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Oral health-related quality of life measures: variation by socioeconomic status and caries experience

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Abstract

Objectives—1) Quantify the relative association between child dental caries experience and maternal-reported child oral health-related quality of life (OHRQoL); 2) Examine whether that association differed according to family socioeconomic status (SES); and 3) Explore whether absolute OHRQoL varied by family SES at similar levels of child caries experience.

Methods—Among children in Southern Brazil (N=456, mean age: 38 months), OHRQoL impact was quantified as mean score on the Brazilian Early Childhood Oral Health Impact Scale (ECOHIS) and compared over categories of caries experience (dmft: 0, dmft: 1–4, dmft: ≥5). Adjusted ECOHIS ratios between caries categories were calculated using regression modeling, overall and within socioeconomic strata defined by maternal education, social class, and household income.

Results—Caries prevalence (dmft >0) was 39.7%, mean ECOHIS score was 2.0 (SD: 3.5), and 44.3% of mothers reported OHRQoL impact (ECOHIS score >0). Increasing child caries experience was associated with worsening child and family quality of life: ECOHIS scores were 3.0 times greater (95% CI: 2.0, 4.4) for children with dmft ≥5 versus dmft=0, a pattern that persisted regardless of family socioeconomic status (*P*-for-interaction: all >0.3). However, adjusted for dental status and socio-demographics, mean ECOHIS scores were lower when reported by mothers of less educational attainment (ratio: 0.7 ; 95% CI: 0.5, 1.0), lower social class (ratio: 0.7; 95% CI: 0.5, 1.0), or in lower income households (ratio: 0.8; 95% CI: 0.4, 1.2).

Conclusion—Dental caries was associated with negative child and family experiences, contributing to diminished OHRQoL across all social groups; yet, families facing greater disadvantage may report lesser quality of life impact at the same level of disease experience. Thus, subjective quality of life measures may differ under varying social contexts, with possible

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implications for service utilization, evaluating oral health interventions, or quantifying disease morbidity in low SES groups.

INTRODUCTION

Oral health-related quality of life (OHRQoL) has been applied extensively as a measure of the impact of oral diseases and disorders on individuals and society. Unlike normative clinical indicators, quality of life measures aim to capture broad consequences of poor oral health from the perspective of affected adults, children, and families.[1,2] Quality of life can serve as a relevant outcome measure following oral health interventions or aid practitioners in identifying patient concerns.[2] Health-related quality of life measures have been incorporated in disease surveillance,[3] facilitating morbidity comparisons across health conditions, with the potential to guide large-scale priority setting.

Multiple instruments have been validated to assess OHRQoL in children.[2] Studies have consistently reported reduced quality of life in children affected by dental caries in diverse populations.[4–8] Other oral conditions have also been associated with deleterious impacts on child functioning and wellbeing, including malocclusion[4,6] and traumatic dental injury,[6,9] albeit not consistently.[10,11]

Mirroring the stark socioeconomic disparities in oral health,[12] lower OHRQoL has similarly been described among children in families facing greater socioeconomic disadvantage.[13–15] Socioeconomic status (SES) is a critical influence of child oral health: partly as a marker of familial capacity to respond to dental problems, but perhaps also a lens through which caregivers evaluate their children's oral health needs. As Wilson and Cleary[16] proposed, the pathway from physio-biologic states to quality of life and wellbeing is potentially modified by individual characteristics and environmental context. Individuals adapt to their immediate environment and situation, and subjective measures of wellbeing may reflect context-dependent expectations.[17]

Decreasing child OHRQoL was associated with increasing dental disease among grade-school children in Canada, but the association was most evident among children from lower income families.[18] In contrast, among children ages 3–5 years in the United States, the association between caregiver-rated child oral health status and child OHRQoL was attenuated among caregivers of lower oral health literacy, potentially a result of underreporting of child symptoms or quality of life impacts by lower literacy caregivers.[19]

In this study, we aimed to quantify the association between clinically measured child dental status and caregiver-reported child OHRQoL among a population of preschool children in southern Brazil. Our goal was to evaluate both whether the strength of the relative association between increasing caries experience and OHRQoL differed across multiple measures of family SES and also whether at similar levels of caries experience, there were absolute differences in OHRQoL by SES.

