

Association between parental oral health knowledge and children's oral condition

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Abstract: Objective: To examine the association between the oral health knowledge of parents and the oral health condition of their children treated in the postgraduate course in Pediatric Dentistry at the Faculty of Dentistry, University of Costa Rica. **Methods:** A survey was conducted on oral health knowledge (general concepts, oral hygiene and eating habits) and sociodemographic characteristics of parents, including age, sex, educational level, occupation, and socioeconomic level. Data regarding patients' age, sex, Decayed, Missing, and Filled Teeth index, oral hygiene index (Green and Vermillion index) were extracted from the patient's electronic records. Descriptive statistics were carried out establishing the absolute and relative frequency of sociodemographic variables and questions about parents' knowledge about oral health. The chi-square test ($p < 0.05$, 95% CI), the T test and the Pearson test were also used. **Results:** 40 surveys were obtained. 50% of the participants had an acceptable knowledge of oral hygiene. There was no statistically significant association between the level of knowledge and the sociodemographic variables of the parents or with dmft ($p=0.372$) or Oral Hygiene index ($p=0.892$). However, there was a moderate correlation between dmft and the Oral Hygiene index ($R=0.451$, $p=0.003$). **Conclusions:** There is no association between parents' level of knowledge and their children's oral health condition.

Key words: Knowledge, Oral Health, Oral Hygiene, Dental Caries.

Asociación entre el conocimiento de los padres de familia sobre salud bucal y la condición oral de sus hijos

Resumen: Objetivo: Examinar la asociación entre el conocimiento sobre salud bucal de los padres de familia y la condición de salud bucal de sus hijos atendidos en el posgrado en Odontopediatría de la Facultad de Odontología de la Universidad de Costa Rica. **Métodos:** Se elaboró una encuesta referente a conocimientos sobre salud bucal (conceptos generales, higiene bucal y hábitos alimentarios) y características sociodemográficas de los padres, incluyendo edad, sexo, nivel educativo, ocupación y nivel socioeconómico. De las historias clínicas electrónicas de los pacientes se extrajeron los datos relativos a la edad, el sexo, el índice de dientes cariados, extraídos y obturados y el índice de higiene bucal (índice Green y Vermillion) de los pacientes. Se realizó estadística descriptiva estableciendo la frecuencia absoluta y relativa de las variables sociodemográficas y las preguntas sobre el conocimiento de los padres en salud bucal. También se utilizaron la prueba de chi-cuadrado ($p < 0,05$, IC 95%), la prueba T y prueba de Pearson. **Resultados:** Se obtuvieron 40 encuestas. El 50% de los participantes tenía un conocimiento aceptable sobre la higiene bucal. No hubo asociación estadísticamente significativa entre el nivel de conocimientos y las variables sociodemográficas de los padres ni con el ceo-d ($p=0,372$) ni con el índice de Higiene Bucal ($p=0,892$). Sin embargo, hubo una correlación moderada entre el ceo-d y el índice de higiene bucal ($R=0,451$, $p=0,003$). **Conclusiones:** No existe asociación entre el nivel de conocimiento de los padres de familia sobre salud bucal y la condición oral de sus hijos.

Palabras clave: Conocimiento, Salud Bucal, Higiene Bucal, Caries Dental.

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Associação entre o conhecimento dos pais sobre saúde bucal e a condição bucal de seus filhos

Resumo: **Objetivo:** Examinar a associação entre o conhecimento dos pais sobre saúde bucal e a condição de saúde bucal de seus filhos atendidos no programa de pós-graduação em Odontopediatria da Faculdade de Odontologia da Universidade da Costa Rica. **Métodos:** Foi realizado um questionário sobre conhecimentos sobre saúde bucal (conceitos gerais, higiene bucal e hábitos alimentares) e características sociodemográficas dos pais, incluindo idade, sexo, escolaridade, ocupação e nível socioeconômico. Os dados sobre idade, sexo, índice de dentes cariados, perdidos e obturados e índice de higiene bucal (índice Green y Vermillion) dos pacientes foram extraídos dos prontuários eletrônicos dos pacientes. Foram realizadas estatísticas descritivas estabelecendo a frequência absoluta e relativa das variáveis sociodemográficas e das questões sobre o conhecimento dos pais sobre saúde bucal. Também foram utilizados o teste do qui-quadrado ($p < 0,05$, IC 95%), o T teste e o teste de Pearson. **Resultados:** Foram obtidos 40 inquéritos. 50% dos participantes tinham um conhecimento aceitável de higiene bucal. Não houve associação estatisticamente significativa entre o nível de conhecimento e as variáveis sociodemográficas dos pais, nem com o ceo-d ($p=0,372$) nem com o índice de Higiene Bucal ($p=0,892$). No entanto, houve correlação moderada entre o ceo-d e o índice de higiene bucal ($R=0,451$, $p=0,003$). **Conclusões:** Não há associação entre o nível de conhecimento dos pais e o estado de saúde bucal de seus filhos.

