

Association between socioeconomic factors, attitudes and beliefs regarding the primary dentition and caries in children aged 1–5 years of Brazilian and Colombian parents



J. Abanto¹, S. Díaz Cárdenas²,
A. Veloso Duran^{1*}, M. Garza¹,
V. Reis Brigato³, F. Guinot^{1,4}

¹Paediatric Dentistry Department, Faculty of Dentistry, Universitat Internacional de Catalunya, Barcelona, Spain.

²Faculty of Dentistry, University of Cartagena, Colombia.

³Faculty of Dentistry, University of São Leopoldo Mandic, São Paulo, Brazil.

⁴Servicio de Odontopediatría. Hospital HM Nens, HM Hospitales/UCJC. Instituto de Investigación Sanitaria HM Hospitales UCJC

*Corresponding author.

DOI 10.23804/ejpd.2024.2102

Email: aveloso@uic.es

Abstract

Background Dental caries is a prevalent chronic disease affecting children worldwide. However, little research has explored the connection between parents' knowledge, attitudes, and beliefs about oral health and the occurrence of dental caries in their children's primary teeth.

Aim To compare how parents' attitudes, knowledge, and sociodemographic characteristics influence untreated early childhood caries in infants and preschoolers in Brazil and Colombia.

Study design Cross-sectional epidemiological study.

Material and methods Oral health information was evaluated in children aged 3 to 5 years with a questionnaire covering sociodemographic and socioeconomic variables, family information and questions about health knowledge and child's and parents' oral health. In addition, oral examinations have been carried out to determine the prevalence of untreated dental caries. A p-value of 0.05 and 95% reliability level were considered statistically significant.

Results A total sample of 1,047 patients was obtained, with 497 in Brazil and 550 in Colombia. Regarding attitudes towards oral health, a significant correlation was observed in both countries in terms of parents' and children's responses from caregivers ($P < 0.05$). According to the unadjusted results between socioeconomic factors and the prevalence of untreated caries, a statistically significant association was observed regarding the age of the children and the educational level of the mothers in both countries, and regarding the socioeconomic status of the families in Colombia ($P < 0.05$). Considering the variables of oral health, a statistically significant relationship was found in Brazil regarding brushing time, fluoride use, responsibility for brushing, and the prevalence of untreated caries ($P < 0.05$). Significant associations were found in both countries between the prevalence of untreated caries and factors such as sugar consumption, satisfaction with children's oral health, and frequency of dental visits ($p < 0.05$).

Conclusions Untreated caries in infants and preschoolers are influenced by socioeconomic status, maternal education, sugar consumption, oral hygiene, and parents' beliefs about primary dentition.

KEYWORDS Early Childhood Caries (ECC), primary dentition, parents influence; socioeconomic factors, oral health.

Introduction

Caries lesions in primary dentition are a public health problem that can be associated with other medical conditions such as diabetes, obesity, cardiovascular diseases, and the impaired development of oral cavity functions, such as speech, breathing, and digestion [Abanto et al., 2011; Baggio et al., 2015].

The prevalence of Early Childhood Caries (ECC) remains above 50% in most countries around the world, with a median global prevalence of 62.7% [Chen et al., 2019]. The latest epidemiological survey in Brazil showed a caries prevalence of 53.4% in 5-year-old children, with 80% of these lesions being untreated [Ministry of Health, 2010]. On the other hand, in Colombia, the National Oral Health Study observed a prevalence of 66.9% for early childhood caries, reaching up to 83.0% in 3 year old children [Ministry of Health and Social Protection, 2014]. In a recent systematic review, it has been established that dental caries still affects more than half of the paediatric population in Latin America and the Caribbean countries [Gimenez et al., 2016].

Currently, dental caries is defined as a sugar-dependent disease, and its origin lies in the imbalance between the processes of dental tissue remineralisation and demineralisation. Understanding the socioeconomic and educational levels, dietary habits, and hygiene practices of parents and children is essential for paediatric health professionals to identify risk factors and implement preventive measures [Baggio et al., 2015; Van Der Tas et al., 2017; Rai and Tiwari, 2018]. In their systematic review, Moynihan and Kelly [2014] elucidate through their findings that numerous studies have already linked individuals' behaviour regarding diets high in sugars and/or inadequate oral hygiene to the development and progression of ECC. Severino et al. [2021] assert that a diet marked by elevated intake of sugary foods and beverages during childhood is strongly correlated with the occurrence of caries in subsequent years. Additionally, the relationship of this process with parents' educational level is well established [Rai & Tiwari, 2018; Yassin et al., 2020]. Additionally, educational lev-

el is directly related to knowledge about oral health, dietary habits, good oral hygiene, and the use of fluoride toothpaste [Abanto et al., 2011; Mishra et al., 2018; Chen et al., 2020].

