

Impact of Oral Health Literacy on the Clinical Consequences of Untreated Dental Caries in Preschool Children

Letícia Pereira Martins, BDS, MDS¹ • Jéssica Madeira Bittencourt, BDS, MS² • Cristiane Baccin Bendo, BDS, MDS, PhD³ • Isabela Almeida Pordeus, BDS, MDS, PhD⁴
Paulo Antônio Martins-Júnior, BDS, MDS, PhD⁵ • Saul Martins Paiva, BDS, MDS, PhD⁶

Abstract: Purpose: To evaluate the association between parental oral health literacy (OHL) and untreated early childhood caries and its clinical consequences in children. **Methods:** Population-based, cross-sectional study was conducted with 449 parent-preschooler dyads (four-to-six-year-olds) in Ribeirão das Neves, Minas Gerais, Brazil. Parents answered a socioeconomic questionnaire and the Brazilian version of the Hong Kong Oral Health Literacy Assessment Task for Paediatric Dentistry (BOHLAT-P), which measures parental OHL in pediatric dentistry. Preschoolers were examined by two calibrated dentists for the diagnosis of caries (ICDASepi-merged) and its clinical consequences: visible pulp; oral mucosa ulceration due to root fragments; fistula; and abscess (pufa). Data were submitted to univariable and multivariable logistic regression analyses ($P < 0.05$). **Results:** A multivariable model that adjusted for socioeconomic status showed that parental OHL was not associated with untreated dental caries ($P = 0.618$). Parents with lower OHL had a greater odds of having children with at least one clinical consequence of untreated dental caries (odds ratio equals 0.94; 95 percent confidence interval equals 0.89 to 0.98) than parents with higher OHL. **Conclusions:** Low parental OHL appears to impact the occurrence of at least one clinical consequence of untreated dental caries in children but not in the simple presence of untreated dental caries. (*Pediatr Dent* 2021;43(2):116-22) Received May 4, 2020 | Last Revision October 8, 2020 | Accepted November 11, 2020

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Oral health literacy (OHL) is defined as the degree to which individuals can obtain, process, and understand basic oral and craniofacial health information as well as the services needed to make appropriate health choices.¹ It also involves skills needed to understand good oral health, learn and adopt healthy oral behaviors, communicate with health professionals, fill out forms, and use the health care system as a whole.²

Health literacy encompasses word recognition, writing, numerical skills, oral communication, and textual comprehension.^{3,4} In the literature, there are some instruments developed for the evaluation of OHL through word recognition,^{5,6} conceptual knowledge,⁷ and textual understanding.^{8,9} Some are cross-culturally validated for use in Brazil.^{10,11} Among them, the Hong Kong Oral Health Literacy Assessment Task for Pediatric Dentistry (HKOHLAT-P)^{11,12} is used to assess numerical skills, reading comprehension, and knowledge of oral health of caregivers simultaneously, enabling a more comprehensive assessment of OHL. The HKOHLAT-P is a specific instrument for use in pediatric dentistry, what is another advantage of this instrument.^{11,12}

Drs. ¹Martins and ²Bittencourt are PhD students; Drs. ³Bendo and ⁵Martins-Júnior are adjunct professors; and Drs. ⁴Pordeus and ⁶Paiva are full professors, all in the Department of Pediatric Dentistry, School of Dentistry, at the Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil.

Correspond with Dr. Bendo at crysbendo@yahoo.com.br

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The pediatric population in Brazil is greatly affected by dental caries since 53.4 percent of five-year-old Brazilian children had caries in the last national oral health survey.^{13,14} When left untreated, dental caries can develop into more severe lesions, cause pain and, depending on its extent, the pulp may be infected, oral mucosa may have ulceration due to root fragments, and odontogenic infections may develop such as fistula and abscess.¹⁵ Studies have reported that low parental OHL is associated with a higher frequency of dental caries,¹⁶⁻¹⁹ but only one of them was conducted in Brazil and it used word recognition that didn't evaluate the understanding of the oral health-related terms.¹⁹ Consequently, the impact of OHL encompassing numerical skills, reading comprehension, and knowledge of oral health on the occurrence of dental caries has not been explored in Brazilian children.