Palavras-chave: Saúde Bucal, Higiene bucal, Cárie dentária.

Introduction

Knowledge about oral health is a construct that develops as a result of the economic, social, biological, and cultural factors within which individuals live. This knowledge promotes the development of preventive attitudes related to nutrition, hygiene, and care, ultimately leading to improved function of the oral and dental structures, a better relationship with digestion, and prolonged tooth retention throughout an individual's life¹. It has been reported that individuals who lack adequate knowledge of oral health are more susceptible to developing dental caries².

Dental caries is one of the most prevalent diseases affecting humanity. According to the World Health Organization, nearly 2 billion people worldwide suffer from this condition. Dental caries is the most common non-communicable disease globally among children, with an incidence of 43%; approximately 530 million children are affected by caries in the primary dentition³.

Caries is a dynamic, multifactorial disease mediated by biofilm and driven by increased sugar consumption. It is characterized by cycles of demineralization and remineralization of the hard tissues of the teeth^{4,5}. The consequences of untreated dental caries are multidimensional and affect not only oral health but also the patient's general health and quality of life, with significant social, psychological, and biological implications⁶.

Proper oral hygiene is essential for the prevention of dental caries. Adequate removal of dental biofilm and the use of fluoridated toothpaste have been shown to be the most effective methods for preventing this disease. Oral hygiene is the responsibility of each individual; however, in the case of children, this responsibility lies not only with the child but also with their parents or legal guardians, as children do not yet possess the full manual skills required to perform effective oral hygiene⁷. A low level of oral health knowledge among legal

guardians may be a key factor contributing to poor oral hygiene in their children. Parents or caregivers play a fundamental role in maintaining their children's oral health, as children learn habits and behaviors from them. However, scientific evidence indicates that most parents or caregivers transfer to their children the habits they themselves acquired throughout their lives. When these habits are not necessarily appropriate, they carry the risk of compromising their children's oral health⁸. Furthermore, the presence of dental caries in children has been associated with limited oral health knowledge among parents⁹.

In Central America, no studies have been conducted that associate children's oral health status with the level of knowledge of their parents. Therefore, the aim of this study was to examine the association between parental oral health knowledge and the oral health status of their children treated at the Postgraduate Program in Pediatric Dentistry of the Faculty of Dentistry at the University of Costa Rica (UCR).

Methodology

An observational cross-sectional study was conducted at the Postgraduate Program in Pediatric Dentistry of the University of Costa Rica (UCR) between March and August 2024. The inclusion criteria comprised parents or caregivers and the clinical records of first-time pediatric patients who attended for dental care. Exclusion criteria included parents or caregivers with cognitive impairments that prevented them from completing the questionnaire, clinical

records with incomplete information, and patients with chronic systemic diseases or with motor, cognitive, and/or psychosocial disabilities.

From the children's clinical records, the following data were obtained: age, sex, presence of cavitated carious lesions assessed using the decayed, extracted, and filled teeth index, and oral hygiene status evaluated using the Green and Vermillion Oral Hygiene Index.

A questionnaire was administered to parents or caregivers that included the following sociodemographic variables: age, sex, educational level, and socioeconomic status. In addition, a questionnaire was developed based on previous studies assessing parental knowledge regarding oral health^{2,6,10-13}. The instrument included 12 questions addressing general knowledge, oral hygiene, and dietary habits. The questionnaire was previously validated in a group of parents whose children attended dental care at the undergraduate clinics of the Faculty of Dentistry, UCR.

Parental oral health knowledge was assessed as follows: the questionnaire consisted of twelve questions, each with one correct answer. The maximum possible score was 24 points. Adequate oral health knowledge was defined as a score equal to or greater than 18 points, corresponding to at least 75% correct responses. Prior to questionnaire administration, participants signed an informed consent form agreeing to participate in the study.