However, the association between parents' general knowledge, attitudes, and beliefs about oral health and ECC in primary teeth has not been thoroughly studied. Children's oral health is closely related to that of their parents, so parents with good oral hygiene have children with better oral health and hygiene habits [Colombo et al., 2019; Llena et al., 2020]. In a recent study carried out in Brazil, Diel et al. [2022] stated that a significant proportion of parents preferred not to undergo conservative treatments on preschool children between ages 2 to 5 years old, due to beliefs about primary dentition. Given that parents are the primary social influence on children's early years of life, the aim of this study was to evaluate and compare how their attitudes, general knowledge, and sociodemographic status, influence the presence of ECC in two populations with cultural, social, and demographic similarities, such as Brazil and Colombia.

Material and Methods

Study Design and Population

This cross-sectional epidemiological study was approved by the Research Ethics Committee of the Faculty of Dentistry, University of São Leopoldo Mandic, São Paulo, Brazil, in December 2015 (Approval Reference: 1.367.568), and the Research Ethics Committee of the Faculty of Dentistry, University of Cartagena, Colombia, in August 2015 (Approval Reference: 091-Res. 08430). The study was conducted between both universities in a time frame throughout March 2016 and May 2016.

Sample size calculation for the two countries considered the prevalence of dental caries in primary dentition of each of the studied populations, using national epidemiological data (SB-Brasil, 2010; ENSAV IV, 2013). The sample size was calculated considering a caries prevalence of 41.8% in Brazil (SB-Brasil, 2010) and 52.4% in Colombia (ENSAV IV, 2013), along with a design effect of 1.3, a standard error of 5%, and a significance level of 95%. The minimum sample obtained was 486 and 498 preschool children in Brazil and Colombia, respectively.

A two-step random sampling process was used to select the study sample. In the first stage, a random selection was made of all public and private preschools registered with the Municipal Education Secretary in the city of São Paulo and the city of Cartagena, and the number of students participating was determined using the following formula: number of students in each area depending on the sex / number of the total population per sample size. In the second stage, for each grade, a simple random probabilistic sampling with replacement was conducted to select the individuals.

Each participant required a dental examination. Legal guardians/parents were previously informed about the study and were provided a written informed consent. All individuals who agreed to participate in the study met the following inclusion criteria: children aged 1 to 5 years with primary dentition, of both sexes, not undergoing orthopaedic and/or orthodontic treatment, and parents who were intellectually and physically able to respond to the study questionnaire (Figure 1). Children with any type of motor and/or sensory deficiency, and those with dental enamel defects were excluded from the study. The study was conducted in accordance with the Declaration of Helsinki (last updated in October 2013) and the International Conference on Harmonisation (ICH) Good Clinical Practice (GCP) guidelines.

Oral Examination

The clinical examination was conducted within schools

under natural light, using intraoral mirrors, tongue depressors, periodontal probes, and gloves. The children were examined with their heads in an upright position.

The following variables related to oral health status were evaluated:

- Caries lesions were assessed following the criteria of the World Health Organization (WHO) [1997], where dental crowns were classified as decayed, indicated for extraction due to caries, or primary dentition with restorations.
- The prevalence of untreated dental caries was defined as the relative frequency of children who had at least one primary tooth classified as decayed or indicated for extraction due to caries.

Clinical examinations were conducted by two previously trained and calibrated examiners, one in each country. Intra/inter-examiner reliability was assessed by analysing 20 cases not involved in the study, which were re-evaluated after one week, resulting in an intra- and inter-examiner Kappa index above 0.92.

Socioeconomic Variables

The following socioeconomic variables were evaluated using the questionnaire divided into 4 main domains (Figure 1):

Part I - Personal information:

- Sociodemographic variables of children: sex, age (toddler (1 – 2 years), preschool (3 to 5 years)).
- Family variables: family composition (nuclear (mother and father), non-nuclear (others)), number of siblings (one, two or more), number of family members.

Part II - Socioeconomic information:

- Sociodemographic variables of parents: level of education of the mother and father (up to 8 years, ≥ 9 years), monthly family socioeconomic income (up to median, $\geq$ median.)

Part III - Information about the child's oral health:

- Variables of children's oral health included: the frequency of tooth brushing (up to twice a day or ≥ 3 times a day), who performed the brushing (own child or caregiver), the amount of toothpaste used (with fluoride, without fluoride), weekly consumption of sugary substances (everyday, <4 times a week), and satisfaction with their children's oral health (satisfied, partially satisfied, not at all) and frequency of dental visits (at least once a year, never visit the dentist).

Part IV - Information about oral health and knowledge of the responsible party:

- Variables of parents' oral health included weekly consumption of sugary foods (everyday, <4 times a week), satisfaction with their own oral health (satisfied, partially satisfied, not at all), satisfaction with their dentist, and frequency of dental visits (at least once a year, never visit the dentist).
- Attitudes and knowledge of parents regarding oral health were also evaluated, such as beliefs about primary teeth, including whether children inherit their teeth, whether primary teeth have roots, whether they require root canal treatment, and whether antibiotics cause tooth decay.