METHODS

The present study is a cross-sectional analysis of oral health data collected at the 38-month post-baseline visit of a cluster-randomized controlled trial in Porto Alegre, Brazil, a city of 1.4 million residents with a fluoridated community water supply (0.7 ppm). The original trial recruited pregnant women in 2008 from 20 municipal health centers (basic health units), with the objective of evaluating the impact of healthcare worker training in maternal nutritional counseling on infant feeding practices and other child health outcomes,[20] including dental caries.[21] As reported previously, the intervention did not yield a statistically significant reduction in 38-month caries incidence.[21] Of 715 expectant mothers enrolled in the study, a dental examination and OHRQoL questionnaire were completed for 456 children at the 38-month follow-up visit.

The Early Childhood Health Impact Scale (ECOHIS) was developed as a measure of parents' perceived impact of their preschool children's oral health on child and family quality of life[22] and was later translated and validated in Brazilian Portuguese.[23,24] The questionnaire includes 13 items in two sections (Appendix 1). The Child Impact Section has four domains (symptoms, function, psychological, and self image/social interaction), and the Family Impact Section has two domains (parent distress and family function). Response options follow a 5-point Likert-type scale for event frequency during the child's lifetime: 0=never; 1=hardly ever; 2=occasionally; 3=often; 4=very often, with an option "don't know" scored as a non-response.[22] Printed cards showing response options were shown while reading each question aloud, as recommended.[24] We augmented the item related to missed school or daycare to include potential impacts on daily activities such as running, playing, and jumping.[23] Total ECOHIS score is the sum across all domains, with higher scores indicating worse OHRQoL.

Two trained and calibrated dentists completed visual examination during 38-month visits, following World Health Organization methods.[25] Teeth were brushed, dried with gauze and evaluated with a dental mirror and artificial light source to calculate the dmft index (number of visually cavitated, missing, or restored primary teeth). Inter-examiner reliability (kappa: 0.75) and intra-examiner reliability (kappa: 0.83 for both examiners) were estimated using a separate calibration sample. Children were categorized into three groups of caries experience (dmft: 0, 1–4, and ≥5), where the upper cutpoint corresponded to the Significant Caries Index in this population.[26] Clinical signs of dental trauma were also recorded, following Andreasen classification[27] and later dichotomized as any traumatic dental injury versus none.

Field researchers used structured questionnaires to collect maternal and family socio-demographic characteristics during pregnancy (trial baseline visit), including maternal age (at expected delivery date), family composition (nuclear: children living with both parents or non-nuclear), and number of household members (<3, 3–5, or ≥6). Child birthdate and sex were recorded at a later visit. We recorded three SES markers: maternal education attainment (<9 or ≥9 years), estimated equivalized household income (categorized by sample tertile), and social class (based on Brazilian Association of Economic Research Institute classification, later dichotomized as lower: ≤C and higher: ≥B). Total household income was

calculated from all monthly sources, including employment and public benefits, and converted to equivalized income by dividing by the number of household adults plus 0.5-times the number of household children, approximating two adults in each nuclear family.

Summary measures were calculated for overall and domain-specific ECOHIS scores according to socio-demographic and oral health variables. Missing or "don't know" responses to ECOHIS items (0.4% of responses) were multiply imputed by chained equations (Poisson model to predict ECOHIS responses), as were missing socio-demographic responses (0.4% of questionnaire data). Mean ECOHIS scores were averaged over 20 imputations and variances corrected using the standard formula.[28]

Differences in caries experience (dmft index) by SES category were tested using the Mann-Whitney U-test (maternal education or social class) and the Kruskal-Wallis test (equivalized household income). Dental trauma prevalence was compared by SES category using the chi-squared test. Associations between OHRQoL and socio-demographic, socioeconomic, and oral health variables were expressed as ratios of the mean ECOHIS total score for each comparison of interest. Adjusted ratios were estimated from log-linear regression models (outcome: ECOHIS total score; adjustment variables: child sex and age, maternal age, family composition, and intervention/control group in the original trial). To assess differences in the relationship between OHRQoL and caries experience by SES, we calculated adjusted ECOHIS ratios from three separate models corresponding to the three SES markers (maternal education, social class, and household income), with indicators for each rising dmft category (reference: dmft=0) and SES-by-dmft interaction terms. Finally, we plotted mean ECOHIS scores according to dmft category in separate SES subgroups.

