



Feeding Habits and Severe Early Childhood Caries in Brazilian Preschool Children

Tatiana Degani Paes Leme Azevedo, DDS, MS Ana Cristina Barreto Bezerra, DDS, MS, PhD
Orlando Ayrton de Toledo, DDS, MS, PhD

Dr. Azevedo is a PhD student, Science program, and is professor of pediatric dentistry, School of Dentistry, University Catholic of Brazilia (UCB) and Drs. Toledo and Bezerra are associate professors, Department of Pediatric Dentistry, School of Dentistry, The University of Brasilia (UnB), Asa Norte, Brazil. Correspond with Dr. Azevedo at tdplazevedo@hotmail.com

Abstract

Purpose: The objective of this study was to analyze the association between the feeding practice and presence or absence of SECC (Severe Early Childhood Caries) in Brazilian preschool children.

Methods: This cross-sectional study was conducted with male and female preschool children, aged 36 to 71 months, randomly selected from a low-income population. A 24-hour recall diary was used to assess data about infant feeding practices and dietary habits. The data were statistically analyzed using the chi-square test with a significance level of 5%.

Results: SECC was observed in 36% of the children examined. Infant feeding practices showed the association between SECC and night-time breast-feeding ($P=.02$) or breast-feeding ($P=.0004$) in children older than 12 months of age. The use of a bottle at night as a substitute for the pacifier and its use on demand during the day were also correlated with SECC ($P<.0001$).

Conclusions: It was concluded that night-time breast-feeding in children older than 12 months of age, the use of a bottle at night as a substitute for the pacifier, and use of the bottle on demand during the day are feeding practices correlated with the etiology of SECC. (*Pediatr Dent.* 2005;27:28-33)

KEYWORDS: DENTAL CARIES, PRESCHOOL CHILDREN, EARLY CHILDHOOD CARIES, NURSING CARIES, DIETARY HABITS

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Severe Early Childhood Caries (SECC) is a specific form of rampant decay of primary teeth in infants. The lesions develop quickly and occur in surfaces generally considered to be at low risk for caries.¹ A variety of terms have been used to describe this condition: (1) baby bottle tooth decay²⁻⁶; (2) nursing caries^{1,4,7-9}; (3) nursing bottle syndrome; (4) milk bottle syndrome; (5) bottle mouth caries¹⁰; and (6) Early Childhood Caries (ECC).¹¹⁻¹⁴ In 1998, the National Institute of Dental and Craniofacial Research (NIDCR) proposed SECC as the best term to define this caries pattern.¹⁵

SECC can be associated with infection, pain, and premature loss of primary teeth.¹⁶⁻¹⁸ It has been observed that SECC children attain significantly less height and weight when compared to children without SECC.^{19,20}

This caries pattern is observed in late infancy and early childhood. Since this group is at preschool age, they are not as accessible for examination as are older children, and therefore, few studies in the literature are available.

SECC's etiology varies according to a country's level of development. Poverty is a condition previously linked with SECC.²¹ The possible mechanisms involved can be associated with differences concerning social factors and family and socioeconomic variables, which determine distinct forms of behavior.^{1,3,10,22,23} At-will breast-feeding, frequent or prolonged day or night use of baby bottles that contain fermentable liquids,^{16,20,22,24,25} continued use of a sweetened pacifier,^{32,33} and diet³⁴ are the most common habits that can influence this kind of pathology's development.

SECC's clinical manifestation has been well documented.^{1,16-18,35,36} We still do not know, however, which feeding habits are more closely associated with SECC in low-income and underserved Brazilian populations.

Therefore, the purpose of this study was to analyze the association between the feeding practices and presence of SECC in the low-sociocultural level population of Brazil, since such correlation was not available in Brazilian literature. For that reason, this research will play an

Table 1. Educational Level of Parents

Educational level	Father		Mother	
	N	%	N	%
Elementary school or none	243	71	223	61
High school/technical	92	27	141	38
University/professional	7	2	5	1
Total	342*	100	369	100

*27 fathers were absent and not included in this research.

important role in fighting against and preventing this kind of disease.

Methods

The target population was defined as male and female pre-school children, aged 36 to 71 months, randomly selected at public health centers in Brazil. During the study period, the health centers were chosen by chance. At each health center, each target child was examined. This cross-sectional study was conducted after obtaining the approval of the Ethics Committee of the University of Brasilia (UnB). The estimate of SECC prevalence was previously made in a pilot study with 100 children. SECC's frequency in the pilot study was 40%.