Statistical analysis

Statistical analysis of the data was performed using the Statistical Package for Social Sciences (SPSS, version 19.0). Descriptive analyses were initially conducted to obtain measures of central tendency (mean/median) and dispersion (standard deviation (SD) and quartiles) for numerical vari-

QUESTIONNAIRE - CHILD AND RESPONSIBLE PARTY INFORMATION

Thank you very much for agreeing to participate. We kindly request that the questionnaire be answered by the responsible party who spends the most time with the child.

PART I - PERSONAL INFORMATION

1. Child's name: _____
2. Child's age in years: _____
3. Gender: () Female () Male
4. Family structure: () Nuclear (Father and mother) () Non-nuclear (Others)
5. Number of siblings: () One () More than one

PART II - SOCIOECONOMIC INFORMATION

Please provide information about the father and mother. For income data, consider the amount received last month in Brazil (R\$) and Colombia (COP). This amount may include salary, family allowance, pension, rent, retirement, or other income.

1. Mother's information:
Education:
() Up to 8 years () More than 8 years

2. Father's information:
Education:
() Up to 8 years () More than 8 years

Monthly family income: _____

PART III - INFORMATION ABOUT THE CHILD'S ORAL HEALTH

1. Does the child brush their teeth every day?
() Does not brush () Once a day () Twice a day () Three or more times a day
2. Who brushes the child's teeth?
() The child brushes on their own () The responsible party brushes
3. Does the toothpaste used contain fluoride?
() Yes () No
4. If the answer was YES, please write the amount of fluoride in the toothpaste:

5. How often does the child consume snacks such as sandwiches, filled cookies, sweets, and soft drinks in a week?
() Every day () Only on weekends () 3 to 4 times a week () No days of the week
6. Are you satisfied with your child's oral health?
() Yes () More or less () No
7. How often does your child visit the dentist in a year?
() At least once a year () Never visits the dentist

PART IV - INFORMATION ABOUT ORAL HEALTH AND KNOWLEDGE OF THE RESPONSIBLE PARTY

1. How often do you, as the responsible party, consume snacks such as filled cookies, sweets, candies, and soft drinks in a week?
() Every day () Only on weekends () 3 to 4 times a week () No days of the week
2. Are you, as the responsible party, satisfied with the health of your own mouth?
() Yes () No
3. How often do you visit the dental office?
() Once a year () Every 6 months () I don't go to the dentist
4. Do you think your child has inherited your teeth?
() Yes () No
5. In your opinion, do primary teeth have roots?
() Yes () No
6. Do you think the tooth might need root canal treatment?
() Yes () No
7. In your opinion, does the use of antibiotics cause cavities?
() Yes () No

FIG. 1 Questionnaire used in this research study

ables, as well as absolute and relative frequencies for categorical variables. Prevalence ratios (PR) and confidence intervals (95% CI) were calculated. A multivariate model was constructed with selected covariates using a progressive stepwise procedure. To enter the final multivariate model, covariates with a p-value < 0.20 were considered, and to remain in this model, they had to retain a p-value of < 0.05.

Results

A total sample of 1,047 patients was obtained, with 497 in Brazil and 550 in Colombia. From the obtained sample, 49.2% were females and 50.8% were males. Gender-wise, both countries presented a similar distribution of male and female children involved in the study. The mean age of Brazilian children was 2.91 years (SD 1.22), while Colombian children had a mean age of 3.38 years (SD 1.12) respectively (Table 1).

Regarding attitudes towards oral health, a significant correlation was observed in both countries in terms of parents and children's responses from caregivers, specifically in relation to sugar consumption in the diet, satisfaction with oral health, and frequency of dental visits ($P < 0.0001$) (Table 2).

According to the unadjusted results between socioeconomic factors and the prevalence of untreated caries, a statistically significant association was observed regarding the age of the children and the educational level of the mothers in both countries, and regarding the socioeconomic status of the families only in Colombia ($P < 0.05$). Considering the variables of oral health, a statistically significant relationship was found in Brazil regarding brushing time, fluoride use, responsibility for brushing, and the prevalence of untreated caries ($P < 0.05$). On the other hand, in Colombia, a statistically significant relationship was found between daily sugar consumption and the prevalence of untreated caries. Finally, in both countries, a statistically significant relationship was observed between the satisfaction of oral health in children and parents and the prevalence of untreated caries ($P < 0.0001$) (Table 3).