The HKOHLAT-P, which assesses numerical skills, reading comprehension, and knowledge of oral health, was applied to the population only in three studies in Hong Kong: a hospital-based study²⁰ and two studies conducted at daycare centers^{16,21} covering the three- to six-year-old age group. One of the findings was that the OHL of the parents of children who had severe early childhood caries was associated with their socioeconomic context, suggesting that OHL should be directed toward disadvantaged socioeconomic groups.²⁰ Another study found that the parental habit of reading printed and digital texts is associated with a greater probability of a having better OHL score.²¹ The third study found that the literacy of the parents was associated with the child's oral health status.¹⁶

Adequate OHL promotes comprehension and favors good oral health decisions on the part of parents regarding their children,²² which may differ from the decisions they make for themselves. The use of an instrument that evaluates OHL in a more complex way and evaluating multiple skills demonstrates more robust data in relation to children's oral status and

highlights the importance of using a more comprehensive instrument compared to an instrument that evaluates only word recognition.¹⁶ There are no representative studies in the existing literature using a multidimensional instrument for OHL that measures multiple skills in a Brazilian context.

The present investigation fills these gaps in the literature by evaluating the association between parental OHL and untreated dental caries and its clinical consequences in preschoolers using a robust and specific instrument for pediatric dentistry that measures multiple skills in OHL. Improved knowledge regarding parental OHL can be useful in establishing more effective communication between dentists and the parents of pediatric patients as well as guiding the planning of health promotion actions. This better communication between parents and professionals helps improve parents' knowledge of oral health concepts, promoting empowerment on the individual, family, and community levels.

Therefore, the purpose of the present study was to evaluate the impact of parental oral health literacy on the occurrence of untreated dental caries and its clinical consequences in preschoolers. The hypothesis was that low parental OHL is associated with the presence of untreated dental caries and its clinical consequences in children.

Methods

The present study conforms to the guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement.²³

Ethical aspects. This study was conducted in accordance with the Declaration of Helsinki and received approval from the Human Research Ethics Committee of Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil (certificate number: 86759218.0.0000.5149). Only preschoolers whose parents signed a statement of informed consent participated in the study. The preschoolers also assented to participate.

Study design and sample selection. A population-based, cross-sectional study was conducted from August 2018 to March 2019 in the city of Ribeirão das Neves, which is a municipality in the metropolitan region of Belo Horizonte in the state of Minas Gerais, Brazil. Ribeirão das Neves is geographically divided into three administrative districts (Justinópolis, Regional Centro, and Veneza). It has an area of 155,105 square kilometers and had an estimated population of 338,197 inhabitants in 2020.²⁴ The Municipal Human Development Index (MHDI) score is 0.684 (range 0-1), which places the city in the middle human development range, and the Gini Index score is 0.39 (range 0-1).²⁵ Gini coefficients close to zero signify less inequality regarding family income per capita.²⁵

The sample size was calculated, giving a significance level of 95 percent, a power of 80 percent, an exposed to unexposed ratio of one to one, a positive nonexposure rate of six percent (percentage of parents with high OHL and children with clinical consequences of untreated dental caries), and a positive exposure rate of 14 percent (percentage of parents with low OHL and children with clinical consequences of untreated dental caries).¹⁹ The minimum sample size was determined to be 440 preschoolers, to which 20 percent was added to compensate for possible losses, resulting in a sample of 550 preschoolers aged four to six years. The OpenEpi (version 3.01, The OpenEpi Project, Atlanta, Ga., USA) software was used to calculate sample size.

To ensure the representativeness of the study, the sample was stratified according to the proportion of preschoolers

enrolled at public and private preschools in each of the three districts of the municipality. Randomization was performed in two stages. First, a random drawing of public and private preschools was performed in each district. Next, a classroom was drawn from each selected preschool and all children were invited to participate.

