

## Pediatric graduate students' and pediatricians' knowledge and habits on child oral health

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### ABSTRACT

**Objective:** To analyze child oral health training background, habits and knowledge in a group of pediatric graduate students and recently graduated pediatricians.

**Materials and methods:** A descriptive study using an anonymous self-administered 18-item survey sent via Google Forms to students and graduates of a Pediatrics specialty program from Universidad Maimonides in the Autonomous City of Buenos Aires, Argentina.

**Results:** Sixty participants completed the survey: 80 % were women, most of them with no children, who were pursuing one of the three years of a specialty program or had less than two years of clinical experience. Out of the respondents, 78.9 % did not usually record information on oral health in the patients' medical records, and 72 % failed to establish the prevalence of cavities in relation to other childhood illnesses. Misconceptions were also found regarding cavities etiology. A total of 67.2 % have had no prior oral health training, and those who had had such training stated that it had been insufficient. The self-perception to carry out preventive actions was uneven, and difficulties were identified for the early detection of dental disease. Sixty percent were unable to establish the right amount of toothpaste recommended for a child and felt unprepared to offer advice on the right brushing technique. Likewise, in the sample there were no correct and uniform criteria for the first visit of healthy children to pediatric dentists.

**Conclusions:** As stated by other authors, deficiencies were found in pediatric graduate students' and recently graduated pediatricians' training and, therefore, self-perception of topics related to oral health. Despite the difficulties participants identified, they agreed on the key role pediatricians play in oral health prevention and its impact on children's quality of life.

**Keywords:** Oral Health; Pediatrics; Education, Medical; Knowledge (Source: MeSH NLM).

## Conocimientos y conductas de estudiantes de posgrado de Pediatría y pediatras sobre la salud bucodental infantil

### RESUMEN

**Objetivo:** Analizar los antecedentes de formación, conductas y conocimientos sobre salud bucodental infantil en un grupo de pediatras en formación y recientemente graduados.

**Materiales y métodos:** Estudio descriptivo mediante la aplicación de una encuesta anónima de 18 ítems, autoadministrada, enviada en forma virtual a estudiantes y graduados de un posgrado de Pediatría de la Universidad Maimónides en la Ciudad Autónoma de Buenos Aires, Argentina.

**Resultados:** Se obtuvieron 60 respuestas. El 80 % de los participantes fueron mujeres, en su mayoría sin hijos, pertenecientes a los 3 años de formación del posgrado o con menos de 2 años de experiencia. El 78,90 % no consigna habitualmente la información del estado de salud bucodental en la historia clínica del paciente. Un 72 % de los encuestados fallaron en determinar la prevalencia de la caries dental con relación a otras patologías de la infancia. También se encontraron errores de concepto en cuanto a la etiología de la caries. Un 67,20 % no había recibido hasta el momento ninguna capacitación en salud bucodental; los que la habían recibido refirieron que esta había sido insuficiente. La autopercepción para llevar adelante acciones de prevención fue poco homogénea, y se identificaron dificultades para el reconocimiento temprano de lesiones. Un 60 % tuvo dificultades para establecer la cantidad adecuada de pasta dental que un niño debe utilizar y tampoco se sintió capacitado para dar recomendaciones sobre la técnica correcta del cepillado. Asimismo, en la muestra no

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se observó un criterio correcto y uniforme para la primera visita del niño sano al odontopediatra.

**Conclusiones:** Al igual que lo manifestado por otros autores, se encuentran deficiencias en la formación y, por ende, en la auto percepción de los pediatras en formación y recientemente graduados en temas relacionados con la salud bucodental. A pesar de las dificultades reconocidas por los participantes, hubo consenso en la importancia del rol del pediatra en la prevención de la salud bucodental y en el impacto de esta en la calidad de vida del niño.

