

Impact of Early Childhood Caries and Maternal Behaviors on Oral Health-Related Quality of Life of Children

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Abstract

Objective: To evaluate the impact of early childhood caries, maternal behaviors and associated factors on the oral health-related quality of life (OHRQoL) of preschool children. **Material and Methods:** This cross-sectional study was conducted with 163 preschool children aged 3-4 old from Porto Alegre, Southern Brazil. Mothers completed the Brazilian version of the Early Childhood Oral Health Impact Scale (ECOHIS) and answered questions about sociodemographic and maternal behaviors characteristics. The severity of dental caries was assessed by ICDAS criteria for evaluated early childhood caries (ECC). A Poisson regression model was used to investigate the association of ECC and associated factors on OHRQoL. **Results:** A total of 91.4% of preschooler children was ECC (ICDAS \geq 1). Mean ECOHIS function domain and parental anxiety domain scores were significantly higher in children with dental caries ($p < 0.05$). The adjusted Poisson regression model showed that household income, maternal education, mother's job status and breastfeeding time was significantly associated with ECOHIS scores. Regarding oral conditions, child caries experience was associated with worsening child and family quality of life (RR 2.21; 95% IC: 1.43-3.41). **Conclusion:** Our findings suggest that ECC, socioeconomic and maternal behaviors characteristics influence children's OHRQoL.

Keywords: Dental Caries; Maternal Behavior; Quality of Life; Observational Study.

Introduction

In the last years has been observed a change in the pattern of distribution and occurrence of childhood caries [1-5]. However, its prevalence is still high, reaching 55% in the deciduous dentition and 60% in the permanent dentition [6]. In Brazil, the most recent epidemiological survey reports that 53.4% of 5-year-old children have experience of dental caries [7]. Therefore, early childhood caries (ECC) in preschool children is an important dental public health problem in Brazil.

Dental caries has been consistently associated with a negative impact on the oral function, social and psychological wellbeing of the children and their families, influencing the oral health-related quality of life (OHRQoL) [8-13]. The concept of OHRQoL refers to the impact that oral conditions have on individual's day-to-day functioning, well-being and overall quality of life [14,15]. OHRQoL measures have emerged as the main health outcome, both for clinical trials and for observational studies, allowing health professionals to evaluate the effectiveness of their treatment and the quality of care provided from the patients' perspective [14-17].

Interest in assessing OHRQoL in preschool children has grown. Low socioeconomic status and maternal education are directly related with poor oral health status and worse OHRQoL [9,10,18-21]. Similarly, maternal behaviors are associated with poor oral health in preschool children [22-24]. To our knowledge, few studies have evaluated the association of ECC and maternal health behaviors in a critical period of childhood development with the perception of mothers in relation to the OHRQoL of their children. Moreover, most studies evaluated the presence of caries using DMFT, which does not discriminate cavitated lesions from the initial stages of dental caries [10-25]. In addition, approach to these issues in children and families enrolled in primary healthcare services was not explored yet.

Although health-related behaviors are important in determining health status, a focus on behaviors alone will not address social gradients in population oral health. Furthermore, impacts caused by dental caries and their consequences do not reflect only in childhood, but may persist throughout life [26]. The understanding that knowledge, health beliefs and attitudes, patterns of behavior and psychosocial factors are interlinked and influence in determining individuals' responses, the aim of this study was to evaluate the impact of ECC, maternal behaviors and associated factors on OHRQoL of preschool children and their parents. We hypothesized that children who presented ECC are more likely to report low OHRQoL.

Material and Methods

Study Design and Sample

This cross-sectional study included 163 preschools born in 2008 in Porto Alegre, a southern city in Brazil. Whose families were registered in one of 12 Public Primary Care Services, located in Porto Alegre (RS, Brazil). All children born in 2008 and their mothers were initially eligible for the study if they resided in public health care services (PHC) catchment areas. Sampling occurred randomly by clusters, maintaining the proportion of live births in each of the 12 PHC. For this, each PHC provided the list of 2008 live births in order of date of birth and, from a table of random numbers, the children and their mothers were selected and invited to participate.