Eligibility criteria. The inclusion criteria were male and female children aged four to six years enrolled in the first and second periods of public and private preschools in Ribeirão das Neves. Preschoolers absent on the examination day and those with syndromes or cognitive disorders reported by parents were excluded.

Training and calibration exercises. Two examiners underwent training and calibration exercises for the diagnosis of dental caries and the clinical consequences of untreated dental caries. This process was conducted by an experienced pediatric dentist, who served as the gold standard. The theoretical step involved discussions of the International Caries Detection and Assessment System (ICDASepi-merged)²⁶ and pulp, oral mucosa ulceration due to root fragments, fistula, and abscess (pufa)¹⁵ indices as well as the analysis of photographs of teeth with these clinical conditions. For clinical calibration, 17 preschoolers who were not part of the main study were examined by each of the examiners separately to determine interexaminer agreement. After one week, the preschoolers were reexamined to calculate intraexaminer agreement. Kappa values for ICDASepi-merged and pufa ranged from 0.96 to 0.99 for interexaminer and intraexaminer agreement.

Pilot study. To test the methods (clinical examination and administration of questionnaires), a pilot study was conducted with a sample of 53 preschoolers who did not participate in the main study. Minor modifications were necessary to conduct the main study, such as improving the letter sent to parents explaining the purpose of the study as well as some changes in the wording of questions on the socioeconomic questionnaire.

Nonclinical data collection. OHL was measured using the Brazilian version of the HKOHLAT-P (BOHLAT-P).^{11,12} This questionnaire measures the OHL through multiple competencies, such as textual understanding, numeracy, and previous knowledge in oral health, being specific to pediatric dentistry. The total score of the instrument ranges from zero to 49 points, with higher scores denoting better OHL.¹¹ The BOHLAT-P is a self-administered questionnaire that provides prior instructions for respondents on all items. The instrument evaluates the constructs through figures associated with questions to identify structures, clinical appointment cards, medical prescription labels, postoperative instructions, brushing guide, a conversation between the dentist and a parent, et cetera. The OHL was applied as a count variable.

Socioeconomic characteristics were collected due to the potential to interfere with the association between parental OHL and dental caries/clinical consequences. The proposed confounding variables of the child were sex, age, health insurance, and use of dental services (if the preschooler had ever been to a dentist). The proposed confounding variables of the parents were respondent's relationship to the child, health insurance, use of dental services (if the respondent had ever been to a dentist), family income using the Brazilian monthly minimum wage (BMMW: R \$954.00 equals US \$241.17) as reference (less than or equal to or greater than two times the BMMW) and mother's schooling (less than or equal to or greater than eight years of study). The socioeconomic variables were reported by the parents using a structured questionnaire.

Clinical data collection. The preschoolers were examined at the preschool in a private room during class time. The procedures complied with biosafety norms. The clinical examinations were performed with the preschoolers seated facing the examiners. Examiners wore personal protective equipment, and the examinations were performed under artificial light (head lamp, Petzl America, Clearfield, Utah, USA) with the aid of a sterilized mouth mirror (Duflex, Juiz de Fora, Brazil) and gauze to dry the teeth.

Untreated dental caries was diagnosed using the ICDASepi-merged, which merges the six ICDAS caries codes into three severity stages, coding the condition of the tooth as zero for sound (no evidence of caries), 1 and 2 for initial caries (marked opacity, pigmentation retained in bottom of pits and fissures), 3 and 4 for moderate caries (enamel cavitation or underlying dentin shading), and 5 and 6 for extensive caries (cavitation with dentin exposure)²⁶ (Table 1). The ICDASepi-merged was dichotomized as the absence of untreated dental caries (ICDASepi-merged codes 0, 1 and 2) or presence of untreated dental caries (ICDASepi-merged codes 3, 4, 5 and 6).