Nonparametric 95% confidence intervals (CIs) were obtained via bootstrap resampling (5000 repetitions), with imputation for missing data repeated in each resample. P-values were approximated for ratios and interaction coefficients as two-times the proportion of bootstrap values exceeding the null value. Statistical analysis was performed using R (version 3.2.4; r-project.org).

Internal review committees of the Federal University of Health Sciences of Porto Alegre (UFCSPA) and the University of California Berkeley (with reliance at the University of California San Francisco) reviewed and approved this study. Mothers provided signed informed consent. Children with untreated tooth decay, anemia, underweight or overweight status were referred to their nearest municipal health center.

RESULTS

Of 456 children in the analytic sample, 181 (39.7%) presented with at least one caries-affected tooth (dmft >0). Most dental disease was untreated: the decay component accounted for >99% of the dmft index. Overall, mean dmft was 1.54 (SD: 2.77; range: 0 to 15). Signs of traumatic dental injury were noted in 141 children (30.9%). Caries experience was more severe in children of lower SES families (Table 1), with statistically significant differences in dmft by maternal education ($P<0.001$), social class ($P=0.02$), and household income ($P=0.02$). Dental trauma prevalence did not differ by SES category.

The ECOHIS items with the largest number of responses corresponding to some type of OHRQoL impact were “pain in the teeth, mouth or jaws” in the Child Impact Section and “felt guilty” in the Family Impact Section (Appendix 1; Table 2). Overall, ECOHIS scores ranged from 0 to 23, and 202 caregivers (44.3%) reported an OHRQoL impact (score >0) for at least one ECOHIS item.

There was a strong, positive relationship between reported OHRQoL impact and child caries experience (Table 2). Mothers of children with the greatest caries experience were most likely to report unfavorable child or family quality of life occurrences (Table 2). Mean ECOHIS scores among children with ≥5 caries-affected teeth were nearly three-fold greater relative to children with no caries experience, including after adjustment for child and family characteristics (Table 3). Mean ECOHIS scores did not differ according to the presence of dental trauma (Table 3).

On a relative scale, the relationship between reported OHRQoL impact and caries status was similar across all socioeconomic strata. In all subgroups, ECOHIS scores for children of greatest caries experience were 2.5 to 3.9 times higher than for children with no caries experience, with no statistically significant interaction by SES (Table 4). However, mean ECOHIS scores tended to be higher when reported by mothers of more educational attainment, higher social class, or living in higher income households (Figure 1). Adjusted for oral health status and demographic variables (Table 3), mean ECOHIS scores were lower for children from lower SES families, whether measured by maternal education (ratio: 0.70), household income (ratio: 0.75), or social class (ratio: 0.66). In other words, within the same category of child caries experience, caregivers facing socioeconomic adversity tended to reported lesser OHRQoL impacts (Figure 1, Table 4), reaching statistical significance for maternal education (P=0.04) and social class (P=0.03).

DISCUSSION

In this population of preschool children in Brazil, dental caries experience, but not traumatic dental injury, was strongly associated with deleterious impacts on child and family quality of life; an association that was consistent across multiple measures of socioeconomic status. Independent of family SES, caregivers of children with ≥5 caries-affected teeth registered ECOHIS scores approximately 3-fold higher than caregivers of caries-free children, underscoring the potential of dental caries to undermine child wellbeing in all social groups.