This study was approved by the Scientific Ethics Committee of the University of Costa Rica under approval code CEC-112-2024.

For statistical analysis, a database was created using Excel (Microsoft, Inc., Redmond, WA, USA). Data obtained from the electronic clinical records and the questionnaires were tabulated, reviewed, and checked for inconsistencies prior to analysis. Descriptive statistics were performed, and absolute and relative frequencies were calculated for sociodemographic variables and for questions related to oral health knowledge.

The chi-square test was used to determine differences in parental knowledge levels regarding oral hygiene according to sociodemographic variables ($p < 0.05$, 95% CI). Student's t test was applied to assess the association between parental knowledge level and the oral health status of the children. Pearson's correlation coefficient was used to evaluate the relationship between the oral hygiene index and the dmft index. All analyses were performed using SPSS software version 23.0 (SPSS Inc., Chicago, IL, USA).

Resultados

A total of 40 parents participated in the study. Of these, 52.5% were between 20 and 29 years of age. The majority were women, had completed secondary education, and reported a monthly household income of less than USD 1,000. Table 1 presents the results of the descriptive statistical analysis.

Regarding the sociodemographic data of the patients, the mean age was 4 years and 4 months, and 62.5% were male.

Regarding parental knowledge of oral health, half of the participants

Table 1. Sociodemographic characteristics of the surveyed subjects (n=40)

Variables	n	%
Age		
20-29 years	21	52.5
30-39 years	14	35
40-49 years	3	7.5
50-59 years	2	5
Sex		
Male	2	5
Female	38	95
Approved educational level		
School	10	25
College	18	45
University	12	30
Family income		
Less than \$750	15	37.5
From \$701 to \$1,000	14	35
From \$1001 to \$2000	9	22.5
From \$2001 to \$3000	2	5

demonstrated adequate knowledge. The mean knowledge score was 16, with a standard deviation of 1.34. In the domain of general knowledge, most responses were correct. In contrast, questions related to oral hygiene showed lower levels of accuracy, as only 60% of respondents correctly answered questions concerning toothbrushing frequency and the type of toothpaste to be used. With respect to dietary habits, parents reported awareness that the consumption of filled cookies and sugar-sweetened juices should be occasional (Table 2).

Table 2. Parents' knowledge of oral health (n=40).

Knowledge Questions	Answer Options	Answer *	Frequency (%)
General knowledge			
Primary teeth are important.	Yes, because they hold space for permanent teeth they are necessary to eat properly.	CA	35 (87.5)
	No, because in the end they are going to fall.	IA	2 (5)
	No, because they are not permanent teeth.	IA	1 (2.5)
	No, because they only serve to make the child look good.	IA	1 (2.5)
	I do not know.	IA	1 (2.5)
First visit to the dentist	When the first baby tooth appears.	CA	28 (70)
	From 2 years old.	IA	5 (12.5)
	When a tooth breaks.	IA	1 (2.5)
	Only when there is pain.	IA	1 (2.5)
	I do not know.	IA	5 (12.5)
What causes tooth decay?	Sugar consumption and lack of oral hygiene.	CA	38 (95)
	Cavities are inherited.	IA	2 (5)
	Only the consumption of candies.	IA	0 (0)
	Brush your teeth without toothpaste.	IA	0 (0)
	I do not know.	IA	0 (0)
Preventive measures to avoid tooth decay	Proper oral hygiene with fluoride toothpaste.	IA	13 (32.5)
	Avoid excessive consumption of sugars.	IA	4 (10)
	Frequent visits to the dentist.	IA	0 (0)
	All of the above.	CA	23 (57.5)
	I do not know.	IA	0 (0)
Frequency of dental check-ups	As recommended by the dentist.	CA	27 (67.5)
	Every 6 months.	IA	12 (30)
	Only when they have some discomfort.	IA	1 (2.5)
	When baby teeth change.	IA	0 (0)
	I do not know.	IA	0 (0)
Knowledge of oral hygiene			
Frequency of tooth brushing	Two or three times a day and mainly at night.	CA	24 (60)
	After each feeding	IA	14 (35)
	Only at night.	IA	1 (2.5)
	The more times a day the better.	IA	1 (2.5)
	I do not know.	IA	0 (0)

Table 2. Parents' knowledge of oral health (n=40) (cont.).

