

Association between breast-feeding practices and sucking habits: A cross-sectional study of children in their first year of life

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Abstract

In addition to providing nutrition and immunological protection, breast-feeding has positive effects on the development of the infant's oral cavity. The aim of the present study is to assess breast-feeding patterns and to analyze the influence of breast-feeding practices and maternal sociodemographic variables on the prevalence of non-nutritive sucking habits in a sample of Brazilian infants. This cross-sectional study was carried out in Southern Brazil. A random sample of 100 mothers of infants up to 12 months of age was interviewed during the National Vaccination Campaign Day. The prevalence and median duration of breast-feeding were assessed. Breast-feeding practice, the exposure factor, was categorized as exclusive breast-feeding, predominant breast-feeding, complementary breast-feeding, or weaning. Maternal sociodemographic variables included age, race, marital status, educational level, profession, and family income. The outcome investigated was the prevalence of sucking habits (pacifier use and thumb sucking). We used two-sample tests, the chi-square test and FISHER EXACT TEST for statistical analyses of the data. The study revealed that 75% of infants were being breast-fed. Pacifier use and thumb sucking were common in 55%. Bottle-feeding was prevalent in 74% of infants. Breast-feeding was negatively correlated with pacifier use and thumb sucking (OR = 0.11; 95% CI: 0.03 to 0.4). Bottle-feeding was strongly associated with weaning ($p = 0.0003$). Among the sociodemographic variables, only marital status showed a statistical association with sucking habits ($p = 0.04$). These findings suggest that breast-feeding can prevent the occurrence of sucking habits. Although we could not evaluate causality assessment, malocclusion prevention seems to be yet one more reason for promoting breast-feeding practices.

Keywords: Breastfeeding, bottle-feeding, finger sucking, habits, malocclusion, pacifiers, risk factors

Sucking is the first coordinated muscular activity of the infant. A natural sucking instinct leads some babies to suck their thumbs during the first few months of life or even before birth. During this period, besides satisfying the infants' need for sucking, breast-feeding contributes to the correct development of dentofacial structures. Children who do not have access to unrestricted breast-feeding or are bottle-fed may satisfy their instinctive sucking urge with prolonged use of pacifiers or by sucking their thumbs, which may result to the development dental problems.^[1]

The sucking habits of infants are described in the literature as being of two types: nutritive and non-nutritive sucking.^[2] Thumb sucking, finger sucking, and sucking on a pacifier (dummy, comforter) are considered as non-nutritive sucking. Pacifiers or other sucking devices are given to infants to comfort and calm them.^[3] Great variations in non-nutritive sucking habits can be observed in different cultures.^[4-7]

Dental Surgeons claim that thumb sucking and pacifier use are associated with dental malocclusion.^[8-10] An increased prevalence of both oral candida and salivary lactobacilli has been observed in infants using a pacifier or being bottle-fed.^[11] Also, pacifier use is found to be associated with an increased risk of recurrent acute otitis media.^[12] It has been shown that the use of a pacifier in the early postpartum

period, when the infant is learning to suck at the breast, may interfere with proper sucking and can contribute to so-called nipple confusion.^[13] Several studies have shown an association between shorter breast-feeding duration and pacifier use.^[14-18] These findings led the World Health Organization / United Nations Children Fund to recommend avoidance of the use of pacifiers; the recommendation being incorporated as step 9 of the 'Ten Steps to Successful Breast-feeding,' as part of the Baby Friendly Hospitals Initiative.^[19]

Therefore, it seems that the longer the children are breast-fed, the less chance they have of using the pacifier or of sucking on their thumbs and, consequently, the lower the probability of developing malocclusion in childhood.^[20]

The aim of the present study was to assess the breast-feeding pattern (i.e., breast-feeding frequency and median duration) and to analyze the influence of breast-feeding practices and maternal sociodemographic variables on the prevalence of non-nutritive sucking habits in Brazilian infants.

Materials and Methods

This cross-sectional study was conducted in the Department of Pediatric Dentistry, Araçatuba city, Brazil. Araçatuba is a city of 179,000 people in São Paulo State in the northeast of Brazil.