In the adjusted model (Table 4), among socioeconomic factors, Brazilian children aged 3 to 5 years old were 3.85 times more likely to have a prevalence of untreated caries compared to younger children (95% CI 1.70-6.7; $P < 0.001$). Regarding the educational level of Brazilian mothers, there was a significant association between maternal education ≥ 9 years and lower prevalence of untreated caries (PR=0.56;

Variables	BRAZIL		COLOMBIA	
	Untreated decayed teeth =0 n (%)	Untreated decayed teeth >0 n (%)	Untreated decayed teeth =0 n (%)	Untreated decayed teeth >0 n (%)
SOCIOECONOMIC VARIABLES				
Child's age				
Toddler (1 – 2 years)	196 (95.1)	10 (4.9)	157 (98.1)	3 (1.9)
Preschool (3 to 5 years)	236 (81.7)	53 (18.3)	352 (90.3)	38 (9.7)
Sex				
Female	231 (90.2)	25 (9.8)	241 (93.1)	18 (6.9)
Male	203 (84.2)	38 (15.8)	268 (92.1)	23 (7.9)
Family Structure				
Nuclear (mother and father)	339 (88.5)	44 (11.5)	383 (92.7)	30 (7.3)
Non-nuclear (others)	90 (83.3)	18 (16.7)	126 (92.0)	11 (8.0)
Number of siblings				
One	345 (87.3)	50 (12.7)	433 (92.9)	33 (7.1)
Two or more	84 (87.5)	12 (12.5)	76 (90.5)	8 (9.5)
Mother's educational level				
Up to 8 years	63 (80.8)	15 (19.2)	18 (72.0)	7 (28.0)
≥ 9 years	360 (89.3)	43 (10.7)	491 (93.5)	34 (6.5)
Father's educational level				
Up to 8 years	68 (85.0)	12 (15.0)	17 (85.0)	3 (15.0)
≥ 9 years	309 (88.8)	39 (11.2)	492 (92.8)	38 (7.2)
ORAL HEALTH ATTITUDES VARIABLES				
Toothbrushing frequency				
Up to twice a day	278 (88.8)	35 (11.2)	206 (92.4)	17 (7.6)
≥ 3 times a day	129 (82.2)	28 (17.8)	303 (92.7)	24 (7.3)
Responsible for toothbrushing				
Own child	106 (79.1)	28 (20.9)	83 (88.3)	11 (11.7)
Caregiver	314 (90.0)	35 (10.0)	426 (93.4)	30 (6.6)
Type of dentifrice				
With fluoride	332 (86.0)	54 (14.0)	324 (92.0)	28 (8.0)
Without fluoride	93 (93.9)	6 (6.1)	185 (93.4)	13 (6.6)
Child's frequency of sugar consumption				
Everyday	52 (85.2)	9 (14.8)	203 (88.3)	27 (11.7)

TABLE 1 Descriptive characteristics for untreated decayed teeth prevalence comparison between countries in relation to socioeconomic, oral health attitudes and beliefs regarding primary teeth.

Follows next page

< 04 times a week	382 (87.6)	54 (12.4)	306 (95.6)	14 (4.4)
Responsible's frequency of sugar consumption				
Everyday	46 (83.6)	9 (16.4)	86 (86.9)	13 (13.1)
< 04 times a week	386 (87.7)	54 (12.3)	423 (93.8)	28 (6.2)
Satisfaction with child's oral health				
Satisfied	265 (94.0)	17 (6.0)	410 (97.6)	10 (2.4)
Partially satisfied	145 (81.9)	32 (18.1)	75 (78.1)	21 (21.9)
Not at all	21 (63.6)	12 (36.4)	24 (70.6)	10 (29.4)
Responsible's satisfaction with oral health				
Satisfied	180 (91.4)	17 (8.6)	334 (94.9)	18 (5.1)
Partially satisfied	183 (84.3)	34 (15.7)	134 (89.3)	16 (10.7)
Not satisfied	69 (85.2)	12 (14.8)	41 (85.4)	7 (14.6)
Child's visits to the dentist				
At least once a year	289 (88.9)	36 (11.1)	119 (92.2)	10 (7.8)
Never visit the dentist	142 (84.5)	26 (15.5)	390 (92.6)	31 (7.4)
Responsible's visits to the dentist				
At least once a year	53 (84.1)	10 (15.9)	44 (97.8)	1 (2.2)
Do not visit the dentist	375 (87.5)	52 (12.2)	465 (92.1)	40 (7.9)
BELIEFS REGARDING PRIMARY TEETH				
Children inherited their teeth				
No	215 (87.0)	32 (13.0)	364 (93.3)	26 (6.7)
Yes	197 (87.2)	29 (12.8)	145 (90.6)	15 (9.4)
Primary teeth have root				
No	244 (87.1)	36 (12.9)	358 (93.7)	24 (6.3)
Yes	165 (87.8)	23 (12.2)	151 (89.9)	17 (10.1)
Primary teeth need root canal treatment				
No	192 (86.5)	30 (13.5)	300 (92.0)	26 (8.0)
Yes	219 (87.6)	31 (12.4)	209 (93.3)	15 (6.7)
Antibiotics causes caries				
No	65 (89.0)	8 (11.0)	345 (92.7)	27 (7.3)
Yes	353 (86.7)	54 (13.3)	164 (92.1)	14 (7.9)

TABLE 1 Descriptive characteristics for untreated decayed teeth prevalence comparison between countries in relation to socioeconomic, oral health attitudes and beliefs regarding primary teeth.