The persistence of oral health disparities demands concerted efforts to direct preventive efforts toward communities of greatest disadvantage, through policies that are both proportionate (targeting the least advantaged) and universal (accessible to all).[29] Thus, Proportionate Universalism calls for action that enhances equity, through concerted efforts to aid the least advantaged that are integrated into policies from which all can benefit. Our findings that caries experience was associated with diminished quality of life at all SES levels, but that caries burden rose with decreasing SES, are consistent with a need for universal and proportionate action across the socioeconomic spectrum.

In a counterintuitive finding, among children of similar caries experience, mean ECOHIS scores were higher (indicating worse OHRQoL) when reported by caregivers of greater socioeconomic standing. We speculate that several potential mechanisms could have yielded this result. For example, it is possible the low SES caregivers had incomplete comprehension of the B-ECOHIS questions; however, this instrument has been validated in similar populations[24] and was administered orally with a visual scale to aid interpretation. Alternatively, quality of life measures are inherently subjective and may reflect the expectations of individuals who have adapted to a particular life situation or local environment.[17,30] The pervasiveness of early childhood caries in low-SES communities, potentially coupled with limited access to care, may have influenced caregivers to view caries as an unavoidable part of childhood or a condition that they have limited capacity to control,[31,32] perhaps contributing to cognitive dissonance between caregivers' quality of life perceptions and actual experiences.[33] Moreover, facing competing needs, low-SES caregivers might de-emphasize the impact of oral conditions relative to other stressors or priorities deemed more immediate or consequential.[34]

If confirmed in further studies, differences in OHRQoL reporting by SES carry implications for research and public health practice. Quality of life measures have been used increasingly as proxy for clinical assessments in oral health surveillance,[35,36] and could underestimate the oral health needs in disadvantaged communities if measures are interpreted differently. Similarly, the effectiveness of oral health interventions could appear less pronounced in subgroups that underreport OHRQoL impacts. Importantly, an elevated threshold for recognition of dental problems could impede utilization of dental services. Caregiver beliefs, attitudes, and perceptions of their children's oral health have been associated with child dental status, home care behaviors, and treatment-seeking.[31,37,38] In a telephone survey in Brazil, adults of higher educational attainment were more likely to report a perceived need for dental treatment and were also more likely to access care successfully when needed.[39]

Few prior studies have examined SES differences in child OHRQoL within groups of similar objective dental status. In contrast to the present study, among 5 to 6-year-old dental patients in São Paulo, Brazil, parent-perceived child OHRQoL impacts decreased with rising family income in a statistical model adjusted for three levels of child caries experience.[11] Among Canadian children ages 11 to 14 years, self-perceived OHRQoL impacts increased with worsening dental condition among children from low-income households, but OHRQoL was unrelated to dental status among high-income children.[18] The study proposed that greater psychosocial resources may help children from more affluent families mitigate impacts of oral conditions.[18] Consistent with the present study, among preschool children in the United States, there was an increasing gradient in parent-reported ECOHIS scores with worsening self-reported child oral health status among both low and high oral health literacy parents, but association strength was weaker, and mean ECOHIS scores lower, among low literacy caregivers.[19] Differences in age groups, measurement instruments, self-perceptions versus parent-perceptions, and recruitment from the community versus dental practices, all likely contributed to differences between these investigations. Further studies are needed to evaluate the consistency of SES as a modifier of the relationship between perceived OHRQoL and oral health status.

Some limitations of the present study warrant consideration. While we observed differences in OHRQoL according to socioeconomic groups, the study population as a whole was recruited from public health centers, which predominantly serve lower income families. Thus, high-SES households were somewhat under-represented in the study sample, and the results await replication in a more generalizable population. Similarly, although power was sufficient to identify statistically significant differences, the smaller number of high-SES families limited the precision of study estimates, which were associated with wide confidence intervals. Additionally, this cross sectional analysis was nested within a randomized intervention study, and prior losses to follow-up or possible influences of the intervention itself might have affected generalizability, as well.

Balancing these limitations were several study strengths, including consistency of the findings across multiple SES markers. Dental measures were recorded by calibrated dentist-examiners, and OHRQoL was measured using a validated instrument. The study population was recruited during routine health center visits in pregnancy, more reflective of community-dwelling families than dental clinic attendees, who tend to seek treatment for self-recognized oral health problems. The sample size accommodated stratification by SES and multi-variable adjustment for confounding variables. Overall associations between SES and caries status and between caries status and OHRQoL were consistent with the existing literature.