Knowledge Questions	Answer Options	Answer *	Frequency (%)
Person in charge of brushing children's teeth	No one, always children should brush their teeth themselves.	IA	0 (0)
	Parents or caregivers until the children turn 12 years old.	IA	23 (57.5)
	Depending on the age, an adult should be in charge of brushing the child's teeth.	CA	15 (37.5)
	In the morning the child can brush on his own and at night the brushing should be done by an adult.	IA	2 (5)
	I do not know.	IA	0 (0)
Type of toothpaste for children	They don't use toothpaste until they can spit.	IA	5 (12.5)
	A toothpaste that contains fluoride.	CA	24 (60)
	A fluoride-free toothpaste.	IA	3 (7.5)
	It is up to the child to decide what type of toothpaste they want to use.	IA	0 (0)
	I do not know.	IA	8 (20)
Importance of daily flossing	No, floss is used only in adults.	IA	1 (2.5)
	No, floss is only used if you feel any leftover food.	IA	1 (2.5)
	Yes, children should floss daily.	CA	33 (82.5)
	Yes, they can floss but only if they have permanent teeth.	IA	2 (5)
	I do not know.	IA	3 (7.5)
Knowledge about eating habits			
Frequency of consumption of cookies with sugary filling	Every day.	IA	0 (0)
	Once a month.	IA	5 (12.5)
	Cookies with sugary filling should never be eaten.	IA	4 (10)
	Occasionally.	CA	29 (72.5)
	I do not know.	IA	2 (5)
Frequency of consumption of sugary juices	Every day.	IA	2 (5)
	Once a month.	IA	6 (15)
	Sugary juices should never be consumed.	IA	4 (10)
	Occasionally.	CA	28 (70)
	I do not know.	IA	0 (0)
Blowing food or tasting it to see if it is too hot before giving it to a young child	Yes, because the child can get burned if the food is hot.	IA	16 (40)
	Yes, because you need to know if the food tastes good.	IA	0 (0)
	No, because food can be filled with bacteria from the person testing it.	CA	16 (40)
	No, because children should not be given very hot food.	IA	7 (17.5)
	I do not know.	IA	1 (2.5)

*RC: correct answer, RI: incorrect answer.

Table 3. Association between degree of knowledge and sociodemographic variables

Variable	Adequate knowledge *(%)	Inadequate knowledge (%)	p
Age			0.448
20-29 years	11 (27.5)	10 (25.0)	
30-39 years	7 (17.5)	7 (17.5)	
40-49 years old	2 (5.0)	1 (2.5)	
50-59 years old	0 (0)	2 (5.0)	
Sex			1
Male	1 (2.5)	1 (2.5)	
Female	19 (47.5)	19 (47.5)	
Approved educational level			0.399
School	4 (10.0)	6 (15.0)	
College	9 (22.5)	9 (36.0)	
University	7 (17.5)	5 (12.5)	
Family income			0.484
Less than \$700	8 (20.0)	7(17.5)	
From \$701 to \$1,000	5 (12.5)	9 (22.5)	
From \$1001 to \$2000	5 (12.5)	4 (10.0)	
From \$2001 to \$3000	2 (5.0)	0(0)	

*"Adequate knowledge": grade greater than or equal to 18 points, "Inadequate knowledge": score less than 18 points.

No association was found between the level of oral health knowledge and the parents' sociodemographic variables, as shown in Table 3.

Regarding the dmft index, the mean value was 6.3 with a standard deviation of 3.84, with a minimum value of 0 and a maximum value of 18. The mean oral hygiene index was 0.98 with a standard deviation of 0.22, a maximum value of 2.39, and a minimum value of 0.20. No significant association was found between parental knowledge level and dmft ($p = 0.372$) or the oral hygiene index ($p = 0.892$). However, a moderate correlation was identified between dmft and the oral hygiene index ($r = 0.451$, $p = 0.003$).

Discussion

Oral health contributes to an individual's overall health, not only in physical terms but also in social and mental aspects, allowing children to develop properly. Assessing parents' oral health knowledge is important not only because it allows the identification of gaps that can be addressed, but also because it may influence their children's oral health.

In the present study, half of the respondents demonstrated adequate oral health knowledge, in contrast to findings reported in other studies. A study conducted in Chiclayo in 2022 reported that only 16.7% of parents exhibited

good knowledge¹. Similarly, another study in Saudi Arabia found that parental knowledge in this area was also limited¹². Nevertheless, there are reports in which the majority of parents show good oral health knowledge, as observed in a study conducted in Libya in 2022¹⁴.