95% CI 0.33-0.9; $P < 0.031$). These variables did not retain correlation in the adjusted model of the Colombian sample.

On the other hand, in the same adjusted model (Table 4) regarding oral health variables, parents who were partially satisfied or dissatisfied with their children's oral hygiene, both in Brazil and Colombia, had higher odds of having a prevalence of untreated caries ($P < 0.05$).

Finally, when taking into consideration the attitude and knowledge of parents about oral health, there was a significant association between Colombian parents who believed that primary teeth did not have root canals, and the prevalence of untreated caries (PR = 1.98; 95% CI 1.15-3.43; $P = 0.015$).

Discussion

To our knowledge, there are no studies comparing the association of factors, oral health knowledge, and beliefs about primary dentition with the prevalence of untreated dental caries among different countries, considering the cultural diversity within the same continent. Our study demonstrated a significant relationship between the prevalence of untreated caries in infants and preschoolers and certain socioeconomic variables, attitudes about oral health, and beliefs concerning primary teeth.

According to the scientific evidence, Abanto et al. [2011] and Diel et al. [2022] concluded that the age of children, parents' level of education, attitudes, and beliefs, as well as certain oral care factors, are directly related to the prevalence of dental caries.

Considering the age of the patients, Twetman [2016] stated that the first age of risk for the onset of caries ranges from 1 to 3 years old, and the second age range is between 5 and 7 years old, when the first permanent molars erupt. Elamin et al. [2021], in their systematic review, associated an increase in children's age with a higher risk of caries in 8 different countries. In our study, we observed a higher prevalence of untreated caries in children between the ages of 3 to 5 years old, compared to those aged 1–2 years old in both studied populations, with a 3.85 times higher likelihood of having untreated caries compared to children aged 1–2 years old in the case of Brazil. Thus, we could conclude that increasing age is recognised as an independent risk factor for the occurrence of dental caries due to prolonged exposure to cariogenic processes.

Rai and Tiwari [2018] and Kumar et al. [2014], in their systematic reviews, stated that most researchers have observed a strong correlation between the level of knowledge and education of the mother, which can influence the oral health of children and, consequently, a higher likelihood of developing early

COLOMBIA		
	r*	P-value
Frequency of sugar consumption	0.322	<0.0001
Satisfaction with oral health	0.444	<0.0001
Frequency of visits to the dentist	0.210	<0.0001
BRAZIL		
	r*	P-value
Frequency of sugar consumption	0.435	<0.0001
Satisfaction with oral health	0.320	<0.0001
Frequency of visits to the dentist	0.177	<0.0001

* Spearman's correlation coefficient

TABLE 2 Correlations of oral health attitudes between parents and children.

childhood caries. At the same time, Diel et al. [2022] related a higher level of maternal education to a greater tendency to perform conservative treatments in the primary dentition of their children, even in the absence of pain. Our results demonstrated a statistically significant association between higher maternal education and a lower prevalence of untreated dental caries in both countries. Maternal education is a key factor for the prevention of dental caries in childhood, as there is a growing need for educational programs for parents regarding best practices for oral hygiene to maintain optimal oral health.

Parents' attitudes towards the oral health of their children as well as themselves, also play a fundamental role in the prevention of oral pathologies and are bound to be associated with ECC [Rai & Tiwari, 2018]. According to the study by Sun et al. [2017], children imitate their parents' behavior regarding their oral health habits. In our study, we observed a correlation between parents and children regarding the consumption of sweets in the diet, satisfaction with oral health, and frequency of dental visits. These results confirm that the parents' behaviour regarding their oral health and hygiene habits can be crucial in the prevention of this disease.

One of the main risk factors for dental caries is sugar consumption. Moynihan and Kelly [2014], in their systematic review, stated that 42 of the 50 included studies reported at least one association between caries and sugar intake. They also observed that the effect of sugar on the dentition lasts a lifetime and the level of caries in childhood can be indicative of the caries level throughout the child's life. Leong et al. [2013] asserted that parents' behavior regarding their dietary habits is associated with early childhood caries. In our study, we were able to observe a statistically significant relationship between high daily sugar consumption by children and caregivers and the prevalence of untreated carious teeth in Colombia, although they were not maintained in the adjusted model. Limiting the frequency of sugar consumption and avoiding inadequate consumption play a very important role in minimising the risk of dental caries.

Bhaskar et al. [2014], in their systematic review, observed that there is not enough evidence to demonstrate the effectiveness of dental preventive visits in children up to 6 years old. Similar results were found by Rai and Tiwari [2018], where they concluded that more research is needed to examine the influence of parental attitudes on the development of early childhood caries. In our study, we also did not find statistically significant results between dental visits of parents and children and early childhood caries.