**Palabras clave:** Salud Bucal; Pediatría; Educación Médica; Conocimiento (Fuente: DeCS BIREME).

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## INTRODUCTION

Oral and dental health are integral parts of overall good health. Dental caries is very common in childhood and is defined as a disease resulting from an ecological imbalance caused by increased intake of fermentable carbohydrates leading to an imbalance in the composition and activity in the biofilm and mineral loss caused by contact with bacterial acids. Early childhood caries (ECC) affects the teeth of children aged 0 to 5 years. According to the Global Burden of Disease (GBD) study, in 2017, more than 530 million children worldwide had dental caries in baby teeth. Despite this, some professionals did not consider such situation important because, based on their beliefs, milk teeth exfoliate with children's growth <sup>(1)</sup>. Carious lesions impact individuals, families and societies. The disease affects not only both dentitions but also general health and quality of life. It is related to other common childhood diseases, mainly due to risk factors in common with other non-communicable diseases (NCDs), e.g., high sugar intake, and diseases related to other health conditions such as obesity. Dental caries can lead to abscesses and toothache, which could make chewing and sleeping difficult, thus restricting children's life activity. Severe dental caries are associated with growth disorders. In addition, caries is an economic burden for families and society since treatment is particularly expensive.

In Argentina, as in many other Latin American countries, there is no continuous oral health monitoring system that provides complete and comparable information to find out the trend of dental caries over time, the distribution of the disease at the population level and the factors that regulate its prevalence <sup>(2)</sup>. A child with severe dental caries may experience chronic oral pain and infection, be malnourished, miss school frequently and suffer from low self-esteem due to missing or defective teeth <sup>(3)</sup>.

Pediatricians, who in their practice interact with pregnant women in the prenatal consultation and with children in their daily practice, play a key role in providing the necessary preventive advice on oral health. This contributes to creating healthy habits rather than correcting harmful habits and already existing dental problems, making dental

health education the first and most important pillar of prevention <sup>(2,4)</sup>.

According to the World Health Organization (WHO), the prevalence of oral diseases is one of the main public health problems. Based on recent studies, dental caries affects approximately 90 % of the population in Latin America; the most alarming aspect is that it begins early in life and increases as the individual grows older <sup>(5)</sup>.

Dental caries is a multifactorial process. When studying the subject, biological risk factors are usually addressed and the fact that the family members—especially parents and/or caregivers—are an essential part of future promotion and prevention programs in order to reduce morbidity, disease progression and costs is overlooked <sup>(6)</sup>.

According to the WHO, approaches to ECC prevention and control include changing personal behaviors, working with families and caregivers, and providing public health solutions such as developing health policies, creating enabling environments, promoting health, and orienting health services toward universal health coverage. It is essential to create adequate environments to integrate ECC prevention and control into general health activities. In addition, primary care teams, including community health workers, are crucial to the success of the programs <sup>(1)</sup>.

Social and economic pressures often affect the behaviors and practices of children and their environment, thus generally resulting in poor oral health. The prevalence of ECC is rapidly increasing in low- and middle-income countries <sup>(7,8)</sup>.

Some studies have reported sequelae of the disease such as infection caused by severe caries with pain and abscesses. An infection produces pain and may prevent the child from eating and make it difficult for the child and family to sleep. Severe dental caries is associated with growth disorders <sup>(9-11)</sup>.

Dental caries is the leading cause of tooth loss <sup>(5)</sup>. The American Academy of Pediatrics (AAP) states in its oral health policies and recommendations that pediatricians

should learn how to determine the oral health risk in all patients from six months of age <sup>(4)</sup>.

For its part, the WHO, in 2000, proposed that oral health promotion should be a priority in preschool and school children <sup>(5)</sup>. The etiology of ECC is multifactorial and is frequently associated with poor diet and poor oral health habits <sup>(2,6,12,15)</sup>.

Almost all risk factors are modifiable and involve not only the oral cavity but also the child, the family, the social environment and even the health policies. The behaviors and beliefs of the family group influence their diet; to understand the etiology and management of ECC, it is essential to assess the effects of excessive and frequent consumption of free sugars. The importance of establishing good eating habits in childhood to minimize the risk of ECC and obesity cannot be overemphasized. Considering that eating behaviors learned in childhood transfer into adulthood, establishing healthy eating habits in early years is a major goal <sup>(1,14)</sup>.