In this study population, the dental caries experience of preschool children was strongly associated with parent-reported OHRQoL regardless of family socioeconomic status. However, caregivers of greater socioeconomic disadvantage tended to report lesser quality of life impact at the same level of child disease experience. The potential for variation in subjective quality of life measures under different social environments deserves consideration in program evaluation and disease-specific morbidity surveillance. Additionally, the validity of OHRQoL measures in disadvantaged communities is critical for studies of parent perceptions in relation to dental service utilization.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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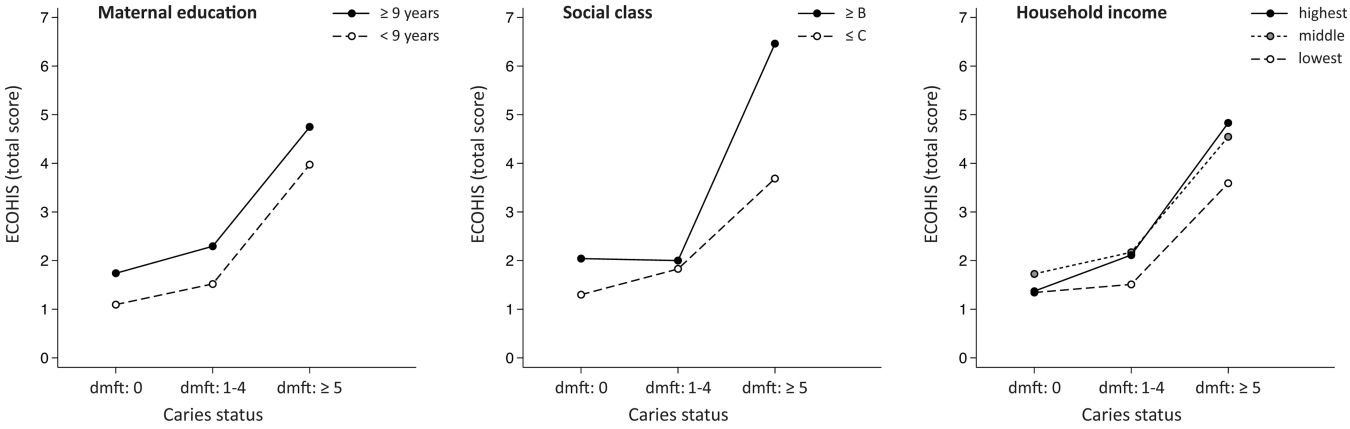

Figure 1.

Early Childhood Oral Health Impact Scale scores, by caries status and family socioeconomic status and composition

Legend: Mean maternal-reported ECOHIS scores are shown at three levels of child caries status in strata defined by socioeconomic measures.

Abbreviations: dmft = decayed (cavitated) missing filled (restored) primary tooth index; ECOHIS = Brazilian Early Childhood Health Impact Scale.

Table 1

Population characteristics, overall and by socioeconomic subgroups; Porto Alegre, Brazil

