

ORIGINAL ARTICLE



Maternal perception about child oral health is associated to child dental caries and to maternal self-report about oral health

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ABSTRACT

Objective: To test the association between maternal perception about child's oral health and child dental caries experience and maternal self-perception about oral health.

Materials and methods: A cross-sectional study was performed with mothers and their children aged six to 13 years. A questionnaire was applied to mothers. Children were dentally examined using the DMF-T/dmf-t Index. For analysis, Poisson regression models with robust variance were employed for each variable of interest (child dental caries experience and maternal self-report about oral health). Magnitudes of associations were estimated through Prevalence Ratio (PR) as effect measure with 95% confidence intervals (CI). A significant level of $p \leq .05$ was adopted.

Results: Overall, 131 mothers-children dyads were included. Most of children were girls (52.7%) and aged between 10 to 13 years (60.3%). Negative maternal perception about child's oral health was associated to maternal negative self-perception about oral health (PR 2.54; 95%CI 1.54–4.30) and to higher child dental caries experience (PR 2.21; 95%CI 1.41–3.47).

Conclusion: Maternal perception about child oral health was associated to child dental caries and to maternal self-report about oral health.

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Dental caries; oral health;
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Introduction

The occurrence of dental caries in children is still a public health problem in Brazil.

According to last Brazilian National Oral Health survey [1], 53.4% and 56.5% of children at ages of 5 and of 12 had at least one tooth affected by dental caries, respectively. In addition, most of teeth of these children are not treated [1]. Difficulties in access to public services, coupled with high cost of private practice, influence on seek for dental care, reflecting the great socioeconomic inequality still prevalent in Brazil [2].

Besides environmental factors, including economic situation, being strongly associated with oral health condition, behavioral characteristics have been explored as predictors of oral health, especially in children. Mothers play an important role in choosing the oral health habits of their children. Children tend to learn oral health behaviors from their parents, and in the long term, maternal behaviors are transferred through generations [3]. Children's caries experience has been related to maternal behaviors including those behaviors not directly related to caries such as smoking [4,5].

Mothers have a greater capacity to recognize an impact of oral health on the quality of life of their children [6]. A poorer perception of mothers regarding their children's oral

health is associated with a negative quality of life related to children's oral health [7]. Besides that, maternal oral health has been found to be a risk factor for dental caries experience of their children, since, children whose mothers reported having caries, had high prevalence of dental caries when compared to those mothers who had no caries experience [8]. In addition, parents who positively perceive oral health status of their child are more likely to be aware of their child's teeth cleaning than those who perceived otherwise [9].

Parents, especially mothers, are responsible for establish oral hygiene habits of their children, including the use of dental service, either during childhood or in adulthood [8,10]. Parents' beliefs about diet and oral hygiene have been associated to presence of oral diseases and to their children's oral health [10]. This fact highlights the importance of those responsible being aware of their children's oral health condition and in identification of their needs [11,12]. In view of the importance of maternal perception in child's oral health, the aim of this study was to test a possible association between maternal perception about child's oral health and child dental caries experience, and maternal self-perception about oral health in children aged six to 13 years of age.

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Materials and methods

Sample and study design

This cross-sectional study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology recommendations (STROBE) [13].

A convenience sample with children attended at the Child Clinic Unit of the Faculty of Dentistry of the Federal University of Pelotas was adopted. Children who seek the Pediatric Clinic come from free demand, referred from Basic Health Units (BHU) of the Pelotas city or from other health professionals the private network. Children aged from six to 13 years and those that were accompanied by their mothers were included in this study. Children with diagnosis of neuropsychiatric disorder, comorbidity with mental illness or physical disorders in general health were not included. Those mothers who were not able to understand and answer the questionnaire were excluded.