A total of 369 children were evaluated. Only children ages between 36 and 71 months (Table 2), healthy and accompanied by the mother, were included. Therefore, children with medical illnesses and infants who had exfoliated upper incisors were excluded from the study.

After the parents had signed the informed consent, a blinded investigator conducted an interview, guided by a questionnaire, about the cultural and socioeconomic status, the occupation of the parents, and the family income. The questionnaire was previously validated in a pilot study. It also gathered data about infant feeding practices, including patterns and duration of bottle-feeding and breast-feeding. Only after all the questionnaires had been completed did the oral examinations proceed.

A single examiner, blinded as to each child's questionnaire answers, performed the clinical examinations. The children were examined in rooms with good natural and artificial illumination. Caries was assessed by visual examination, using a mirror and probe after drying the teeth with gauze. All tooth surfaces were carefully examined. The probe was used only in case of doubt to confirm absence of a cavity. This is in accordance with Pitts³⁷ and Ismail,³⁸ who stated that explorers do not add accuracy to caries diagnosis and that the application of slight force with an explorer could damage a tooth surface with a white spot lesion.^{37,39}

The tooth was considered present in the mouth when any part of it was visible. The criteria for diagnosing caries were consistent with those of the World Health Organization.⁴⁰

SECC prevalence was calculated according to NIDCR¹⁵ case definition: children with 1 or more cavitated, filled, or missing (due to caries) smooth surfaces in primary maxillary anterior teeth were classified as having SECC.

In 2003, Psoter et al⁴¹ also proposed dental caries in any maxillary incisor surface as a caries pattern and validated this case definition.

Statistical analysis included both descriptive and analytical tests. Discrete and categorical data were presented as frequency/percent distribution. The chi-square analytical test was employed. This test analyzed the difference in feeding variables with the presence or absence of SECC. The significance level was set at 5%. The database was processed by Epiinfo (2002 - Windows - Centers for Disease Control and Prevention, Atlanta, Ga., USA) and SAS (Statistical Analyses System, Version 6.12, SAS Institutes, Inc. Cary, NC, 1997).⁴²

Results

The final sample consisted of 181 girls (49%) and 188 boys (51%). The mean age of the children was 52 months (SD±10). The distribution of children according to age and sex is displayed in Figure 1.

The majority of parents had an educational level ranging from elementary school to none, as observed in Table 1. The average monthly family income of the sample was set at \$50.00 (equivalent to RB147,58 - Brazillian currency). The family income of 65% of the sample was under the average. SECC prevalence in the population evaluated in this study was 36% (Table 2).

It was observed that 95% (N=352) of the children received breast-feeding for at least 1 month. Breast-feeding during night-time was observed in 72% (N=265) and was statistically associated with SECC (P=.02; Table 3).

The children were breastfed for a mean of 17 months (±13). Only 43% stopped the breast-feeding before 12 months (Table 4). Seventy percent of SECC children and 50% of the children without SECC were breastfed after 12 months of age. Statistical analysis showed a significant

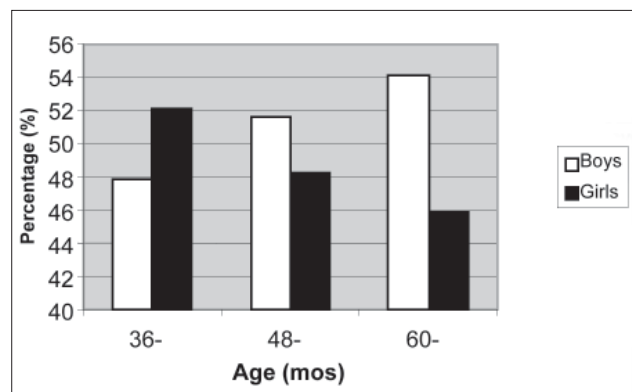


Figure 1. Distribution of children according to sex and age.

association of breast-feeding in children older than 12 months and presence of SECC ($P=.0004$).