The partial or total dissatisfaction of parents regarding the oral health of their children can be considered an indicator of the prevalence of early childhood caries. To our knowledge, there are no studies in the literature that associate parental satisfaction with their children's oral health and the prevalence of dental caries in children aged 1–5 years old. However, Jiang et al. [2021] have linked parental dissatisfaction with the oral health of preschool children with dental caries. In our study, we observed that in both Brazil and Colombia, there is a significant association between higher prevalence of untreated caries and partial or dissatisfaction.

The lack of knowledge about primary dentition is a common characteristic in many populations. Alkhtib and Morawala [2018] and Calcagnile et al. [2019] have conducted studies confirming how parental knowledge influences the presence of ECC. Tamosiunas et al. [2013], Meriç et al., [2020], Valpreda et al., [2020] and Misová et al. [2021] report that parental misinformation about primary dentition can interfere with early attention to paediatric dentistry, as most parents consider all dental procedures to be painful and expensive, making them more likely to dismiss more conservative treatments. Diel et al. [2022] stated in their study that 40.4% of parents believe that primary teeth do not have root canals and, therefore, pulp treatments are not viable options for parents with this belief. Alazmah [2017] concluded that a lack of knowledge about primary dentition is associated with a higher prevalence of caries in the paediatric population. Similar results have been observed in our study, where there is a higher prevalence of untreated caries in Colombian children whose parents believe that primary teeth do not have root canals, making it more likely for them to have untreated carious teeth. We can also affirm that there is limited knowledge about the oral health of children in both populations, although this knowledge is not related to a higher ECC index.

Moynihan and Kelly [2014] identified that providing oral health education to parents and caregivers reduces the risk of early childhood caries. Therefore, an effective and accessible public health intervention is needed to prevent caries in children, including educational programs for parents and caregivers that address the importance of oral hygiene, diet, and the prevention of early childhood caries. Additionally, the socioeconomic and cultural situation of populations should be considered to design interventions tailored to the specific needs of each community.

Conclusions

- The older the age of the patient, the lower satisfaction of parents regarding their children's oral health and the myth that primary dentition has no roots, increases the prevalence of untreated caries in infants and preschoolers, while higher maternal education is associated with lower prevalence of this outcome.
- There is a correlation between sugar consumption habits, frequency of dental visits, and satisfaction with oral health between parents and preschool-aged children.

References

- › Abanto J, Carvalho TS, Mendes FM, Wanderley MT, Bönecker M, Raggio DP. Impact of oral diseases and disorders on oral health-related quality of life of preschool children. *Community Dent Oral Epidemiol.* 2011;39(2):105-114.
- › Alazmah A. Early Childhood Caries: A Review. *J Contemp Dent Pract.* 2017 Aug 1;18(8):732-737.
- › Alkhtib A, Morawala A. Knowledge, Attitudes, and Practices of Mothers of Preschool Children About Oral Health in Qatar: A Cross-Sectional Survey. *Dent J*

	BRAZIL			COLOMBIA		
	Unadjusted values			Unadjusted values		
Exposure	PR	(CI 95%)	P-value	PR	(CI 95%)	P-value
SOCIOECONOMIC VARIABLES						
Child's age (Toddler as ref.)						
Preschool (3 to 5 years)	3.77	(1.97-7.25)	<0.0001	5.20	(1.63-16.6)	0.005
Sex (Female as ref.)						
Male	1.61	(1.01-2.59)	0.047	1.14	(0.63-2.06)	0.671
Family Structure (Nuclear as ref)						
Non-nuclear	1.45	(0.87-2.40)	0.149	1.10	(0.56-2.14)	0.767
Number of siblings (One as ref.)						
Two or more	0.98	(0.55-1.78)	0.967	1.35	(0.64-2.81)	0.431
Mother's educational level (Up to 8 years as ref.)						
≥8 years	0.55	(0.32-0.95)	0.031	0.23	(0.11-0.47)	<0.0001
Father's educational level (Up to 8 years as ref.)						
≥8 years	0.74	(0.41-1.37)	0.341	0.48	(0.16-1.42)	0.184
Family monthly income (Up to median as ref.)						
≥ median	0.70	(0.41-1.18)	0.179	0.45	(0.24-0.86)	0.017
ORAL HEALTH ATTITUDES VARIABLES						
Toothbrushing frequency (Up to twice a day as ref.)						
≥ 3 times a day	1.59	(1.00-2.52)	0.046	0.96	(0.53-1.75)	0.901
Responsible for toothbrushing (Own child as ref.)						
Caregiver	0.47	(0.30-0.75)	0.002	0.56	(0.29-1.08)	0.085
Type of dentifrice (With fluoride as ref.)						
Without fluoride	2.31	(1.02-5.21)	0.044	1.21	(0.64-2.29)	0.554
Child's frequency of sugar consumption (Everyday as ref.)						
< 04 times a week	0.84	(0.43-1.61)	0.600	0.37	(0.19-0.69)	0.002
Responsibles frequency of sugar consumption (Everyday as ref.)						
< 04 times a week	0.78	(0.39-1.43)	0.384	0.47	(0.25-0.88)	0.018
Satisfaction with child's oral health (Satisfied as ref.)						
Partially satisfied	2.99	(1.72-5.24)	<0.0001	9.19	(4.47-18.8)	<0.0001
Not at all	6.03	(3.16-11.5)	<0.0001	12.4	(5.52-27.6)	<0.0001
Responsibles satisfaction with oral health (Satisfied as ref.)						
Partially satisfied	1.82	(1.05-3.15)	0.034	2.08	(1.09-3.98)	0.026
Not satisfied	1.77	(0.86-3.43)	0.126	2.85	(1.26-6.47)	0.012
Child's visits to the dentist (At least once a year as ref.)						
Never visit the dentist	1.39	(0.87-2.23)	0.162	0.95	(0.48-1.89)	0.883
Responsible's visits to the dentist (At least once a year as ref.)						
Do not visit the dentist	0.77	(0.41-1.43)	0.405	3.56	(0.50-25.4)	0.204
BELIEFS REGARDING PRIMARY TEETH						
Children inherited their teeth (Yes as ref.)						
No	0.73	(0.45-1.18)	0.206	1.41	(0.76-2.58)	0.272
Primary teeth have roots (Yes as ref.)						
No	1.07	(0.67-1.71)	0.764	0.83	(0.46-1.55)	0.576
Primary teeth need root canal (Yes as ref.)						
No	1.37	(0.87-2.18)	0.176	1.61	(0.88-2.91)	0.116
Antibiotics causes caries (Yes as ref.)						
No	0.89	(0.48-1.69)	0.738	1.08	(0.58-2.01)	0.800