The clinical consequences of untreated dental caries were diagnosed using the pufa index¹⁵ (Table 1). This is an appropriate index for quantifying the consequences of the severity of tooth decay. For example, pulp involvement and dental abscess, which can be more serious injuries than cavities and have a greater impact on children and families.¹⁵ In the present study, to assess the consequences of untreated caries, each tooth was given a pufa index score, according to its severity. The total pufa index score per patient was then calculated cumulatively. The pufa index was dichotomized as absence (pufa equals zero) if no clinical consequences of untreated dental caries were found or presence (pufa greater than or equal to one) if at least one clinical consequence of untreated dental caries was found. Scores were assigned on a tooth-by-tooth basis.

Data analysis. Data analysis was performed using STATA 16.1 software (StataCorp College Station, Texas, USA). Descriptive statistics were performed. Two univariable analyses and multivariable logistic regression analyses were conducted between each outcome (untreated dental caries and their clinical consequences) and independent variables (parental OHL and

confounding variables). These analyses were performed, taking into account the weights of the administrative districts of the municipality and the type of school of each participant, since a multistage sampling method was used instead of simple random sampling.

The first was performed with untreated dental caries as the main outcome and the independent variables with a *P*-value less than 0.20 in the univariable analysis: respondent's relationship to the child, health insurance (parent); mother's schooling; monthly family income; type of preschool; health insurance (child); use of dental services (child); and the independent variable of interest (parent's OHL). The other multivariable logistic regression analysis was performed with the clinical consequences of untreated dental caries as the main outcome and the independent variables with a *P*-value less than 0.20 in the univariable analysis: respondent's relationship to the child; health insurance (parent); mother's schooling; monthly family income; type of preschool; sex; health insurance (child); use of dental services (child); and the independent variable of interest (parent's OHL). The significance level for the analyses was set at five percent (*P*<0.05).

Results

The present sample consisted of 449 children (230 girls [51.2 percent]) representing four- to six-year-old preschoolers residing in the municipality of Ribeirão das Neves. The participation rate was 81.6 percent, which is satisfactory. The distribution of the sample by region and type of preschool was not affected by the losses, maintaining an adequate proportion for representativeness (Table 2).

The preschoolers predominantly attended public preschools (84.4 percent), were five years old (49.4 percent), do not have health insurance (61.0 percent), and never used dental service (66.6 percent). Most preschoolers had untreated dental caries (51.0 percent). A total of 13.6 percent had clinical consequences of untreated dental caries (pufa), and of these 10.9 percent had visible pulp and/or oral mucosa ulceration due to root fragments and 2.7 percent had fistula and/or abscess. Regarding parents, most respondents were mothers (88.2 percent), with more than eight years of schooling (80.8 percent), family

Table 1. DESCRIPTION OF THE ICDASepi-merged AND pufa INDEXES*

Index	Code	Stages	Description
ICDASepi-merged†	0	Sound	No evidence of caries.
	1/2	Initial	Opacity or discoloration (white or brown) is visible at the entrance to the pit or fissure.
	3/4	Moderate	Localized enamel breakdown (without clinical visual signs of dentinal involvement)/underlying dark shadow from dentin.
	5/6	Extensive	Distinct cavity with visible dentin/extensive (more than half the surface) distinct cavity with visible dentine.
pufa‡	0	Sound	No evidence of clinical consequences of untreated dental caries is shown.
	p	Pulpal involvement	Opening of the pulp chamber is visible or the coronal tooth structures have been destroyed by the carious process and only roots or root fragments are left.
	u	Ulceration	Sharp edges of a dislocated tooth with pulpal involvement or root fragments have caused traumatic ulceration of the surrounding soft tissues.
	f	Fistula	Pus releasing sinus tract related to a tooth with pulpal involvement is present.
	a	Abscess	Pus containing swelling related to a tooth with pulpal involvement is present.

* Abbreviations used in this table: ICDAS=International Caries Detection and Assessment System; pufa=pulp, oral mucosa ulceration due to root fragments, fistula, and abscess.

† Pitts et al., 2012.