ECC prevention and control interventions should be included in primary care programs, e.g., maternal and child health programs, immunization and general medical exams. This could lead to continuous interventions that provide confidence to parents and caregivers, thus improving their knowledge of the need to attend medical appointments <sup>(15)</sup>. There are relatively few trained oral health professionals worldwide. Fortunately, most ECC interventions are proven effective, affordable and feasible in places where people usually live. These interventions can be performed by non-oral health specialists in community or primary care settings <sup>(1)</sup>. Carious lesions progress much faster in primary than in permanent teeth, so early detection is crucial to treat ECC and prevent related problems; treatment is also likely to be painless and less expensive <sup>(16)</sup>.

According to Pierce et al., training pediatricians in child oral health can help identify, with an adequate level of accuracy, children with cavitated carious lesions <sup>(17)</sup>. The study results suggest that dental screenings can be easily incorporated into pediatrics practice and significantly contribute to the overall oral health of young children by identifying those who need to be referred to a pediatric dentist.

For all of the above, this study was conducted with the aim of analyzing the behaviors and level of knowledge of pediatric graduate students and pediatricians with less than two years of experience regarding children's oral health.

## MATERIALS AND METHODS

### *Study design and population*

An observational, descriptive and cross-sectional study conducted with an anonymous online questionnaire-type survey sent via Google Forms, whose link was distributed through cell phones. The population consisted of students of the Pediatrics specialty program from Universidad Maimonides in the Autonomous City of Buenos Aires, Argentina, and graduates of said specialization with less than two years of experience.

### *Variables and measurements*

The structured survey included 18 items aimed at analyzing the following variables: sociodemographic data (sex and age), year of training, training history, knowledge and behaviors on oral health (etiology, impact and prevention of dental caries, role of pediatricians in oral health promotion, ability to detect oral problems in children and caregivers, adequate use of toothpaste and first referral to the pediatric dentist).

The instrument was designed by consulting five experts in pediatric dentistry and analyzing updated literature. The survey was tested for comprehension with a pilot group of pediatricians who did not meet the inclusion criteria.

### *Statistical analysis*

Descriptive statistics were used for data analysis using the Centers for Disease Control and Prevention (CDC) Epi Info 7.1.4 program. Mean and standard deviation were reported for the quantitative variables; frequencies and percentages for the qualitative variables.

### *Ethical considerations*

Study participants were recruited on a voluntary basis and gave their informed consent. The confidentiality of the data collected and anonymity of the participants were guaranteed. The authors declared that they received no external funding and had no conflicts of interest.

## RESULTS

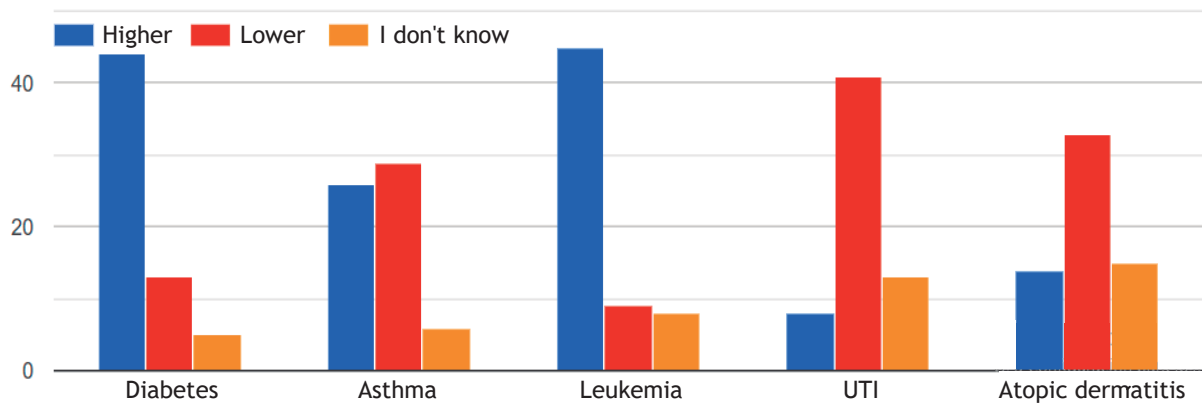
A total of 72 invitations were sent and 60 surveys were obtained (response rate: 83.3%). The general characteristics of the surveyed physicians are presented below (Table 1).