A sample of 100 mothers of infants up to 12 months of age

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was selected and interviewed in the biggest health center of Araçatuba, which is part of the public health service network in the city, during the National Vaccination Campaign Day in June 2005. The sample size was calculated on the basis of the breast-feeding prevalence rate reported in previous national studies^[21] and was weighted to be representative of the population attending the health center. The mothers were randomly selected while they were standing in line to have their child vaccinated. Women who did not want to participate in the study and those whose child was older than 12 months were excluded.

The data was collected by means of a structured interview. The instrument consisted of a pretested form with questions related to the mothers' and offsprings' identification, maternal sociodemographic characteristics, history of breast-feeding and bottle-feeding, history of sucking habits, and history of maternal dental treatment. Breast-feeding duration refers to the total duration of any breast-feeding. Bottle-feeding refers to feeding of the child with liquid or semisolid food from a bottle with a nipple/teat. Infants were considered pacifier users/thumb suckers if they sucked pacifiers/thumbs every day.

We used the definition and categories of breast-feeding recommended by WHO: exclusive breast-feeding (when the child has received only breast milk), predominant breast-feeding (when breast milk was the predominant source of nourishment), and complementary breast-feeding (when breast milk was given in addition to solid or semisolid food); breast-feeding refers to feeding the infant with breast milk and weaning is the term used when the infant is fed liquid or food other than breast milk.^[22]

A pilot study was carried out in the Expectant mother Dental Care Clinic of Araçatuba School of Dentistry (UNESP) in order to validate the instrument and to calibrate the researchers.

Data analysis

Data analysis was carried out using the statistical software Epi Info, version 3.2 (CDC, USA, 2004). Baseline variables were described through means and proportions (%). The prevalence and median duration of breast-feeding (the age in months at which 50% of children are no longer breast-fed) were calculated. The hypothesis tested was that breast-feeding practices and sociodemographic factors are associated with the occurrence of sucking habits. The exposure factors were the breast-feeding practices and maternal sociodemographic variables and the outcome was the presence or absence of sucking habits.

The association between maternal variables (age, race, marital status, educational level, profession, and family income); breast-feeding prevalence [breast-feeding (exclusive breast-feeding + predominant + complementary breast-feeding); or weaning (artificial breast-feeding)] and infants' sucking habits (presence or absence of pacifier use and thumb sucking) was examined. The statistical analysis included two-sample

tests, the Chi-square test and Fisher exact test. A p value of ≤ 0.05 was assumed to indicate statistical significance in all the tests.

Results

All the expectant mothers who were invited to participate in this study agreed to it. Therefore, 100 mothers were included in this study and were interviewed after they had signed informed consent forms.

The majority of the mothers in this study were from low-income families, were urban dwellers, and were mostly young adults, the mean age being 26 years. More than half of them (54%) were primiparous. The mean age of the infants was 5.8 months and the sample had almost equal numbers of girls (48%) and boys (52%). Only 12 children were premature, i.e., had been born before completion of 37 weeks of gestation.

Breast-feeding pattern

According to the feeding practices, the infants could be separated into the following groups: exclusive breast-feeding (20%), predominant breast-feeding (21%), complementary breast-feeding (34%), and weaning (25%).

Through survival analysis we calculated the proportion of breast-fed infants at different ages. Figure 1 shows the breast-feeding duration among infants in their first year of life. As the infants grew older, there was a rapid decrease in the numbers being exclusively breast-fed, and by 6 months of age only 22.2% were being exclusively breast-fed. However, among infants receiving any form of breast-feeding (i.e., exclusive breast-feeding + predominant + complementary breast-feeding), there was a less steeper decline, with a steady proportion of 65% of children being breast-fed from 7 to 12 months. The median duration of exclusive breast-feeding