The sample size was calculated with consideration of the following parameters: sampling error of 5%, 95% confidence interval (95% CI), the number of live births in these communities in 2008 (674 infants) and a prevalence of 31% in the exposed group (with caries - ECC at two years) [27]. The ratio of exposed to unexposed was 1:1. Considering possible losses, 20% was added to the sample size, resulting in a required

minimum of 208 subjects. Children and/or mothers who had systemic diseases that prevent them from participating in the study or cognitive disabilities, and mothers who were not speakers of the Brazilian Portuguese Language were excluded.

Data Collection

Data collection was conducted from December 2011 to January 2013, including clinical examination of the children, and structured interviews conducted with the mothers. Four previously trained and calibrated examiners conducted the examinations in the children's home. Telephone contact was made with the person legally responsible for the child to invite the respective mothers to participate in the study. An instruction manual for field research was prepared and used during training and data collection. A pilot study of 30 pairs of children and mothers (who were not part of the sample) was carried out to test the methodology and the understanding of questionnaires used.

The Brazilian version of the Early Childhood Oral Health Impact Scale (ECOHIS) was used to assess the children OHRQoL - the outcome of this study [28-30]. Mothers answered the questionnaire through a face-to-face interview conducted by previously trained interviewers. The ECOHIS was used to measure the impact of oral health on the children's and his/her family's quality of life. The ECOHIS consists of 13 items, 9 including a child impact section and 4 a family impact section. Answers were recorded using a Likert scale with response options coded 0-5. The mean ECOHIS scores were calculated by overall scores ranging from 0 to 36. Higher overall scores indicating poorer OHRQoL. Questionnaires with more than 2 "do not know" responses were excluded from the sample.

Children's sociodemographic characteristics were collected from mothers through a self-administered questionnaire regarding sex, maternal educational level, household income, household crowding, marital status and mother's job status. Maternal education was collected in years of study and categorized as <9 years (incomplete primary education), 9-11 years, or >11 years. Household income was a sum of all forms of income in a month. It was collected in Reais (Brazilian cure - R\$3.75 it was equivalent to U\$1.00 approximately) and categorized as the Brazilian minimum wages (BMW): ≤ 2 , $>2 \leq 5$, or > 5 times the BMW. The amount of individuals in the house was evaluated through the number of people living in the house and categorized according to the median (≤ 4 people, or >4). The marital status was dichotomized in not married or married. The mother's job status was evaluated thought the working time outside home (>30 hours per week or < 30 hours per week) in the first two years of the child's life.

Questions related to maternal behavior included: "Did you breastfeed your child? If so, for how long?" (Collected in months and categorized as ≤ 2 years or >2 years, according to WHO recommendations) [30]; "Do you agree that your child is able to brush his or her teeth alone?" (Dichotomized and yes or no); "How often do you perform oral brushing of your child's teeth?" and the following possible responses: 0 = more than once daily; 1 = once daily and 2 = occasionally or never.

For the evaluation of clinical conditions, children were examined in their homes using sterile dental mirrors and probes, an air compressor and portable lighting. First, dental prophylaxis with a toothbrush and floss was performed in each child. Personal protective equipment was used to ensure biosafety. The severity of dental caries experience was assessed by ICDAS criteria of dried and illuminated dental surfaces. These were categorized according to the worst score: caries-free (ICDAS 0), enamel lesions (ICDAS 1-2-3), and dentin lesions (ICDAS 4-5-6). Data were also dichotomized as the presence of cavity related to caries: caries-free and

non-cavitated lesions (ICDAS 0-1-2), and cavitated lesions (ICDAS > 3) [31,32]. ECC was deemed present if a child had at least one surface with an ICDAS score of 1 or more.