**Table 1.** Demographic characteristics of respondents

Characteristic		Percentage
<b>Sex</b>	Female	80.30 %
	Male	19.70 %
<b>Children</b>	No	62.90 %
	Yes	37.10 %
<b>Level of pediatrics training</b>	Graduates with < 2 years of experience	32.70 %
	First-year graduate student	24.60 %
	Second-year graduate student	19.70 %
	Third- to fourth-year graduate student	23.00 %

Source: self-elaboration.

Seventy-two percent of the respondents claim that the prevalence of dental caries in children is higher than that of diabetes and leukemia but lower than that of asthma, urinary tract infection (UTI) and atopic dermatitis. Figure 1 shows how they considered the prevalence of dental caries in relation to other childhood health problems



**Figure 1.** Prevalence of dental caries in comparison with other diseases

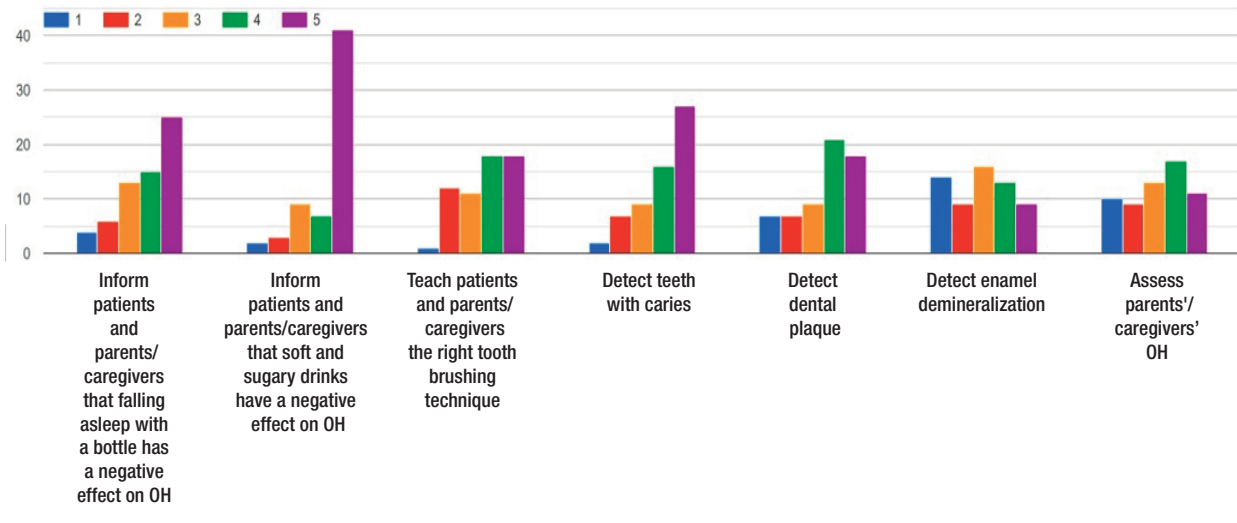
Source: self-elaboration.

When inquiring about their training in oral health during the specialty program, 67.20 % answered that they had received no training. The remaining 32.60% reported having carried out some activity (attending a workshop, taking a tour at a dental office or having spent time watching a dentist at work). However, 72 % said that this learning time was scarce. Concerning their professional practice, 78.90 % responded negatively to whether they found blank spaces

in medical histories to include details of the oral health of their patients.

Using a 1-5 scale, where 1 is “not at all confident” and 5 is “very confident,” the participants were asked to indicate their self-perception of their ability to conduct different practices related to oral health (Figure 2).