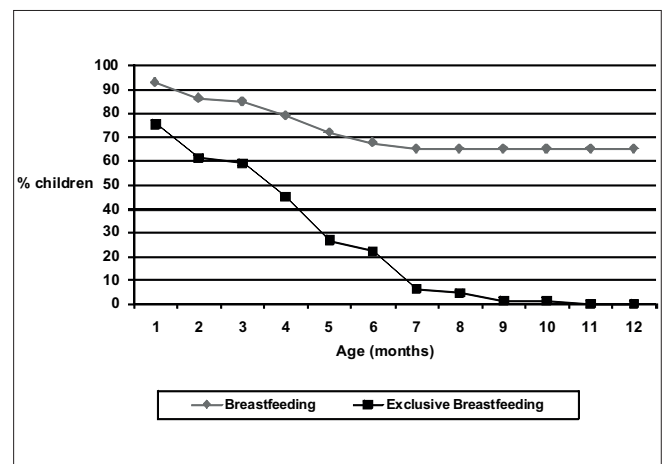


Figure 1: Comparison of duration of exclusive breast-feeding and all forms of breast-feeding (exclusive breast-feeding + predominant + complementary breast-feeding) in Brazilian infants in their first year of life

was 3.65 months.

Sucking habits

Fifty-five percent of all mothers reported that their child had at least one type of sucking habit. Among these infants, 79.2% used a pacifier, 15.1% sucked their thumbs, and 5.7% had both habits. In the group of breast-fed children ($n = 75$) 44% reported some sucking habit. When only the artificial breast-feeding group was considered, 55% had sucking habits as compared with 88% in the weaning group.

Seventy-four percent of infants were bottle-fed, which corresponded to 25% being artificial breast-fed (not human milk) and 49% were predominantly and complementarily breast-fed (human milk and other liquids). In many cases, the bottle was used to feed children with infant formula, tea, water, and juice.

Breast-feeding was found to prevent the occurrence of sucking habits ($OR = 0.107$). When all forms of breast-feeding were considered together (i.e., exclusive + predominant + complementary) there was a statistically significant negative association with the presence of sucking habits ($P = 0.0001$). When the type of sucking habits were considered separately,

breast-feeding was found to be negatively associated with the use of pacifiers ($p < 0.0001$), but there was no statistically significant association with thumb sucking ($p = 1.000$); however, breast-feeding does seem to prevent the occurrence of thumb sucking ($OR = 0.876$) [Table 1].

Bottle-feeding was strongly associated with weaning ($p = 0.0003$). Among the infants who were bottle-fed, the odds that the child was being weaned was 26 times that of those who were not bottle-fed ($OR = 26.305$; 95% CI: 1.534 to 451.00).

Among the maternal sociodemographic variables evaluated in this study, only marital status showed a statistically significant association with the presence of at least one of the sucking habits (pacifier use and/or thumb sucking) ($p = 0.04$). The distribution of these variables according to the prevalence of sucking habits is presented in Table 2.

Only 29% of mothers received dental treatment when they were pregnant. There was no association between the mother's dental care during the pregnancy and the prevalence of sucking habits among the offspring in their first year of life ($p = 0.8$).

Table 1: Negative association between breast-feeding practices and non-nutritive sucking habits (pacifier use and/or thumb sucking) in a Brazilian group of children up to 12 months of age

Variable	Odds ratio	95% CI	p value
Presence of at least one sucking habit	0.107	0.029 to 0.389	0.0001
Pacifier use	0.125	0.042 to 0.372	<0.0001
Thumb sucking	0.876	0.213 to 3.594	1.000

Table 2: Association between maternal sociodemographic variables and non-nutritive sucking habits (pacifier use and/or thumb sucking) in a Brazilian group of children up to 12 months of age

Variables/categories	Presence of sucking habits, n (%)	Absence of sucking habits, n (%)	p value
Place of residence			0.59
Urban area	1 (1.8)	2 (4.4)	
Rural area	54 (98.2)	43 (95.6)	
Income per capita (MW*)			0.69
0–2	25 (45.5)	23 (51.1)	
More than 2	30 (54.5)	22 (48.9)	
Age (years)			0.42
15–25	24 (43.6)	24 (53.3)	
26 or more	31 (56.4)	21 (46.7)	
Race (n = 95)			0.72
White	22 (43.1)	15 (34.1)	
Black	7 (13.7)	8 (18.2)	
Mulatto	21 (41.2)	19 (43.2)	
Asian	1 (2.0)	2 (4.5)	
Marital status			0.04†
Married	52 (94.6)	37 (82.2)	
Divorced	2 (3.6)	1 (2.2)	
Single	1 (1.8)	7 (15.6)	
Profession status			0.84
Do not work (housewives)	32 (58.2)	28 (62.2)	
Work	23 (41.8)	17 (37.8)	
Schooling (years)			1
≤ 8	15 (27.3)	13 (28.9)	
> 8	40 (72.7)	32 (71.1)	