‡ Monse et al., 2010.

income less than two times the BMMW (75.9 percent), do not have health insurance (69.7 percent), and already used dental service (80.6 percent). The mean score of parental OHL was 34.59 (± 7.721 standard deviation).

The results of the univariable analysis revealed a significant association between untreated dental caries and parental OHL ($P=0.023$), parents who did not have health insurance ($P=0.009$), family income of up to two times the BMMW ($P<0.001$), enrolled at a public preschool ($P=0.001$), and a child without health insurance ($P=0.005$). The variables respondent's relationship to the child and mother's schooling demonstrated a P -value less than 0.20 and were also included in the multivariable analysis. The multivariable logistic regression model demonstrated that children from families with a lower income had a 2.37 greater odds (95 percent confidence interval [95% CI] equals 1.21 to 4.62; $P=0.012$) of exhibiting untreated dental caries than those with a higher income. Parental OHL was not associated with untreated dental caries in the preschoolers within the multivariable model (odds ratio [OR] equals 0.99; 95% CI equals 0.95 to 1.03; $P=0.618$; Table 3).

The results of the univariable analysis revealed an association between at least one clinical consequence of untreated dental caries and low parental OHL ($P<0.001$), parents without health insurance ($P<0.001$), mothers with less than eight years of schooling ($P<0.001$), income up to two times the BMMW ($P<0.001$), enrollment at a public preschool ($P=0.008$), male children ($P=0.026$), and children who already used dental services ($P<0.001$). The variables respondent's relationship to the child and parent without health insurance demonstrated

a P -value of less than 0.20 and were also included in the multivariable analysis. The multivariable logistic regression model demonstrated that parents with a lower OHL had a greater odds of having children with at least one clinical consequence of untreated dental caries (OR equals 0.94; 95% CI equals 0.89 to 0.98; $P=0.008$) than those parents with higher OHL. Clinical consequences of untreated dental caries were also associated with low family income (OR equals 5.15; 95 percent CI equals 1.40 to 18.99; $P=0.014$), male children (OR equals 2.50; 95 percent CI equals 1.29 to 4.83; $P=0.007$), and preschoolers who used dental services (OR equals 0.25; 95 percent CI equals 0.12 to 0.52; $P<0.001$; Table 4).

Table 2. DISTRIBUTION OF THE SAMPLE OF PRESCHOOLERS, IN ABSOLUTE AND PROPORTIONAL VALUES, ACCORDING TO ADMINISTRATIVE REGION AND TYPE OF SCHOOL, RIBEIRÃO DAS NEVES, MINAS GERAIS, BRAZIL (N=449)

Administrative region	First stage (breakdown by administrative region)	
	Total preschoolers N (%)	Sample N (%)
Justinópolis	4,043 (48.4)	203 (45.2)
Centro	2,358 (28.2)	130 (29.0)
Veneza	1,959 (23.4)	116 (25.8)
Type of school	Second stage (breakdown by type of school)	
	Total preschoolers N (%)	Sample N (%)
Justinópolis		
Public	3,607 (89.2)	174 (85.7)
Private	436 (10.8)	29 (14.3)
Centro		
Public	2,092 (88.7)	114 (87.7)
Private	266 (11.3)	16 (12.3)
Veneza		
Public	1,459 (74.5)	91 (78.4)
Private	500 (25.5)	25 (21.6)

Table 3. UNIVARIABLE ANALYSES AND MULTIVARIABLE LOGISTIC REGRESSION MODELS EXPLAINING THE ASSOCIATION OF INDEPENDENT VARIABLES IN UNTREATED DENTAL CARIES RIBEIRÃO DAS NEVES, MINAS GERAIS, BRAZIL (N=449)*