TABLE 3 Unadjusted associations between socioeconomic, oral health attitudes and beliefs regarding primary teeth variables and the prevalence of untreated decayed teeth.

	BRAZIL			COLOMBIA		
	Adjusted values			Adjusted values		
Exposure	PR	(CI 95%)	P-value	PR	(CI 95%)	P-value
SOCIOECONOMIC VARIABLES						
Child's age (Toddler as ref.)						
Preschool (3 to 5 years)	3.85	(1.70-6.7)	<0.001		CNS	
Mother's educational level (Up to 8 years as ref.)						
≥9 years	0.56	(0.33-0.9)	0.031		CNS	
ORAL HEALTH ATTITUDES VARIABLES						
Satisfaction with child's oral health (Satisfied as ref.)						
Partially satisfied	2.62	(1.47-4.6)	0.001	9.47	(4.64-19.3)	<0.001
Not at all	4.82	(2.48-9.3)	<0.001	13.8	(6.18-31.1)	<0.001
BELIEFS REGARDING PRIMARY TEETH						
Primary teeth have root (Yes as ref.)		CNS				
No				1.98	(1.15-3.43)	0.015

TABLE 4 Adjusted associations between socioeconomic, oral health attitudes and beliefs regarding primary teeth variables and the prevalence of untreated decayed teeth.