Child and Family Characteristics	Overall	Maternal education		Social class		Equivalized household income		
	N=456	≥ 9 yr n=244	< 9 yr n=212	≥ C n=99	≤ B n=356	> 244 BRL/mo n=147	110-244 BRL/mo n=147	< 110 BRL/mo n=148
Demographics								
Child sex, % female	49.1	49.2	49.1	48.5	49.2	51.0	49.0	48.7
Mean child age, mo (SD)	38.8 (2.3)	38.8 (2.4)	38.9 (2.3)	38.5 (2.3)	38.9 (2.3)	38.9 (2.3)	38.5 (2.3)	39.2 (2.3)
Mean maternal age, yr (SD)	25.9 (6.7)	25.8 (6.0)	26.0 (7.4)	26.1 (6.3)	25.9 (6.8)	26.1 (6.2)	26.0 (6.6)	25.9 (7.1)
Mean household residents (SD)	4.2 (2.1)	3.7 (1.8)	4.8 (2.3)	4.4 (2.2)	4.2 (2.1)	2.7 (0.9)	4.2 (1.6)	5.6 (2.4)
Family composition, % nuclear	50.7	53.7	47.2	44.4	52.2	72.1	51.0	31.1
Child Oral Health Status								
dmft: 0, %	60.3	69.3	50.0	71.7	57.0	67.3	65.3	50.0
dmft: 1–4, %	26.3	20.9	32.6	15.2	29.5	21.8	19.7	35.1
dmft: ≥ 5, %	13.4	9.8	17.5	13.1	13.5	10.9	14.8	14.9
Mean dmft (SD)	1.54 (2.77)	1.20 (2.44)	1.94 (3.07)	1.16 (2.34)	1.65 (2.87)	1.25 (2.41)	1.48 (2.83)	1.89 (3.08)
Dental trauma presence, %	30.9	33.2	28.3	31.3	30.9	36.1	25.2	31.8

Abbreviations: BRL = Brazilian real (approximately 0.6 US dollars at time of measurements); dmft = decayed (cavitated) missing filled (restored) primary tooth index; mo = month; SD = standard deviation; yr = year

Table 2

Overall and domain-specific Early Childhood Oral Health Impact Scale scores, by caries status

	Child Symptoms (1 item)		Child Function (4 items)		Child Psychological (2 items)		Child Self-Image (2 items)		Family Distress (2 items)		Family Function (2 items)		Total Scale (13 items)	
	Mean	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**
Overall (N=456)	0.37	(0.80)	0.52	(1.28)	0.37	(0.94)	0.04	(0.24)	0.57	(1.34)	0.09	(0.44)	1.96	(3.47)
Caries status														
dmft: 0 (n=275)	0.35	(0.77)	0.39	(1.09)	0.35	(0.87)	0.03	(0.21)	0.32	(0.89)	0.05	(0.28)	1.49	(2.76)
dmft: 1–4 (n=120)	0.23	(0.67)	0.62	(1.35)	0.36	(1.05)	0.02	(0.20)	0.53	(1.12)	0.08	(0.51)	1.85	(3.23)
dmft: ≥5 (n=61)	0.71	(1.04)	0.97	(1.74)	0.48	(1.06)	0.08	(0.38)	1.75	(2.39)	0.30	(0.74)	4.29	(5.47)

Table demonstrates mean scores and standard deviations (SD) according to three levels of child caries experience at a mean age of 38 months. Missing values (0.4% of responses) were multiply imputed.

Abbreviation: dmft = decayed (cavitated) missing filled (restored) primary tooth index.

Table 3

Early Childhood Oral Health Impact Scale scores, by socio-demographic and clinical characteristics

		Unadjusted		Adjusted[1]	Adjusted[2]
Child and Family Characteristics	**n**	**mean ECOHIS score**	**ratio (95% CI)**	**ratio (95% CI)**	**ratio (95% CI)**
Demographics					
Child sex					
Male	232	2.12	-	-	-
Female	224	1.79	0.84 (0.61, 1.16)	0.84 (0.61, 1.17)	0.89 (0.65, 1.23)
Child age					
2 years (31-35 months)	63	2.78	-	-	-
3 years (36-46 months)	393	1.83	0.66 (0.43, 1.11)	0.65 (0.42, 1.09)	0.58 (0.39, 0.97)
Mother's age					
< 20 years	82	1.58	-	-	-
20 to 30 years	260	2.07	1.31 (0.88, 2.03)	1.38 (0.90, 2.19)	1.33 (0.88, 2.09)
> 30 years	114	1.97	1.25 (0.77, 2.06)	1.33 (0.77, 2.28)	1.34 (0.79, 2.25)
Household residents					
< 3	94	1.95	-	-	-
3 to 5	266	1.89	0.97 (0.66, 1.48)	0.94 (0.65, 1.43)	0.92 (0.64, 1.38)
> 5	96	2.17	1.11 (0.65, 1.83)	1.14 (0.68, 1.88)	1.08 (0.65, 1.74)
Family composition					
Nuclear	231	1.95	-	-	-
Non-nuclear	225	1.96	1.00 (0.72, 1.39)	0.99 (0.70, 1.38)	0.99 (0.70, 1.37)
Child Oral Health Status					
Dental caries					
dmft: 0	275	1.49	-	-	-
dmft: 1-4	120	1.85	1.24 (0.84, 1.80)	1.25 (0.84, 1.83)	1.25 (0.84, 1.82)
dmft: ≥ 5	61	4.28	2.87 (1.87, 4.19)	2.94 (1.90, 4.31)	2.99 (1.93, 4.45)
Dental trauma					
Absence	315	1.99	-	-	-
Presence	141	1.90	0.95 (0.68, 1.31)	0.96 (0.68, 1.32)	1.09 (0.78, 1.51)