Variables	Untreated dental caries			
	Nonadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Parents' variables				
Oral health literacy	0.96 (0.93-0.99)	0.023	0.99 (0.95-1.03)	0.618
Health insurance				
Yes	1.00		1.00	
No	2.11 (1.21-3.67)	0.009	1.11 (0.39-3.11)	0.842
Use of dental services				
Yes	1.00		—	—
No	0.72 (0.39-1.33)	0.297	—	—
Mother's schooling (years of study)				
≤8	1.00		1.00	
>8	1.57 (0.88-2.80)	0.122	0.93 (0.51-1.69)	0.822
Monthly family income (minimum salary)				
≤2	1.00		1.00	
>2	3.18 (1.73-5.86)	<0.001	2.37 (1.21-4.62)	0.012
Preschoolers' variables				
Type of school				
Private	1.00		1.00	
Public	2.55 (1.47-4.41)	0.001	1.58 (0.84-2.98)	0.154
Sex				
Female	1.00		—	—
Male	0.72 (0.43-1.20)	0.202	—	—
Age				
4	1.00		—	—
5	1.07 (0.61-1.87)	0.822	—	—
6	0.71 (0.32-1.54)	0.382	—	—
Health insurance				
Yes	1.00		1.00	
No	2.15 (1.26-3.70)	0.005	1.30 (0.48-3.52)	0.599
Use of dental services				
Yes	1.00		—	—
No	0.81 (0.47-1.32)	0.428	—	—

*Abbreviations used in this table: OR=odds ratio; CI=confidence interval; bold typing indicates statistical significance. $P<0.05$; adjusted for respondent's relationship to the child, parental oral health literacy, parental health insurance, mother's schooling, monthly family income, type of school, and preschooler's health insurance.

Discussion

The present study demonstrated that parents with low OHL had children with more clinical consequences of untreated dental caries. This result corroborates a previous Brazilian study involving four- to five-year-olds.¹⁹ However, it was performed only in public preschools and the instrument that evaluated OHL measures only word recognition and did not have a multidimensional approach.¹⁹ Thus, the present study brings important contributions to the literature, since it was carried out with a representative sample and with an instrument that measures OHL through multiple skills.

No association was found between parental OHL and the simple presence of untreated dental caries in children. By contrast, other studies have found such an association.¹⁶⁻¹⁹ This divergence may be due to methodological and cultural differences. Two Iranian studies were conducted with a convenience sample and a different OHL questionnaire that was not multidimensional.^{17,18} A study conducted in Hong Kong used the same instrument for OHL; however, dental caries was measured by a different index and the Brazilian study used a word recognition OHL instrument and was conducted only at public preschools.^{16,19}

The evaluation of parental OHL is important for the health professional to establish effective communication with the family and the patient. Thus, there can be greater empowerment of the family and, consequently, improvements in the oral health of their children. A practical implication of these findings is that parents with low OHL have children with more severe dental caries, which may lead to dental pain, missed school, poorer school performance, and difficulty eating.²⁷

The present study demonstrated that a higher prevalence of untreated dental caries and its clinical consequences were associated with family income up to two times the BMMW. It also demonstrated an association between clinical consequences of untreated dental caries and the use of dental services. These findings are in accordance with previous studies that had demonstrated an association between worse oral health conditions, lower family income, and greater use of emergency dental services.^{28,29} These results suggest that the use of dental services may be related to a greater demand for emergency dental treatment compared to routine consultations. The search for dental care for preschoolers is often neglected, either due to difficulty accessing public oral health services, the costs of private services, or a lack of understanding about the importance of primary dentition.²⁰ Further studies should identify the core of this problem. Educational interventions could be implemented to improve parents' understanding of the importance of primary teeth.³⁰ Furthermore, dental caries in the primary dentition is the most robust predictor of dental caries in the permanent dentition,^{31,32} so the failure to implement healthy oral care behaviors in childhood may be perpetuated into adolescence and adulthood and, consequently, facilitate the occurrence of oral problems.