In the evaluation of Traumatic dental injury (TDI), the criterion used was the Children's Dental Health Survey Criteria - CDHS-UK [33]. Data were dichotomized according to the presence of at least one type of trauma or absence. Malocclusion was recorded as anterior open bite, increased overjet, deep bite, anterior crossbite and/or posterior crossbite [34]. The evaluation was carried out with the child in occlusion, and malocclusion was deemed to be present if at least one of the conditions was present.

Statistical Analysis

Statistical analysis was performed using SPSS V.17.0 (SPSS Inc., Chicago, IL, USA). Mean ECOHIS scores were described for each domain in relation to the exposures of interest. Kruskal-Wallis and Mann-Whitney tests with a significance level of 5% ($p < 0.05$) were used. Poisson regression with robust variance was performed using ECOHIS scores as outcome and socioeconomic characteristics, maternal behaviors, and oral conditions as exposures. All variables that had $p < 0.20$ in the crude analyses (and those with clinical or epidemiological importance) were included in the final model. From this comparison, a fully adjusted model was obtained. Rate ratios (RR) and respective 95% confidence intervals (CI) for the exposures in relation to the outcomes are shown.

Ethical Issues

This study was approved by the Ethics Committee for Research of the Conceição Hospital Group (CEP-GHC/11-196). Before entering the study, all mothers read and signed an informed consent form.

Results

A total of 208 mother-infant pairs were invited to participate; 163 (78.4%) agreed to participate. The reasons for losses included the inability to find the children/mother ($n=34$) and refusal to take part in the study ($n=11$). Inter and intraexaminer agreement (Kappa values) for dental caries ranged from 0.64 to 0.73 and from 0.75 to 0.80, respectively. For trauma and malocclusion, examiners achieved a Kappa equal to 1.0.

Table 1 summarizes the characteristics of the sample according to sociodemographic, behavioral and oral health variables. Most children are girls (55.6%) and were in the lower-income categories. For maternal behaviors, 18.4% of mothers reported having breastfed their children after 2 years of age. Regarding dental caries, the most (91.4%) preschooler children was ECC (the presence of at least one clinically detected carious lesion (ICDAS ≥ 1). The ICDAS ranged between 0 and 6 (2.54 ± 1.57). Dental trauma and malocclusions were present in 38% and 46% of the children, respectively.

Table 1. Characteristics of participants according to sociodemographic, behavioral and oral health variables.

Variables	N	%
Sex		
Male	74	45.4
Female	89	55.6
Maternal Education		
< 9 Years	40	24.5
9-11 Years	72	44.2
> 11 Years	51	31.3

Household Income		
≤ 2 BMW ^a	56	34.4
> 2 ≤ 5 BMW	79	48.4
> 5 BMW	28	17.2
Number of Individuals in the House		
≤ 4 People	82	50.3
> 4 People	81	49.7
Mother's Working Time Outside Home ^b		
> 30 Hours	97	59.5
≤ 30 Hours	66	40.5
Marital Status		
Not Married	59	36.2
Married/Living Together	104	63.8
Breastfeeding Time		
≤ 2 Years	133	81.6
> 2 Years	30	18.4
Agree that the Child is Able to Brush his or her Teeth Alone		
Yes	27	16.6
No	136	83.4
Frequency of Child' Oral Brushing		
More Than Once Daily	82	50.3
Once Daily	60	36.8
Occasionally or Never	21	12.9
Early Childhood Caries		
Caries-free (ICDAS 0)	14	8.6
Enamel lesions (ICDAS 1, 2 or 3)	111	68.1
Dentin lesions (ICDAS 4, 5 or 6)	38	23.3
Cavitated lesions (ICDAS > 3)	52	32.0
Traumatic Dental Injury		
Presence	62	38.0
Absence	101	62.0
Malocclusion		
With	75	46.0
Without	88	54.0

Values lower than 163 due to missing data; ^aBMW: Brazilian Minimum Wages; ^bTime for week.