The size of the sample (minimum) was calculated assuming that the prevalence of dental caries in Brazilian children is of 53.4% percent [1] using the software OpenEpi (available at http://www.openepi.com/Menu/OE_Menu.htm). An 80% power, with a standard error of five percent, and confidence level of 95 percent were considered. To cover non-response, the sample was increased in 10%. The minimum sample size was estimated at 131 children. As selection criteria, new patients were randomly invited to participate according to the order of arrival, until the target number had been reached.

Data collection

Data collection was performed from July 2014 to March 2015. Interviews were conducted with mothers and children were clinically examined. The interview included questions about demographic and socioeconomic factors and psychosocial characteristics related to the mother-child dyads and it were performed by two interviewers previously trained. Two undergraduate students received two hours of theoretical training on how to perform the interview and discussion of questions. To test proposed methodology, a pilot study involving 12 mother-child dyads, in the same age range as study's participants, was performed prior to data collection. These children were not included in final sample.

Questionnaire

Child's age was collected in years of age and was categorized as following: (a) from six to nine years, (b) from 10 to 12 years. Maternal age were collected in years of age and was categorized into tertiles (from 26 to 33 years, from 34 to 40 years, and more than 40 years). Maternal education was categorized in eight years or less of study and over eight years of study. Family structure was categorized as nuclear (composed of father and mother, two fathers or two mothers) and non-nuclear (composed of a father or a mother and/or other caregivers). Number of children was dichotomized into only child or more than one child.

The outcome, maternal perception about child's oral health, was assessed through the question: 'Comparing with children of age of your son/daughter, how do you consider health of the child's teeth, mouth and gums?'. Answer alternatives were dichotomized into: Positive (Very Good and Good alternatives) and Negative (Regular, Poor and Very Poor alternatives) [14]. Self-perception of mothers about their oral health was assessed through the question: 'Comparing with people of your age, how do you consider health of your teeth, mouth and gums?' For statistical analysis, this variable was dichotomized into Positive (Very Good and Good alternatives) and Negative (Regular, Poor and Very Poor alternatives) [13]. Child dental pain due to dental caries in the last four weeks was assessed by the question: 'Did your child have toothache due to dental caries in the last four weeks?' (yes/no) [15].

Dental evaluation

Dental caries experience was assessed by the DMT/dmt Index (sum of decayed, missing and filled teeth in both dentitions), considering tooth in permanent and primary dentitions, respectively, as recommend by the World Health Organization [16]. For analysis purposes, dental caries experience was dichotomized according to the severity of the dental condition into a) Low caries experience (0 to 5 teeth affected by dental caries); and b) High caries experience (6 to 14 teeth affected by dental caries).

At first dental visit, clinical examination was performed by students of final year of dental school. These students have experience in the DMF-T/dmf-t Index, which is routinely used to diagnose and to plan dental treatment of all individuals attended at Dentistry School. In a two-hour theoretical training process, all criteria were discussed. As a standard procedure, the professor responsible – PhD in Pediatric Dentistry and with experience in epidemiological studies – for the Child Clinic checked all clinical examination. Biosecurity precepts recommended by the World Health Organization were adopted for clinical evaluations [16]. Examiners used personal protective equipment (gloves, mask, cap and white coat), triple syringe and artificial light of dental equipment, mouth mirror, and a NIDR standard periodontal probe (developed by the National Institute of Dental Research).

Ethical considerations

This study was approved by the Research Ethics Committee of the Dentistry School of the Federal University of Pelotas under protocol no 29/2013. All mothers were invited to participate and signed a consent form. All children were invited to participate and signed an assent form. Mothers who did not agree to participate continued to be attended without any prejudice to their children.

Statistical analysis

Data were analyzed using the Software Stata 14.0 (Stata Corporation, College Station, TX, USA). Absolute and relative

Table 1. Descriptive of the sample according to the maternal perception about child's oral health.