Discussion

The main finding of this study reveals that the breast-feeding protects against the occurrence of non-nutritive sucking habits during early childhood. Marital status was the only sociodemographic variable associated with sucking habits; however, when the two types of sucking habits (i.e., pacifier use or thumb sucking) were considered separately, no association was observed. The rate of exclusive breast-feeding was low, although a high proportion of children received breast milk in addition to other liquids or foods during their first year of life. More than half of the children used pacifiers and/or sucked their thumb as a daily habit.

As a secondary outcome, we also observed that dental care during pregnancy had no influence on the prevalence of sucking habits in children. It seems that no health education (with regard to oral health) was imparted as part of dental treatment during pregnancy. It must be realized that mothers play an important role in families; they determine many of the behaviors their children will develop in the future. Education on the prevention of oral diseases imparted to pregnant women is fundamental to the introduction of good oral habits in their children. It has been reported that the children of mothers who have received such health education during their pregnancy have better oral health status than the children of mothers not submitted to educational programs.^[23,24] During pregnancy, women are more inclined to receive and accept new information and assume responsibilities. However, especially in underprivileged communities, the majority of pregnant women get no instruction during pregnancy regarding oral health.^[25]

Breast-feeding provides multiple nutritional, immunological, and psychological benefits to the infant in its first year of life. Systematic reviews have shown strong evidence in favor of this practice.^[26–28] In addition, it seems that the act of breast-feeding has positive effects on the development of an infant's oral cavity: there is improved shaping of the hard palate, resulting in proper alignment of teeth and fewer problems with malocclusions.^[29–32]

WHO recommends that infants be exclusively breast-fed for the first 6 months of life, with some breast-feeding continuing for up to 2 years of age or beyond.^[19,28] When provided along with appropriate and adequate complementary food, breast milk continues to be an important source of nutrition and fluids and provides immunological benefits even after 6 months of age. However, the rates of exclusive breast-feeding in our study were far from satisfactory. Supplemental feeding before 6 months has a detrimental effect on breast-feeding duration.^[14,28] The early introduction of liquids other than human milk, in the form of infant formula, tea, and juice, is common practice in several countries and can contribute to early weaning.^[33–36]

The strengths of this analysis included the study question and the quality of the data that was collected. A weakness was the study design. Clinical evidence is rated on a scale ranging from level 1 (high) to level 5 (low). Based on ability to control for bias and to demonstrate cause and effect, cross-sectional studies are assumed to provide level 4 evidence.^[37] They can not be used for assessing causality. Another problem with this design is the inability to control for confounders. Although we tried to minimize the bias in our study, it could not be totally eliminated. A randomized controlled trial might have been better, but withholding breast-feeding in one group of infants would have been unethical. The best design, therefore, would have been a cohort study. A continuation of our study is being developed according to this model.

Non-nutritive sucking habits may predispose to the occurrence of malocclusion during childhood; it is a risk factor for the development of open bite and posterior crossbite in deciduous dentition.^[20,38] Occlusal dysfunctions can have severe implications on children's general health and self-esteem and have been classified as a dental public health problem.^[39,40] If the act of breast-feeding can prevent the development of sucking habits in children in their first year of life, that is yet one more reason to promote breast-feeding practices. International organizations such as WHO and UNICEF, governments, and the media have been making great efforts to increase the rates of breast-feeding in all parts of the world.

Analysis of the available data suggests that the occurrence of non-nutritive sucking habits can be avoided through simple measures like correct breast-feeding practices. Although this is not a new issue, consistent evidence is still lacking on the effect of breast-feeding on sucking habits and, consequently, malocclusion.^[41] This study contributes to scientific literature by reporting new data on this field.

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