Table 2 shows the descriptive distribution of total ECOHIS and domain scores. About 48.0% of mothers reported that their children had an impact on at least one of the items of the ECOHIS. The negative impacts on OHRQoL were more prevalent in the child subscale (74/163; 45.4%) than in the family subscale (39/163; 23.9%). Oral pain and toothache were the more prevalent impacts reported in the child subscale, while guilt was the most prevalent impact in the family subscale.

The mean ECOHIS overall and domains scores according to socioeconomic, behaviors and clinical characteristics of the sample are presented in Table 3. The ECOHIS scores ranged between 0 and 28, with an average of 2.15 (SD = 3.85). The highest scores were 16 and 12 on the child and family subscales, respectively. When the overall mean of ECOHIS was analyzed, ECC was associated with a negative impact on OHRQoL ($p < 0.05$). There were significant differences in mean ECOHIS self-image and social interaction domain scores (child subscale) in relation to maternal schooling, family income, prolonged breastfeeding and tooth brushing frequency ($p < 0.05$). Mean ECOHIS function domain (child subscale) and parental anxiety domain (family subscale) scores also differed significantly in relation to the presence of cavitated lesions and severity of dental caries ($p < 0.05$) (Table 3).

Table 2. Descriptive distribution of total ECOHIS and domains scores.

ECOHIS Domains	Responses						Mean (SD)
	Never N (%)	Hardly Ever N (%)	Occasionally N (%)	Often N (%)	Very Often N (%)	Don't Know N (%)	
Child Section							
1. Has your child had pain in the teeth, mouth or jaws? (Symptom)	103 (63.2)	36 (22.1)	20 (12.3)	3 (1.8)	1 (0.6)	0 (0.0)	0.55 (0.8)
2. Has your child had difficulty drinking hot or cold beverages because of dental problems or dental treatments? (Function)	148 (90.8)	10 (6.1)	3 (1.8)	0 (0.0)	1 (0.6)	1 (0.6)	0.15 (0.6)
3. Has your child had difficulty eating some foods because of dental problems or dental treatments? (Function)	147 (90.2)	13 (8.0)	1 (0.6)	3 (1.8)	0 (0.0)	0 (0.0)	0.13 (0.4)
4. Has your child had difficulty pronouncing any words because of dental problems or dental treatments? (Function)	152 (93.3)	3 (1.8)	13 (1.8)	2 (1.2)	3 (1.8)	0 (0.0)	0.17 (0.7)
5. Has your child missed preschool, daycare or school because of dental problems or dental treatments? (Function)	149 (91.4)	8 (4.9)	4 (2.5)	0 (0.0)	0 (0.0)	2 (1.2)	0.16 (0.7)
6. Has your child had trouble sleeping because of dental problems or dental treatments? (Psychology)	155 (95.1)	4 (2.5)	2 (1.2)	1 (0.6)	1 (0.6)	0 (0.0)	0.09 (0.5)
7. Has your child been irritable or frustrated because of dental problems or dental treatments? (Psychology)	141 (86.5)	15 (9.2)	5 (3.1)	2 (1.2)	0 (0.0)	0 (0.0)	0.19 (0.5)
8. Has your child avoided smiling or laughing because of dental problems or dental treatments? (Self-image/social interaction)	157 (96.3)	4 (2.5)	2 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)	0.05 (0.3)
9. Has your child avoided talking because of dental problems or dental treatments? (Self-image/social interaction)	157 (96.3)	2 (1.2)	3 (1.8)	1 (0.6)	0 (0.0)	0 (0.0)	0.07 (0.4)
Family Section							
10. Have you or another family member been upset because of your child's dental problems or dental treatment? (Parental distress)	147 (90.2)	11 (6.7)	3 (1.8)	0 (0.0)	2 (1.2)	0 (0.0)	0.15 (0.6)
11. Have you or another family member felt guilty because of your child's dental problems or dental treatment? (Parental distress)	139 (85.3)	9 (5.5)	8 (4.9)	2 (1.2)	5 (3.1)	0 (0.0)	0.31 (0.9)
12. Have you or another family member taken time off from work because of your child's dental problems or dental treatment? (Family function)	155 (95.1)	4 (2.5)	2 (1.2)	1 (0.6)	1 (0.6)	0 (0.0)	0.09 (0.5)
13. Has your child had dental problems or dental treatments that had a financial impact on your family? (Family function)	158 (96.9)	3 (1.8)	2 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)	0.04 (0.3)