Variables	Maternal perception about child's oral health			p value*
	Total n (%) (95%CI)	Positive n (%) (95%CI)	Negative n (%) (95%CI)	
Age				.815
6–9 years	52 (39.7) (31.2–48.6)	32 (61.5) (52.9–70.1)	20 (38.5) (29.8–47.1)	
10–13 years	79 (60.3) (51.3–68.7)	47 (59.5) (50.6–68.0)	32 (40.5) (31.9–49.3)	
Gender				.350
Female	69 (52.7) (43.7–61.4)	39 (56.5) (44.0–68.4)	30 (43.5) (31.5–55.9)	
Male	62 (47.3) (36.2–58.5)	40 (64.5) (51.3–76.2)	22 (35.5) (23.7–48.6)	
Mothers' age				.798
26–33 years	44 (33.6) (25.5–42.3)	28 (63.6) (45.4–75.6)	16 (36.4) (24.3–54.5)	
34–40 years	48 (36.6) (28.3–45.5)	29 (60.4) (43.2–72.3)	19 (39.6) (27.6–56.7)	
>40 years	39 (29.8) (22.1–38.3)	22 (56.4) (42.1–74.4)	17 (43.6) (25.5–57.9)	
Maternal schooling				.549
≤8 years	70 (53.4) (44.5–62.1)	40 (57.1) (44.7–68.9)	30 (42.8) (31.1–55.2)	
>8 years	61 (46.6) (37.8–55.4)	38 (62.3) (48.9–74.3)	23 (37.7) (25.6–51.0)	
Family structure				.003
Nuclear	88 (67.2) (58.4–75.1)	61 (69.3) (58.5–78.7)	27 (30.7) (21.2–41.4)	
Non-nuclear	43 (32.8) (24.8–41.5)	18 (41.9) (24.9–55.5)	25 (58.1) (44.4–75.0)	
Number of children				.005
Only child	51 (38.9) (30.5–47.8)	38 (74.5) (60.3–85.6)	13 (25.5) (14.3–39.6)	
>1 child	80 (61.1) (52.1–69.4)	40 (50.0) (38.6–61.4)	40 (50.0) (38.6–61.4)	
Child dental pain due to dental caries in the last month				.001
No	69 (52.7) (43.7–61.4)	50 (72.5) (60.3–82.5)	19 (27.5) (17.4–39.6)	
Yes	62 (47.3) (38.5–56.2)	28 (45.2) (32.4–58.3)	34 (54.8) (41.6–67.5)	
Maternal self-perception about oral health				<.001
Positive	75 (57.3) (48.3–65.8)	59 (78.7) (67.6–87.2)	16 (21.3) (12.7–32.3)	
Negative	56 (42.7) (34.1–51.6)	19 (33.9) (21.8–47.8)	37 (66.1) (52.1–78.1)	
Child dental caries experience				<.001
Low caries experience	75 (57.2) (43.0–60.7)	57 (76.0) (64.7–85.1)	18 (24.0) (14.8–35.2)	
High caries experience	56 (42.8) (34.1–51.6)	22 (39.3) (24.9–51.4)	34 (60.7) (48.5–75.1)	

Chi-square test. *p value ≤ .05.

Pelotas, Brazil (n = 131 mother-children dyads). 2018.

frequencies of exposure variables were presented through a descriptive analysis and illustrates in a graphics form. Associations between exposure variables and outcome were tested with Chi-square test. Maternal self-perception about oral health and child's dental caries experience were analyzed in separate Poisson regression models with robust variance. Crude and adjusted models for co-variables (child's gender and age, maternal schooling and maternal age, number of children and family structure, and child dental pain due to dental caries in the last month) were tested. Magnitudes of associations were estimated through Prevalence Ratio (PR) as effect measure and 95% confidence intervals (CI). The significant level of $p \leq .05$ was adopted.

Results

All 131 invited mother-child dyads accepted to participate of study. No mother or child refused to participate. All mothers were able to understand and answer the questionnaire. This sample size present power of 99.2% to detect prevalence ratio of 0.5 or greater, considering a prevalence of 53.4% of dental caries on exposed group.