- (Basel). 2018 Oct 1;6(4):51.
- Baggio S, Abarca M, Bodenmann P, Gehri M, Madrid C. Early childhood caries in Switzerland: a marker of social inequalities. *BMC Oral Health*. 2015 Jul 22;15:82.
 - Bhaskar V, McGraw KA, Divaris K. The importance of preventive dental visits from a young age: systematic review and current perspectives. *Clin Cosmet Investig Dent*. 2014 Mar 20;6:21-7.
 - Calcagnile F, Pietrunti D, Pranno N, Di Giorgio G, Ottolenghi L, Vozza I. Oral health knowledge in pre-school children: A survey among parents in central Italy. *J Clin Exp Dent*. 2019 Apr 1;11(4):e327-e333.
 - Chen KJ, Gao SS, Duangthip D, Lo ECM, Chu CH. Prevalence of early childhood caries among 5-year-old children: A systematic review. *J Investig Clin Dent*. 2019;10(1):e12376.
 - Chen L, Hong J, Xiong D, et al. Are parents' education levels associated with either their oral health knowledge or their children's oral health behaviors? A survey of 8446 families in Wuhan. *BMC Oral Health*. 2020 Jul 11;20(1):203.
 - Colombo S, Gallus S, Beretta M, et al. Prevalence and determinants of early childhood caries in Italy. *Eur J Paediatr Dent*. 2019;20(4):267-273.
 - Diel LC, Abanto J, Ferreira Antunes JL, et al. Parental preferences for dental caries treatment in preschool children according to socio-demographic conditions and beliefs about the primary dentition. *Eur J Paediatr Dent*. 2022;23(2):147-152.
 - Elamin A, Garemo M, Mulder A. Determinants of dental caries in children in the Middle East and North Africa region: a systematic review based on literature published from 2000 to 2019. *BMC Oral Health*. 2021 May 4;21(1):237.
 - Gimenez T, Bispo BA, Souza DP, et al. Does the Decline in Caries Prevalence of Latin American and Caribbean Children Continue in the New Century? Evidence from Systematic Review with Meta-Analysis. *PLoS One*. 2016 Oct 21;11(10):e0164903.
 - Gruebber AO. A Measurement of Dental Caries Prevalence and Treatment Service for Deciduous Teeth. *J Dent Res* 1944;23(3):163-168.
 - Jiang M, Xie QY, Wong MCM, Chu CH, Lo ECM. Association between dental conditions, sliver diamine fluoride application, parental satisfaction, and oral health-related quality of life of preschool children. *Clin Oral Investig*. 2021;25(2):653-662.
 - Kumar S, Kroon J, Laloo R. A systematic review of the impact of parental socio-economic status and home environment characteristics on children's oral health related quality of life. *Health Qual Life Outcomes*. 2014 Mar 21;12:41.
 - Leong PM, Gussy MG, Barrow SY, de Silva-Sanigorski A, Waters E. A systematic review of risk factors during first year of life for early childhood caries. *Int J Paediatr Dent*. 2013;23(4):235-50.
 - Llena C, Calabuig E, Sanz JL, Melo M. Risk Factors Associated with Carious Lesions in Permanent First Molars in Children: A Seven-Year Retrospective Cohort Study. *Int J Environ Res Public Health*. 2020 Feb 22;17(4):1421.
 - Meriç E, Bolgöl B, Duran N, Ay E. Evaluation of oral streptococci in saliva of children with severe Early Childhood Caries and caries-free. *Eur J Paediatr Dent*. 2020;21(1):13-17. doi: 10.23804/ejpd.2020.21.01.03.
 - Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal - Resultados Principais. Brasília: Ministério da Saúde; 2011.
 - Ministerio de Salud y Protección Social, Instituto Nacional de Salud. Estudio Nacional de Salud Bucal - ENSAB IV. Bogotá: Ministerio de Salud y Protección Social; 2014.
 - Mishra A, Pandey RK, Chopra H, Arora V. Oral health awareness in school-going children and its significance to parent's education level. *J Indian Soc Pedod Prev Dent*. 2018;36(2):120-124.
 - Mišová E, Žižka R, Vágnerová B, Morozova Y, Langr O, Voborná I. Prospective longitudinal study of early childhood caries and developmental defects of enamel on permanent successors in children in the Czech Republic. *Eur J Paediatr Dent*. 2021;22(1):41-46.
 - Moynihan PJ, Kelly SA. Effect on caries of restricting sugars intake: systematic review to inform WHO guidelines. *J Dent Res*. 2014;93(1):8-18.
 - Petersson GH, Bratthall D. The caries decline: a review of reviews. *Eur J Oral Sci*. 1996;104(4 (Pt 2)):436-443.
 - Rai NK, Tiwari T. Parental Factors Influencing the Development of Early Childhood Caries in Developing Nations: A Systematic Review. *Front Public Health*. 2018 Mar 16;6:64.
 - Severino M, Caruso S, Ferrazzano GF, et al. Prevalence of Early Childhood Caries (ECC) in a paediatric Italian population: An epidemiological study. *Eur J Paediatr Dent* 2021;22(3):189-98.
 - Sun HB, Zhang W, Zhou XB. Risk Factors associated with Early Childhood Caries. *Chin J Dent Res*. 2017;20(2):97-104.
 - Tamošiūnas V, Kay E, Craven R. A preliminary study applying decision analysis to the treatment of caries in primary teeth. *Stomatologija*. 2013;15(3):84-91.
 - Tinanoff N. Association of diet with dental caries in preschool children. *Dent Clin North Am*. 2005;49(4):725-737, v.
 - Twetman S. Caries risk assessment in children: how accurate are we? *Eur Arch Paediatr Dent*. 2016;17(1):27-32.
 - van der Tas JT, Kragt L, Elfrink MEC, et al. Social inequalities and dental caries in six-year-old children from the Netherlands. *J Dent*. 2017;62:18-24.
 - Valpreda L, Carcieri P, Cabras M, Vecchiati G, Arduino PG, Bassi F. Frequency and severity of dental caries in foster care children of Turin, Italy: a retrospective cohort study. *Eur J Paediatr Dent*. 2020 Dec;21(4):299-302. doi: 10.23804/ejpd.2020.21.04.8.
 - World Health Organization. Oral Health Surveys: Basic Methods. 4th ed. Geneva: World Health Organization; 1997.
 - Yassin SM, Tikare S, Alkahtani ZM, et al. Caries preventive practices and dental caries among boys aged 615 in Saudi Arabia. *Eur J Paediatr Dent* 2020;21(2):97-102.