This is a population-based study with a random sample of preschool children from public and private schools, enabling the data to be extrapolated to the entire preschool population. However, the cross-sectional design impedes the establishment of causal relations. Further studies with a longitudinal design and clinical trials should be encouraged. The BOHLAT-P is a long questionnaire. The development of a short version of the questionnaire could obtain greater adherence from the participants. Furthermore, individuals with low OHL are more likely not to complete long questionnaires and there is a significantly higher probability of not answering the more complex items, leading to missing data.³³ However, the BOHLAT-P is an important advance, as it is an instrument with a pediatric dentistry approach that assesses OHL based on multidimensional skills, such as text comprehension, numerical skills, and oral health knowledge. For the present study, the losses concerning the absence of answers to the questionnaire probably did not interfere in the results, since the sample maintained the necessary proportion for the types of schools in all administrative districts of the city.

Table 4. UNIVARIABLE ANALYSIS AND MULTIVARIABLE LOGISTIC REGRESSION MODELS EXPLAINING THE ASSOCIATION OF INDEPENDENT VARIABLES IN THE CLINICAL CONSEQUENCES OF UNTREATED DENTAL CARIES, RIBEIRÃO DAS NEVES, MINAS GERAIS, BRAZIL (N=449)*

Variables	Clinical consequences of untreated dental caries (pufa)			
	Nonadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Parents' variables				
<i>Oral health literacy</i>	0.91 (0.88-0.94)	<0.001	0.94 (0.89-0.98)	0.008
<i>Health insurances</i>				
Yes	1.00		1.00	
No	5.12 (2.29-11.42)	<0.001	1.35 (0.29-6.17)	0.701
<i>Use of dental services</i>				
Yes	1.00		—	—
No	1.02 (0.47-2.22)	0.961		
<i>Mother's schooling (years of study)</i>				
≤8	1.00		1.00	
>8	3.53 (1.80-6.91)	<0.001	1.21 (0.54-2.74)	0.638
<i>Monthly family income (minimum salary)</i>				
≤2	1.00		1.00	
>2	11.51 (3.77-35.15)	<0.001	5.15 (1.40-18.99)	0.014
Preschoolers' variables				
<i>Type of school</i>				
Private	1.00		1.00	
Public	14.79 (2.01-109.07)	0.008	6.69 (0.98-45.38)	0.052
<i>Sex</i>				
Female	1.00		1.00	
Male	2.04 (1.09-3.81)	0.026	2.50 (1.29-4.83)	0.007
<i>Age</i>				
4	1.00		—	—
5	1.38 (0.69-2.78)	0.361		
6	1.61 (0.64-0.12)	0.314		
<i>Health insurance</i>				
Yes	1.00		1.00	
No	6.47 (2.91-14.40)	0.106	2.30 (0.46-11.55)	0.312
<i>Use of dental services</i>				
Yes	1.00		1.00	
No	0.59 (0.31-1.12)	<0.001	0.25 (0.12-0.52)	<0.001

*Abbreviations used in this table: OR=odds ratio; CI=confidence interval; bold typing indicates statistical significance. $P<0.05$; adjusted for respondent's relationship to the child, parental oral health literacy, parental health insurance, mother's schooling, monthly family income, type of school, and preschooler's health insurance.

The findings of the present study demonstrate the need for short-, medium-, and long-term changes to achieve improvements in parental OHL. In the short-term and medium-term, dentists should identify parental OHL to establish effective communication in order to promote improvements in oral health status^{33,34} as well as the understanding and involvement of parents in dental treatment. In the dental university curriculum, besides clinical skills it is important to teach comprehension of the skills of the patient and family as a whole.³⁵ The general population has difficulties understanding technical terms, and effective communication is an important tool for increasing the OHL of individuals. In the long term, public health measures should be implemented to increase OHL on the population-level and improve knowledge regarding the use of health care services, a proper reading of prescriptions and packages, understanding the indication of a medication, and establishing a productive relationship with health professionals.

Conclusions

Based on this study's results, the following conclusions can be made:

1. Low oral health literacy in parents is associated with the occurrence of at least one clinical consequence of dental caries in their children.
2. However, the simple presence of untreated dental caries in children was not associated with parental OHL.

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