Prevalence of dental caries in this population was 87.7%. DMFT/dmft mean was 4.96 (SD 3.00) (data not shown). Almost 43% of children presented between high dental caries experience. The majority of the children were girls (52.7%) and aged between 10 to 13 years (60.3%). Most of mothers were aged between 34 to 40 years (36.6%) and had eight years or less of study (53.4%). In addition, more than 60% of children belonged to a nuclear family (67.2%) and

had brothers (61.1%). In relation to oral health, mothers reported that 47.3% of children had dental pain in the last month, and 42.7% reported a negative self-perception about oral health. In bivariate analyses, maternal perception about child's oral health was associated with family structure ($p = .003$), number of children ($p = .005$), child dental pain due to dental caries in the last month ($p = .001$), maternal self-perception about oral health ($p < .001$) and child dental caries experience ($p < .001$) (Table 1).

The Poisson regression models showed positive associations between maternal perception about child's oral health and maternal self-perception about oral health ($p < .001$) and child's dental caries experience ($p = .001$), after adjustments. Mothers with a negative self-perception about oral health presented 154% higher prevalence of negative perception about their child's oral health (PR 2.54; 95%CI 1.54–4.30). Mothers whose their children presented high caries experience presented 121% higher prevalence of negative perception about their child's oral health (PR 2.21; 95%CI 1.41–3.47) (Table 2).

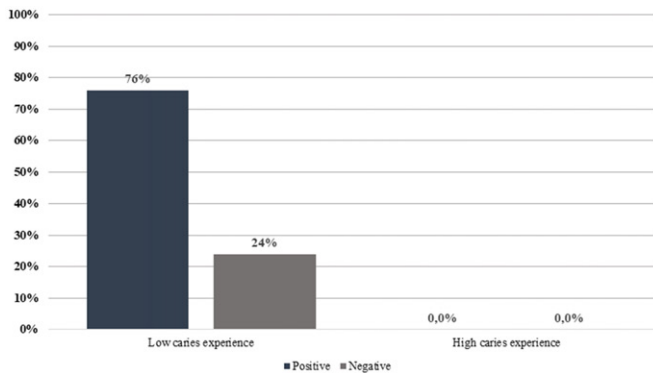
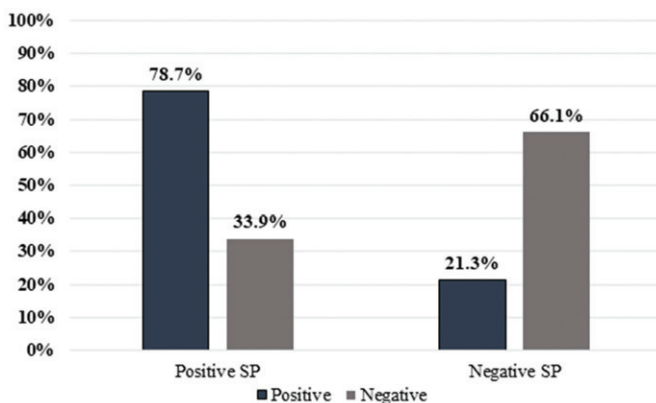
Figure 1 shows distribution of maternal perception about child's oral health according to child dental caries experience. It was observed a high prevalence of negative maternal perception about child's oral health among those children with high caries experience (60.7%). Among those mothers whose children presented low caries experience, a high prevalence of positive maternal perception about child's oral health was observed (76%). Figure 2 shows distribution of maternal perception about child oral health according to maternal self-perception about oral

Table 2. Association between child dental caries experience and self-perception about oral health and maternal perception about child's oral health.