Pediatric graduate students' and pediatricians' knowledge and habits on child oral health

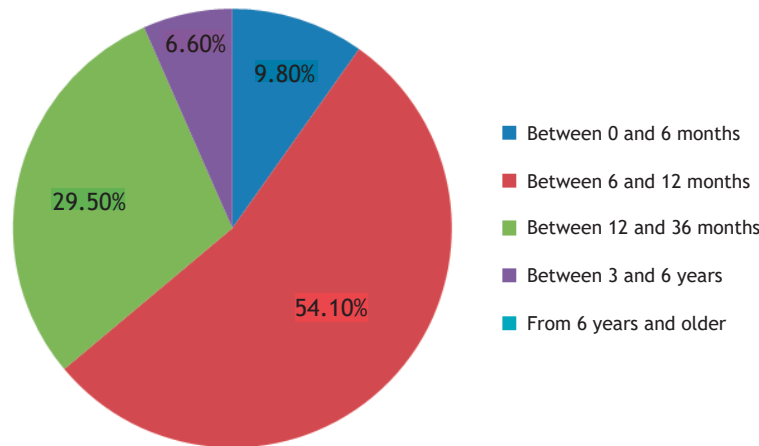


**Figure 2.** Self-perception of abilities concerning children’s oral health (OH)  
**Source:** self-elaboration. Used scale: 1 = “not at all confident” and 5 = “very confident.”

When asked to select the image that showed the right amount of toothpaste that a 2-year-old child should use during brushing, only 40 % answered correctly. A total of 50% of respondents believed that children aged 7 years or older could only brush their teeth without supervision.

As for the risk factors for dental caries, more than 90 % responded that dietary sugar consumption and poor brushing had a great impact, and more than 65 % believed that breastfeeding had almost no influence on the occurrence of dental caries. They ranked the following risk factors in descending order: brushing without toothpaste, non-nutritive sucking (finger, pacifier, etc.), living with family members with caries and genetic factors.

Regarding the age they consider appropriate to recommend the first visit to the dentist, the answers varied and are shown in Figure 3. As for the role of the pediatrician in oral disease prevention and oral health promotion, they answered as follows: inform parents and caregivers of the risks of falling asleep with a bottle (93.30 %), inform that sugary drinks have a negative effect on oral health (100 %), detect teeth with caries (91.60 %), teach parents and caregivers the right tooth brushing technique (85 %), detect dental plaque and enamel demineralization (61 %) and assess parents’ and caregivers’ oral health (56.60 %).



**Figure 3.** Age considered appropriate to recommend the first visit to the dentist  
**Source:** self-elaboration.

A series of questions were asked to find out pediatricians' opinion on caries and oral disease in children. Table 2 shows the degree of agreement reported by the respondents.

Table 2. Respondents' degree of agreement

	Strongly agree	Slightly agree	Undecided	Slightly disagree	Strongly disagree
Untreated caries is associated with poorer quality of life in children	49	10	1	-	-
Poor oral health in childhood leads to social problems in adulthood	41	12	7	-	-
Pediatricians should be able to apply topical fluoride	11	17	6	15	-
It is very difficult to detect early caries without special equipment	17	22	9	8	2
Caries is more frequent in high-income population with access to junk food	24	19	9	4	5

## DISCUSSION

Latest research works conclude that there is a relationship between dietary habits and dental caries and that the prevalence of dental caries can even exceed 90 % in the pediatric population <sup>(18)</sup>.

The research sample consisted of young pediatricians pursuing or recently graduated from a specialty program, mostly females with no children. There was a lack of previous training in child oral health, both in quantity and duration. Although our participants failed to recognize the prevalence of caries in relation to other childhood health problems, they identified dietary sugar and poor brushing as the main risk factors. All this agrees with the findings of Roló et al., who conducted a study in Paraguay <sup>(3)</sup>, as well as with those reported by Carlos-Medrano et al. in Mexico <sup>(19)</sup> and by Hope et al. in Chile <sup>(20)</sup>.

Medical histories include patients' written, accurate, clear, organized and detailed information which enables establishing an adequate diagnosis for children's successful treatment <sup>(21)</sup>. The lack of blank spaces to record data means that these are considered unimportant or unnecessary. Given the prevalence of oral diseases and its impact on health, oral examination should be an essential part of the physical examination and be included in the medical history.

Self-perception to carry out oral health-related activities was high for informing relatives and caregivers that sugary drinks and falling asleep with a bottle have a negative effect on oral health; average for identifying caries; and low for explaining the right brushing technique, identifying plaque and demineralization, and assessing parents' oral health which is known to be related to that of the child.