Table 3. Mean ECOHIS overall and domains scores according to socioeconomic, behaviors and clinical characteristics.

Variables	Domains						ECOHIS
	SD Mean (SD)	FD Mean (SD)	PD Mean (SD)	SSD Mean (SD)	PDD Mean (SD)	FFD Mean (SD)	
Socioeconomic Variables							
Maternal Education							
< 9 Years	0.67 (0.88)	0.27 (0.51)	0.27 (0.66)	0.22 (0.51)	0.42 (0.88)	0.06 (0.32)	0.28 (0.47)
9-11 Years	0.52 (0.85)	0.12 (0.26)	0.08 (0.22)	-	0.15 (0.47)	0.11 (0.37)	0.13 (0.19)
> 11 Years	0.47 (0.73)	0.09 (0.21)	0.11 (0.35)	0.00 (0.07)	0.18 (0.61)	0.00 (0.07)	0.11 (0.19)
p-value	0.541	0.310	0.369	0.008 [†]	0.117	0.118	0.396
Household Income							
≤ 2 MW	0.69 (0.85)	0.25 (0.45)	0.22 (0.58)	0.13 (0.42)	0.34 (0.78)	0.13 (0.45)	0.25 (0.41)
>2 ≤ 5 MW	0.48 (0.82)	0.11 (0.26)	0.10 (0.30)	0.02 (0.15)	0.22 (0.62)	0.04 (0.19)	0.13 (0.21)
> 5 MW	0.42 (0.74)	0.07 (0.16)	0.08 (0.23)	-	0.03 (0.13)	-	0.07 (0.09)
p-value	0.149	0.063	0.582	0.046 [†]	0.051	0.125	0.067
Number of Individuals in the House							
≤ 4 People	0.58 (0.88)	0.13 (0.29)	0.14 (0.37)	0.04 (0.27)	0.21 (0.61)	0.10 (0.40)	0.16 (0.30)
> 4 People	0.50 (0.76)	0.16 (0.38)	0.14 (0.45)	0.07 (0.27)	0.25 (0.67)	0.02 (0.13)	0.16 (0.28)
p-value		0.828	0.702	0.157	0.651	0.117	0.555
Mother's Working Time Outside Home							
> 30 Hours	0.54 (0.81)	0.19 (0.38)	0.15 (0.48)	0.06 (0.30)	0.25 (0.71)	0.04 (0.24)	0.18 (0.33)
< 30 Hours	0.54 (0.84)	0.09 (0.23)	0.12 (0.30)	0.05 (0.21)	0.19 (0.51)	0.09 (0.37)	0.14 (0.22)
p-value	0.980	0.119	0.859	0.616	0.700	0.314	0.830
Marital Status							
Not Married	0.67 (0.91)	0.16 (0.33)	0.18 (0.55)	0.05 (0.32)	0.26 (0.75)	0.11 (0.43)	0.20 (0.37)
Married/Living Together	0.47 (0.76)	0.14 (0.34)	0.11 (0.31)	0.05 (0.24)	0.21 (0.57)	0.03 (0.18)	0.14 (0.24)
p-value	0.173	0.454	0.974	0.533	0.869	0.187	0.386
Behaviors Variables							
Breastfeeding							
≤ 2 Years	0.51 (0.78)	0.14 (0.33)	0.12 (0.40)	0.03 (0.21)	0.19 (0.57)	0.03 (0.16)	0.14 (0.24)
> 2 Years	0.70 (0.98)	0.17 (0.36)	0.20 (0.48)	0.15 (0.43)	0.41 (0.88)	0.21 (0.59)	0.25 (0.45)
p-value	0.294	0.918	0.457	0.020 [†]	0.038 [†]	0.015 [†]	0.324