SECC had a positive correlation to the use of a night-time bottle as a substitute for the pacifier ($P<.0001$; Table 5) as well as a bottle's use on demand during the day, which was statistically significant ($P<.0001$; Table 6). These practices were taken into consideration when they, as well as the breast-feeding practice, played a part in any period of the child's life. The children received more than 1 kind of liquid in the bottle (Figure 2).

Discussion

This study's sample comprised low-socioeconomic-level children whose parents had a low formal educational level (Table 1) and small family income. SECC's high prevalence among this group has been reported in previous studies.^{6,27,29,43}

SECC's frequency in this study sample was 36% (Table 2). The high prevalence of this kind of tooth decay can be associated with the facts that:

1. this group was from a low socioeconomic level;
2. the children chosen for examination were those present for treatment at a health facility.

The current study has identified several characteristics of feeding habits and SECC. Breast-feeding during night-time was associated with SECC ($P=.02$; Table 3). Similar results were found by Derkson and Ponti,⁴⁴ Matee et al,²⁶ and Al-Dashti et al.⁴⁵ These results are also consistent with Wendt (1995),⁴⁶ showing that night-time breast-feeding can increase a child's risk of developing SECC, and, therefore, should be avoided after primary tooth eruption. This is in accordance with the 1996 American Academy of Pediatric Dentistry (AAPD) statement which recommends that "ad libitum nocturnal breast-feeding should be avoided after the primary tooth begins to erupt."⁴⁷

Table 2. Distribution of Children According to Age and Diagnosis of Signs and Symptoms of SECC

Age (mos)	With SECC		Without SECC		Total	
	Frequency	%	Frequency	%	Frequency	%
36-48	43	30	99	70	142	100
48-60	46	39	72	61	118	100
60-72	44	40	65	60	109	100
Total	133	36	236	64	369	100

Breast-feeding in children older than 12 months has been associated with SECC.^{28,48} In this investigation, children were breastfed up to a mean age of 17 months (± 13). Different ages were found in the studies conducted by Richardson et al⁴⁹ that reported 2 mean ages for stopping breast-feeding: (1) 11.5 months among white children; and (2) 2 months among Black children. Maupome⁵⁰ found 8.1 months as the age at which children typically stopped being breastfed, while Matte et al²⁶ and Wyne et al⁵¹ reported 19 and 17.6 months, respectively—results similar to those found in this research. This prolonged period of breast-feeding can be associated with a low educational level and socioeconomic status, factors that were also related to caries development.⁸

The presence of breast-feeding in children older than 12 months was strongly associated with SECC (Table 4). This finding is similar to Al-Dashti et al,⁴⁵ but different from Richardson et al,⁴¹ Derkson and Ponti,⁴⁴ Serwint et al,⁵² Roberts et al,⁴⁸ and Ramos-Gomez et al.⁵³ This difference may be associated with the populations examined in the aforementioned studies. Based on these findings, it was suggested that mothers should:

1. be encouraged to stop breast-feeding when the child is around 12 months of age;
2. start integrating some other kinds of food in the child's diet as a way to minimize the risks of developing SECC.

There is no agreement concerning human breast milk's cariogenicity.^{26,45,54} Erickson and Mazhari⁵⁴ reported that

Table 3. SECC Prevalence Among Children as Consequence of Night-time Breast-feeding During any Period of Child's Life

Presence	With SECC		Without SECC		Total	
	N	%	N	%	N	%
Yes	105	79	160	68	265	72
No	28	21	76	32	104	28
Total	133	100	236	100	369	100

$P=.02$.

Table 4. SECC Prevalence Among Children According to the Age Breast-feeding Ceased

Period (mos)	With SECC		Without SECC		Total	
	N	%	N	%	N	%
0-12	40	30	110	50	150	43
≥ 12	91	70	111	50	202	57
Total	131	100	221	100	352	100

$P=.0004$.

