup>25</sup>.

Chaves et al.<sup>26</sup> suggest that the use of pacifiers may hide maternal problems such as anxiety and insecurity, which negatively affect breastfeeding. Thus, the use of pacifiers should be interpreted by health professionals as a sign of difficulties in breastfeeding<sup>1</sup>.

Saliba et al.<sup>27</sup> state that health promotion activities should be targeted at risk groups, emphasizing the harmful effects of the use of pacifiers on breastfeeding and the consequences of breastfeeding cessation. However, some authors demonstrate that the provision of information alone is not enough. Fófano et al.<sup>28</sup> found that although the majority of caretakers believe that the recommendation for pacifier use should be made with caution, due to the potential health problems it may cause to infants,

a great number of mothers offer pacifiers to their infants with the aim of calming them down, and in the belief that not offering these devices is synonymous with lack of care and love. In another study it was verified that, although mothers report being aware of the consequences of the use of pacifiers to the infant's health, they justified its use because it allows them to perform other activities<sup>29</sup>. Thus, besides informing the population about the risks of pacifiers, it is necessary to train health professionals to provide routine support to women during the first six months of the infant's life. This is a condition for being successful in avoiding the use of pacifiers<sup>30</sup>.

As this study was part of a research project that evaluated several outcomes, its limitation is that no specific data have been collected regarding frequency of pacifier use.

Based on the information previously presented, we suggest the conduction of studies to examine possible relationships between the use of pacifiers and the occurrence of maternal anxiety during the infant's first months of life. Furthermore, we

recommend the conduction of studies to investigate the existence of a relationship between the offering of pacifiers to infants and the occurrence of colic, since the crying of the baby is one of the main justifications given by mothers for offering pacifiers to infants in their first months of life.

## ■ CONCLUSION

The data from this study showed that pacifier use is associated with absence of exclusive breastfeeding after the first month of a child's life. At the end of the sixth month, its use is associated with absence of exclusive breastfeeding at discharge from hospital and absence of exclusive breastfeeding during the first six months of life. Thus, the use of pacifiers during the first six months of age among infants participating in a breastfeeding promotion program was significantly associated with absence of exclusive breastfeeding.

## RESUMO

**Objetivo:** avaliar a introdução de chupeta entre crianças assistidas por um programa interdisciplinar de incentivo ao aleitamento materno durante os primeiros seis meses de vida, investigando os possíveis determinantes do seu uso. **Métodos:** foi realizado um estudo descritivo, exploratório, longitudinal, quantitativo, por meio do acompanhamento de 120 díades mãe-crianças. Foram coletados dados sobre características pessoais, demográficas, e variáveis referentes aos períodos pré, peri e pós-natal. Foram realizadas análises bivariadas pelo teste Qui-quadrado e teste Exato de Fisher e análise de regressão múltipla de Poisson com ajuste robusto do erro padrão. **Resultados:** verificou-se que 13,33% das crianças usavam chupeta ao final do primeiro mês de vida e que 23,33% apresentavam este hábito ao término do sexto mês. O uso de chupeta esteve associado positivamente à ausência de aleitamento materno exclusivo ao final do primeiro mês (RP:5,44; IC95%:2,38-12,44). Ao final do sexto mês, mostrou-se associado à ausência de aleitamento materno exclusivo no momento da alta hospitalar (RP:4,91; IC95%:1,79-13,48) e ausência de aleitamento materno exclusivo aos seis meses de vida (RP:2,32; IC95%:1,32-4,08). **Conclusão:** o uso de chupeta durante os primeiros seis meses de vida entre crianças assistidas por um programa de promoção à amamentação mostrou-se associado à ausência de aleitamento materno exclusivo.

**DESCRITORES:** Hábitos; Chupetas; Aleitamento Materno; Promoção da Saúde; Estudos Prospectivos

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