Newborns' oral hygiene should be performed with a gauze and/or silicone finger toothbrush; after the appearance of the first tooth, it should be done using a small toothbrush with fluoridated toothpaste <sup>(13)</sup>. Since young children usually swallow 30 % of the toothpaste, it is important to limit its amount <sup>(6)</sup> and to supervise the child until approximately 10 years of age <sup>(22)</sup>. In our sample, there was no clear agreement as to the age of first toothpaste use, its right amount according to the age or the need for adult supervision.

The WHO recommends exclusive breastfeeding for the first six months of life. Although human milk lactose is less cariogenic than sucrose, it can also cause demineralization when in contact with tooth enamel for a prolonged period of time and in the absence of salivary protection factors (sleep) <sup>(3,12,18,21,23)</sup>. When evaluating respondents' knowledge of this risk factor, only a small percentage (14.7 %) considered it as moderate risk, while 68.3 % deemed that it did not influence the appearance of dental caries. This agrees with the findings by Rolón et al., who obtained a percentage of 12 % in their study <sup>(3)</sup>.

There are several predisposing factors to dental caries, which is reflected in the variety of cariogenic factors and habits.

The first visit to the pediatric dentist is extremely important in early childhood since it is necessary to highlight educational and preventive aspects regarding the infant's oral health. The pediatrician is usually the one who refers the child for the first check-up. Although some specialists recommend a first visit before 6 months of age, as long as the child has no disease that would require an earlier visit, it is generally agreed that the first visit should be before 2 years of age and preferably between 6 and 12 months<sup>(3,21)</sup>. Even though there is no agreement as to the exact age, more than 90 % would refer the child to a pediatric dentist before 2 years of age, which is a higher number than that reported by authors such as Rolón et al.<sup>(3)</sup> and Contreras-Vásquez et al.<sup>(13)</sup>

Early dental caries has not only biological but also social and economic consequences. In this regard, Hope et al.<sup>(20)</sup>, in their study conducted in Chile, point out that pediatricians recognize that childhood caries is related to a poorer quality of life and believe that poor oral health in childhood is directly related to social problems in adulthood. However, unlike the Chilean study, the pediatricians in our sample did not agree to apply fluoride varnish during a routine checkup. Moreover, among our findings, there is the misconception that caries affects more high-income populations with access to junk food. It has been shown that children living in poverty, marginalized populations and the elderly are the most affected by oral diseases and, in turn, have little access to dental care<sup>(24)</sup>. Caspary et al., in the United States, conducted a survey of more than 600 pediatricians who were about to graduate and reported that they received little training in oral health. While the participants agreed with performing oral screenings, they perceived a lack of technical skills and resources. The skills for which they felt most trained were informing parents about the harmful effects of sugary drinks and falling asleep with a bottle, while they were less willing to perform tasks requiring more technical training<sup>(25)</sup>.

Pediatricians play a leading role not only in the referral of healthy children but also in the identification of risks and lesions in patients with chronic diseases and greater susceptibility<sup>(26,27)</sup>.

Based on the findings of this study and following a regional and worldwide trend, a mandatory theory-practice training program in oral health was implemented in the curriculum of the graduate program at Universidad Maimónides. Said program is managed by professors working in an interdisciplinary way with the leadership, professors and students of the Pediatric Dentistry specialty with excellent results and high level of satisfaction of the participants<sup>(28-30)</sup>.

When interpreting the results of the present study, it is important to acknowledge the possible limitations. Since this study was conducted with cross-sectional data, the relationship between the level of knowledge and skills of the professionals cannot be determined. As a consequence, causality cannot be tested and it cannot be determined whether the reported practices are reflected in their daily clinical experiences.

In conclusion, pediatric consultation is an excellent opportunity to provide recommendations, detect diseases and refer the patient in a timely manner. It has been demonstrated that pediatricians in Latin America receive poor training in oral health. Although surveyed pediatricians considered caries as an important problem that affects overall health, difficulties, differences in criteria and incomplete registration during medical care were found. Despite recognizing pediatricians' role in health promotion and disease detection, those surveyed considered that they lacked the tools for correct management.

The findings of this study allowed the development of a graduate training program in response to the deficiencies detected.

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