Variables	Maternal perception about child's oral health			
	Crude PR (95% CI)	<i>p</i> value*	Adjusted PR (95% CI)	<i>p</i> value*
Maternal self-perception about oral health (ref. Positive)				
Negative	3.09 (1.92–4.98)	<.001	2.54 (1.54–4.30)	<.001
Child's dental caries experience (ref. Low caries experience)				
High caries experience	2.60 (1.65–4.09)	<.001	2.21 (1.41–3.47)	.001

PR: Prevalence Ratio. For each variable of interest (maternal self-perception about oral health and child's dental caries experience), a Poisson regression model adjusted for co-variables (age and gender of child, maternal age, family structure, number of children, dental pain due to dental caries in the last month) was employed. **p* value ≤.05.

Crude and adjusted Poisson Regression model. Pelotas/Brazil (*n* = 131 mother-children dyads). 2018.

**Figure 1.** Distribution of maternal perception about child's oral health according to child dental caries experience. Pelotas, Brazil. 2018.**Figure 2.** Distribution of maternal perception about child oral health according to maternal self-perception about oral health. Pelotas, Brazil. 2018.

health. Most of mothers who reported a positive perception about child's oral health reported a positive self-perception about oral health (78.7%). Among those women who reported a negative perception about child's oral health, a high prevalence of negative self-perception was observed (66.1%).

Discussion

This study investigated 131 mothers-children dyads showing that a negative maternal perception about child's oral health was associated with a negative self-perception about their oral health and with presence of child's dental caries experience.

Still today, mothers remain the primary caregiver of children, and this maternal role establishes children's behavior related to oral health [17]. Maternal behaviors and perceptions in oral health care are significantly related to dental health in children [8]. Pinto and coworkers [15], in a cohort of adolescent mothers with children aged 24–42 months, observed that a negative maternal perception of child's oral health was associated to higher level of caries in their children. Study of the Moimaz et al. [18] showed similar results in low-income families in Italy. Findings of these studies corroborate with our results, demonstrating that mothers may accurately evaluate oral health of their children.

In this same line, maternal caregiving behaviors might mediate the relationship between maternal oral health-related behavior, including children's frequency of tooth brushing and dental attendance, and children's dental caries [3,8]. Mostly, seek for dental care by parents for their children occurs for treatment of dental caries [19], which is frequently associated to presence of dental pain and infection [15,20]. This search for dental care due to dental diseases is worrying, indicating a reinforcement of an essentially dental curative nature, which is going against the philosophy of minimal intervention widely adopted and recommended. In this line, the lack of demand for dental care due to preventive reasons draw out the maternal unacknowledged as a predictor of the child's oral health condition. Shaghaghian et al. [9] found that children of aware parents regarding their child's oral hygiene had lower prevalence of dental caries and better oral hygiene than those of unaware parents. Thus, parents who positively perceived oral health status of their child were more likely to be aware of their child's teeth cleaning than those who perceived otherwise.

A positive maternal perception about their children's oral health has been associated with higher number of dental visits, particularly preventive or routine appointments [21], demonstrating that higher concerns and knowledge regarding oral health, tends to lead to a decrease of chances for these children developing dental diseases during childhood. Thereby, a dental educational program involving mothers should be encouraged not only for maternal oral health but also for preventing dental caries in their children.

This study has some limitations that should be drawn out. The cross-sectional nature hinders causal inferences. Although a minimum sample size was calculated and a power of sample size was demonstrated, an extrapolation of these results to other populations should be performed with

caution, since the sample studied belonged to a Public Dental Clinic at a Dentistry School. In addition, since that this study was in a sample with high prevalence of dental caries, and therefore we opted for a categorization according to severity of dental caries, it is possible that mothers were aware of oral health condition of children, which motivated the demand for dental care. However, an issue should be pointed out. Most of mothers search for dental treatment in our clinic without a previous information about oral condition of their children. And, therefore, our results suggest that mothers are able to recognize the worsening oral health condition of their children.

In conclusion, this study showed that maternal perception about child's oral health was associated to dental caries experience and to maternal self-perception about their oral health. Therefore, it suggests that maternal perception may provide useful information about child's oral health condition and their need for treatment, as well maternal self-perception about oral health, which are easily informed.

Disclosure statement

No potential conflict of interest was reported by the authors.

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