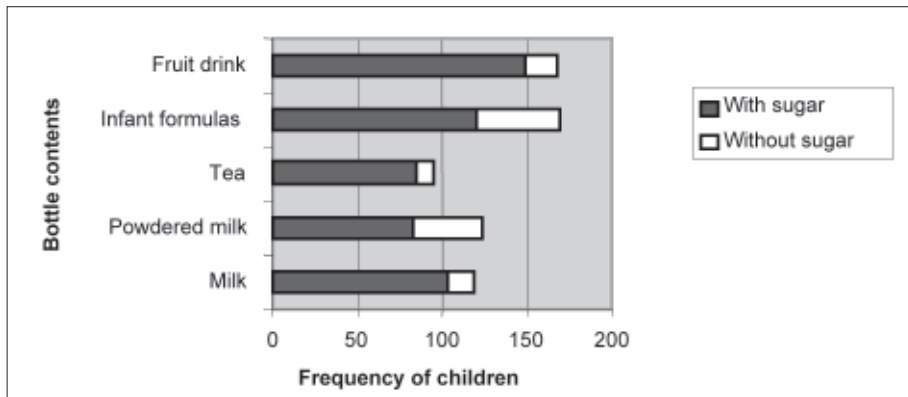


Figure 2. Distribution of children according to bottle contents.

breast milk did not cause significant plaque pH reduction and, consequently, enamel decalcification. They concluded, however, that in a breastfed child who also has a sugar-rich diet, human breast milk becomes highly cariogenic. Therefore, it was believed that it is important to know about breast-feeding habits and their association with other carbohydrates in the child's diet, because this association may become highly cariogenic and lead to SECC.

The use of a bottle as a pacifier substitute has been recognized as an important factor in the etiology of SECC.^{44,56} In this study, the bottle's use at night as a pacifier substitute (Table 5) and its on-demand use during the day (Table 6) were statistically associated with SECC ($P < .0001$). This is in accordance with the findings of Winter et al,³³ Goose,³² Derkson and Ponti,⁴⁴ Holt et al,²⁴ Holt et al,²⁵ Silver,⁵⁷ and Harrison et al.²⁷

On the other hand, Roberts et al⁴⁸ found different results. This can be explained by the fact that the bottle contents are constantly in contact with the dental structures, making it the ideal place for acid production and dental caries onset. In addition, in this study almost all bottles contained sugar (Figure 2), which confirms this feeding habit's cariogenic potential.

This study suggests that night-time breast-feeding, breast-feeding in children older than 12 months of age, the use of a bottle at night as a substitute for the pacifier, and the bottle's use on demand during the day are associated with SECC. Children exhibiting these feeding practices should

be targeted for intense preventive interventions. Furthermore, these findings suggest the opportunity to prevent SECC through educational programs directed toward pregnant women or women with recently born infants.

Conclusions

Using Brazilian preschool children from low-sociocultural-level families as a sample and taking into consideration this cross-sectional study's limitations, it can be concluded that:

1. Breast-feeding at night and beyond 12 months of age are associated with SECC.
2. SECC is positively associated with a:
 - a. night-time bottle used as pacifier substitute;
 - b. bottle used on demand during the day.

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Table 5. SECC Prevalence Among Children According to Night-time Bottles use as Pacifier Substitutes in any Period of Child's Life

Use	With SECC		Without SECC		Total	
	N	%	N	%	N	%
Yes	72	54	71	30	143	39
No	61	46	165	70	226	61
Total	133	100	236	100	369	100

$P < .0001$.

Table 6. SECC Prevalence Among Children According Bottle use During the Day in any Period of Child's Life

Use	With SECC		Without SECC		Total	
	N	%	N	%	N	%
Yes	56	42	53	22	109	29
No	77	58	183	78	260	71
Total	133	100	236	100	369	100

$P < .0001$.

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ABSTRACT OF THE SCIENTIFIC LITERATURE



CHRONOLOGY OF PRIMARY TOOTH ERUPTION IN CLEFT PATIENTS

The objective of this study was to determine the chronology and sequence of eruption of the deciduous teeth in children with unilateral cleft lip and palate. The investigators examined 435 consecutive nonsyndromic patients, ages 0 to 48 months, with complete unilateral cleft lip and palate. They found that all teeth on the cleft side had a higher mean age of eruption than their homologues on the noncleft side. The difference was statistically significant for the maxillary lateral incisor, maxillary canine and mandibular lateral incisor for both sexes, maxillary second molar for girls, and mandibular canine for girls.

Comments: These findings may be useful in the dental treatment planning of patients with cleft lip and palate and in counseling their parents. **SC**

Address correspondence to Profa. Dra. Beatriz Costa, HRCA-USP-Setor de Odontopediatria, Rua Silvio Marchione, 3-20 Vila Universitaria, 17043-900, Bauru, SP, Brazil.

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