Agree that the child is able to brush his or her teeth alone							
Yes	0.59 (0.79)	0.19 (0.47)	0.25 (0.68)	0.05 (0.28)	0.18 (0.60)	0.03 (0.13)	0.18 (0.34)
No	0.53 (0.83)	0.14 (0.30)	0.11 (0.34)	0.05 (0.27)	0.24 (0.65)	0.07 (0.32)	0.16 (0.28)
p-value	0.534	0.788	0.316	0.770	0.497	0.930	0.706
Frequency of Child' Oral Brushing							
More than Once a Day	0.52 (0.86)	0.10 (0.23)	0.07 (0.25)	0.01 (0.11) ^A	0.09 (0.27)	0.06 (0.23)	0.11 (0.16)
Once Daily	0.53 (0.76)	0.22 (0.44)	0.20 (0.47)	0.08 (0.34) ^{AB}	0.36 (0.85)	0.09 (0.41)	0.22 (0.38)
Occasionally or Never	0.66 (0.85)	0.13 (0.29)	0.21 (0.68)	0.16 (0.42) ^B	0.38 (0.86)		0.20 (0.37)
p-value	0.682	0.297	0.144	0.035*	0.073	0.702	0.545
Oral Conditions							
Early Childhood Caries							
Caries-Free	0.57 (0.75)	0.12 (0.21) ^A	0.14 (0.30)	0.00 (0.00)	0.00 (0.00) ^A	0.10 (0.28)	0.12 (0.16) ^A
Enamel Lesions	0.45 (0.78)	0.13 (0.35) ^A	0.08 (0.25)	0.03 (0.18)	0.13 (0.39) ^B	0.02 (0.14)	0.11 (0.19) ^A
Dentin Lesions	0.78 (0.93)	0.22 (0.33) ^B	0.30 (0.71)	0.14 (0.46)	0.59 (1.07) ^C	0.17 (0.53)	0.31 (0.47) ^B
p-value	0.087	0.037*	0.193	0.148	0.001*	0.062	0.027*
Caries-free/Non-cavitated Lesions	0.45 (0.77)	0.11 (0.27)	0.07 (0.21)	0.02 (0.16)	0.13 (0.39)	0.04 (0.18)	0.11 (0.17)
Cavitated Lesions	0.73 (0.90)	0.23 (0.42)	0.27 (0.65)	0.12 (0.41)	0.45 (0.95)	0.12 (0.46)	0.27 (0.43)
p-value	0.052	0.025 ⁺	0.062	0.054	0.003 ⁺	0.302	0.015 ⁺
Traumatic Dental Injury							
Presence	0.46 (0.76)	0.16 (0.36)	0.18 (0.49)	0.07 (0.31)	0.23 (0.64)	0.05 (0.33)	0.17 (0.33)
Absence	0.67 (0.90)	0.13 (0.28)	0.06 (0.21)	0.03 (0.17)	0.22 (0.64)	0.08 (0.24)	0.15 (0.21)
p-value	0.095	0.789	0.083	0.427	0.700	0.081	0.339
Malocclusion							
With	0.61 (0.90)	0.11 (0.26)	0.15 (0.39)	0.06 (0.30)	0.22 (0.62)	0.08 (0.36)	0.16 (0.31)
Without	0.46 (0.72)	0.19 (0.40)	0.12 (0.44)	0.04 (0.23)	0.24 (0.66)	0.04 (0.20)	0.16 (0.27)
p-value	0.367	0.312	0.395	0.622	0.857	0.515	0.578

SD: Symptoms Domain; FD: Function Domain; PD: Psychology Domain; SSD: Self-Image/Social Interaction Domain; PDD: Parental Distress Domain; FFD: Family Function Domain; ECOHIS: Overall; *Kruskal-Wallis test; ⁺Mann-Whitney test; The different letters mean statistically significant difference between groups.