Child and Family Characteristics	n	Unadjusted mean ECOHIS score	Unadjusted ratio (95% CI)	Adjusted[1] ratio (95% CI)	Adjusted[2] ratio (95% CI)
Family Socioeconomic status					
Maternal education					
≥ 9 years	244	2.15	-	-	-
< 9 years	212	1.74	0.81 (0.57, 1.12)	0.80 (0.55, 1.13)	0.70 (0.49, 0.98)
Social class					
≥ B	99	2.62	-	-	-
≤ C	356	1.78	0.68 (0.48, 1.00)	0.68 (0.48, 1.01)	0.66 (0.47, 0.96)
Equivalized household income					
> 244 BRL/month	147	1.91	-	-	-
110-244 BRL/month	147	2.24	1.17 (0.76, 1.71)	1.11 (0.69, 1.69)	1.02 (0.64, 1.56)
< 110 BRL/month	148	1.73	0.91 (0.60, 1.35)	0.82 (0.48, 1.35)	0.75 (0.44, 1.23)

[1] Adjusted for child sex and age (in months), maternal age, household residents, family composition, and allocation group in the nesting trial but not for oral health or socioeconomic variables.

[2] Additionally adjusted for dental caries and dental trauma status.

Abbreviations: ECOHIS = Brazilian Early Childhood Health Impact Scale; CI = confidence interval; BRL = Brazilian real (approximately 0.6 US dollars at time of measurements); dmft = decayed (cavitated) missing filled (restored) primary tooth index.

Table 4

Associations between caries status and oral health-related quality of life according to socioeconomic and family composition measures

Child caries status	**Maternal education**		**P (interaction)**			
	≥ 9 years		< 9 years			
	ratio (95% CI)		**ratio (95% CI)**			
dmft 0	-		-			
dmft 1–4	1.32 (0.77, 2.12)		1.41 (0.73, 2.64)		0.86	
dmft ≥ 5	2.63 (1.36, 4.42)		3.91 (2.18, 7.08)		0.31	
	Social Class					
	≥ B		≤ C			
	ratio (95% CI)		**ratio (95% CI)**			
dmft 0	-		-			
dmft 1–4	1.05 (0.17, 2.67)		1.41 (0.90, 2.15)		0.56	
dmft ≥ 5	3.12 (1.47, 5.63)		2.93 (1.74, 4.76)		0.89	
	Household Income					
	highest	middle	lowest	middle	low	middle
	ratio (95% CI)	**ratio (95% CI)**	**ratio (95% CI)**	v. high	v. high	v. low
dmft 0	-	-	-			
dmft 1–4	1.66 (0.74, 3.02)	1.28 (0.57, 2.58)	1.08 (0.54, 2.18)	0.70	0.45	0.74
dmft ≥ 5	3.85 (1.42, 7.06)	2.53 (1.14, 4.71)	2.78 (1.43, 5.60)	0.46	0.61	0.82

All ECOHIS mean ratios were adjusted for child sex and age (in months), maternal age, household residents, family composition, and allocation group in the nesting trial.

Abbreviations: CI = confidence interval; dmft = decayed (cavitated) missing filled (restored) primary tooth index; ECOHIS = Brazilian Early Childhood Health Impact Scale.