Regarding the studied variables, most respondents were women with varying educational levels, and only 30% had completed university education. A similar situation was reported in another study, where 27.6% of parents had completed higher education¹. Sociodemographic variables have been associated with oral health knowledge, with heterogeneous results reported in the literature. In the present study, no association was found between oral health knowledge and parents' sex or educational level, which is consistent with findings from a study conducted in Nigeria¹⁵. However, other studies carried out in different countries have reported significant associations between these variables^{1,11,16}. Household income was also not statistically associated with parental knowledge level, in contrast to findings reported by Benghasheer and Saub (2022), who observed higher oral health knowledge among individuals with lower income levels.

With respect to questionnaire items related to general knowledge, most respondents correctly answered questions regarding the appropriate timing for a child's first dental visit. Only one participant indicated that children should be taken to the dentist only when experiencing pain, a finding consistent with a study conducted in Trinidad and Tobago, in which only 3.6% of parents responded similarly¹⁶.

This trend may be related to increased parental awareness of the importance of maintaining oral health and seeking dental care preventively rather than only in the presence of pain.

Regarding oral hygiene knowledge, more than half of the parents correctly identified the use of fluoridated toothpaste as necessary, a finding similar to that reported in a study involving parents of children under six years of age, in which 68.8% indicated that fluoridated toothpaste helps prevent dental caries¹⁷.

In the domain of dietary habits, nearly 70% of participants indicated that sugar-sweetened juices and cookies should be consumed only occasionally, suggesting that parents recognize these foods as unsuitable for daily consumption by children. Similar findings were reported in a study evaluating oral health knowledge among parents in Saudi Arabia, where more than 80% of respondents stated that sugary foods can cause dental caries (18). Additionally, another study found that most mothers reported that the intake of sweets, retentive carbohydrates, and sugar-sweetened beverages is harmful to teeth¹¹.

Parental knowledge level was not associated with either the dmft index or the oral hygiene index, a finding that warrants attention, as greater oral health knowledge might be expected to be associated with lower caries prevalence and better oral hygiene. A similar result was reported in a study conducted in Iran involving parents of children aged 4 to 6 years¹⁰. In contrast, a study conducted in Peru in 2019 among

parents of children of the same age group found a statistically significant inverse correlation between knowledge and oral health status, with children of parents who had better oral health knowledge showing lower caries incidence⁹. Likewise, a study conducted in China reported an association between oral health knowledge and the presence of dental caries¹³.

The lack of association between knowledge level and oral health status observed in the present study may be explained by the fact that possessing knowledge alone is insufficient; it must also be translated into practice. This was similarly observed in a study involving parents of children aged 3 to 5 years, in which parental oral health knowledge did not result in improved oral hygiene. However, when parental practices related to oral hygiene were analyzed, a weak inverse relationship was found between practices and oral health status: better practices were associated with lower dmft and oral hygiene index scores¹⁹.

A moderate correlation was identified between dmft and the oral hygiene index in this study, a finding consistent with a study conducted in Pakistan, where children with higher caries experience exhibited poorer oral hygiene²⁰. However, another investigation reported that caries presence was not strongly related to higher oral hygiene index values, leading the authors to conclude that the oral hygiene index should be considered a predisposing factor for caries rather than an independent causal factor²¹.

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One of the strengths of this study is that it is the first conducted within the Postgraduate Program in Pediatric Dentistry of the Faculty of Dentistry at the University of Costa Rica to assess parental oral health knowledge while also determining dmft and oral hygiene index values. One limitation is the small sample size, due to the limited population attending the postgraduate clinic, which prevents extrapolation of the results to the Costa Rican population. For this reason, future research is planned to include parents of patients treated at the undergraduate clinics.

Conclusions

Only half of the parents who attend the UCR Postgraduate Program in Pediatric Dentistry with their children demonstrated good oral hygiene knowledge; however, no association was established between this level of knowledge and their children's oral health status. In addition, a moderate correlation was identified between the dmft index and the oral hygiene index, highlighting the importance of reinforcing parental education on biofilm control techniques and the maintenance of good oral health.

Conflict of interest:

The authors declare no conflicts of interest with respect to the publication of this article.

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