Table 4 shows the results of adjusted Poisson regression analyses. In relation some socioeconomic variables, high maternal education (RR 0.38; 95% IC: 0.21-0.69) were associated with better OHRQoL. In addition, children whose mothers worked in their first two years of life (RR 0.54; 95% IC: 0.30-0.96) presented the highest impacts on OHRQoL. In relation the behaviors characteristics, prolonged breastfeeding (RR 2.15; 95% CI: 1.16-3.96) was associated with higher scores on the ECOHIS. Regarding oral conditions, dental caries was associated with the outcome (RR 2.21; 95% IC: 1.43-3.41), where children with ECC presented high ECOHIS scores, and consequently, poorest OHRQoL.

Table 4. Rate ratio (RR) for unadjusted and adjusted association between overall ECOHIS scores and explored variables.

Variables	Unadjusted		Adjusted	
	RR (95% CI)	p-value	RR (95% CI)	p-value
Demographic Variables				
Sex		0.57	#	
Female	1.00			
Male	1.16 (0.67-2.01)			
Socioeconomic Variables				
Maternal Education		0.173		<0.01
< 9 Years	1.00		1.00	
9-11 Years	0.53 (0.28-1.02)		0.49 (0.30-0.81)	
> 11 Years	0.54 (0.23-1.30)		0.38 (0.21-0.69)	
Household Income ^c		<0.01		
≤ 2 Minimum Wages	1.00		#	
> 2 ≤ 5 Minimum Wages	0.61 (0.37-0.99)			
> 5 Minimum Wages	0.36 (0.18-0.75)			
Number of Individuals in the House		0.78		
≤ 4 People	1.00		#	
> 4 People	0.92 (0.50-1.67)			
Mother's Working time Outside Home ^d		0.15		<0.05
> 30 Hours	1.00		1.00	
< 30 Hours	0.66 (0.38-1.16)		0.54 (0.30-0.96)	
Marital Status		0.97		
Not Married	1.00			
Married/Living Together	0.99 (0.59-1.65)		#	
Behaviors Variables				
Breastfeeding				
≤ 2 Years	1.00	<0.05	1.00	<0.05
> 2 Years	2.03 (1.12-3.69)		2.15 (1.16-3.96)	
Agree that the child is able to brush his or her teeth alone		0.54		
Yes	1.00		#	
No	0.82 (0.44-1.53)			
Frequency of Child' Oral Brushing		<0.05		0.06
More Than Once a Day	1.00		1.00	
Once Daily	1.66 (1.03-2.65)		1.54 (0.98-2.42)	
Occasionally or Never	1.58 (0.76-3.25)		1.40 (0.69-2.86)	
Clinical Conditions				
Early Childhood Caries		<0.01		<0.01
Caries-free/Non-cavitated Lesions	1.00		1.00	
Cavitated Lesions	2.18 (1.34-3.54)		2.2 (1.43-3.41)	
Traumatic Dental Injury		0.60		
Presence	1.13 (0.70-1.80)		#	

Absence	1.00		
Malocclusion		0.18	0.11
With	1.41 (0.85-2.36)		1.48 (0.91-2.40)
Without	1.00		1.00

RR: Rate Ratio; CI: Confidence Interval.

Discussion

The present findings support the hypothesis that ECC influences the children's OHRQoL. Children who presented ECC in the form of cavitated lesions was significantly associated with the mothers' negative perception in relation to their children's OHRQoL. Similarly, lower maternal education, mother's job status and prolonged breastfeeding were associated with more negative impacts on OHRQoL. Understanding these associations may lead to a broader view of the aspects that influence children's and their families' quality of life.

The presence of ECC influenced negatively children's OHRQoL, in accordance with previous studies [10,13,17,35-37], thus providing strong evidence that disease severity is directly proportional to the negative impact generated in OHRQoL. The negative influences of cavitated dental caries on children's quality of life include changes in behavior, chewing and sleeping difficulties, decrease in school performance and mainly dental pain [8,10,38]. Pain impacts daily activities and affects the physical status of the children, as well as their psychological well-being and social interactions, negatively influence the OHRQoL [5,39,40]. Moreover, cavitated lesions can leave parents feeling guilty and upset about the oral condition of their children, which reflects in the OHRQoL [10,41].

Children with white spot lesions presented the lowest scores on ECOHIS and, consequently, a better OHRQoL. This result is in agreement with previous studies that showed that initial lesions of caries do not negatively impact OHRQoL [36,37], including overtime [37]. An explanation for this is that initial dental caries does not usually cause pain, discomfort or aesthetic concerns in the children and their parents, it is understandable that children with only these types of lesions do not report impacts on OHRQoL [37]. However, although the presence of non-cavitated lesions was not associated with the evaluated outcomes, studies have shown that the history of the disease is a risk factor for dental caries [42].

Our findings demonstrated that low maternal education impacted negatively the children OHRQoL, which corroborates with similar findings in the literature [13,14]. A possible explanation for this is that families and children with better socioeconomic conditions generally have better behaviors related to oral health, greater access to health care and preventive interventions, and consequently may have a better quality of life [13,41]. Therefore, it is important to reconsider the current paradigm related to OHRQoL restricted to oral conditions, including contemporary concepts of disease and its consequences, emphasizing the importance of relating these to patients' individual, social, and environmental OHRQoL [13,42].

The mother's job status was also associated with children's OHRQoL. Preschoolers whose mothers worked in their first two years of life, presented the highest impacts on OHRQoL. Studies report that children whose mothers are housewives have lower rates of caries compared to those mothers who work away from home [43]. This may be because mothers who have regular jobs have less time to perform routine oral hygiene and care of their children than mothers who stay at home [44]. Taken together, these results add to the existing evidence about the relation between behaviors and OHRQoL.

In relation to breastfeeding, children who have been breastfed for more than 2 years presented higher scores on the ECOHIS. Breastfeeding up to 2 years of age or longer is uncommon in Western countries (on average, a prevalence of 33%) [30] mainly due to lack of policies that encourage prolonged breastfeeding,

which coincides with the findings of this study (18.4% of the women breastfed their children more than 2 years). The affective link between mother and child is established in the first 24 months of the child's life, and it is a result of constant interactions held between the pair since birth [44]. When the interaction succeeds, the mother is able to understand the demands of the child, which aids physical and mental development and enables better knowledge of the mother about her child [44].

The findings of this study should be interpreted with accounting for some limitations. The cross-sectional design precludes the assessment of risk factors of impacts on OHRQoL. In addition, dental caries was evaluated through the ICDAS index, which requires a longer and more detailed training, also to involving critical steps during the examination. However, the findings obtained through the ICDAS, which mainly include the presence of non-cavitated lesions, show more realistic ECC distribution. In addition, the ICDAS has been previously used in other epidemiological surveys with children [11,38,45] and showed the ease of use and processing of data gathered, when compared with the widely used DMFT [32].

Conclusion

Caries severity, family's socioeconomic characteristics and maternal behaviors were associated with an impact on the OHRQoL of preschool children. The results may help in improving our understanding about how oral conditions affect preschool-aged children's quality of life. The prevention and control of early childhood caries through public policies and on the part of pediatric dentists are fundamental to the prevention of negative impacts on the quality of life of children.

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Conflict of Interest

The authors declare no conflicts of interest.

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