Parental Education From Pregnancy To Birth: a Questionnaire-based Study on Promoting Oral Health and the Prevalence of Habits in Childhood Compared with Socioeconomic Factors

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Abstract

Aim Maintaining oral health and preventing dental caries are crucial for overall well-being and quality of life, especially during childhood. Parental knowledge and practices play a key role in shaping children's oral health. This pilot study investigates parental knowledge and attitudes towards children's oral health and preventive practices.

Materials and Methods A cross-sectional observational study was conducted at the Family Counseling Center of Cesano Boscone, Italy, between March 2023 and September 2024. Participants were 114 parents (2 males, 112 females) of children aged 0-18 or expecting their second child. Data were collected using an anonymous online questionnaire assessing socioeconomic background, dietary habits, risky behaviours (bottle and pacifier use), oral hygiene practices, and preventive strategies.

Results Most participants were mothers (98.24 %). Most children had been breastfed up to six months (73.68 %), and bottle use was common (77.19 %). Dietary habits revealed that 25.43 % of the participants' children consumed sugary foods more than once a day. Regarding oral hygiene, 7.01 % of children did not brush their teeth daily. Only 53.50 % of parents reported using fluoride toothpaste for their children, and 62.28 % were unfamiliar with occlusal sealants. A notable 50.87 % of the interviewees declared that their children feared the dentist.

Conclusion The findings highlight key factors influencing daily habits and preventing dental diseases in children. Socioeconomic conditions influence choices related to health, diet, and prevention. The study provides a valuable overview of family practices and potential areas for improvement in children's oral health. This study emphasises the importance of parental education in oral health prevention. The findings suggest that while breastfeeding is common, there is a need to improve the use of fluoride toothpaste and increase awareness of occlusal sealants to promote more conscious and informed health management from early childhood. Further research is needed to explore strategies for enhancing parental knowledge and promoting better oral health outcomes for children.

KEYWORDS Oral Health Education, Dental Caries, Fluoride Use, Health Behaviour, Socioeconomic, Factors, Paediatric Dentistry.

Introduction

Moral health fundamentally impacts overall well-being and quality of life, particularly during childhood. Oral diseases, such as caries and gingivitis, are widespread problems in the short and long terms for the patients and can affect various planes of the life. According to data from the World Health Organization (WHO), dental caries is one of the most common diseases among children worldwide, with prevalence rates remaining concerning despite advances in prevention. The risk of caries is influenced by numerous factors, including dietary habits, frequency of sugar consumption, poor oral hygiene, genetic predisposition, and socioeconomic factors, often limiting access to timely and appropriate dental care [Colombo et al., 2019]. Untreated caries can lead to severe complications, such as dental infections, chronic pain, premature tooth loss, and difficulties in speech and eating. In this context, parents play a crucial role in educating their children about proper oral hygiene and adopting preventive strategies from early childhood. They are the primary promoters of good oral hygiene habits and are key in preventing risky behaviours, such as the lack of fluoride toothpaste use and excessive sugar intake [Karjalainen et al., 2007]. However, numerous studies have highlighted that mothers of children under 4 years often lack adequate knowledge about early oral hygiene and prevention, such as the appropriate use of toothbrushes, dietary control, and regular dental visits. [Chawłowska et al., 2022; Ilisulu et al., 2024]. In particular, concerning fluoroprophylaxis, or the use of fluoride to prevent caries, there are divergent recommendations among professionals and health organisations [US Preventing serving Task Force, 2023]. These discrepancies concern the appropriate age to start fluoride use, the correct dosage, and the form of administration (toothpaste, supplements, or professional treatments), potentially leading to confusion among parents and reducing the effectiveness of preventive measures. Our study was conducted at the Family Counseling Center of Cesano Boscone to collect data among voluntary participants. It involved 114 individuals (2 males and 112 females), parents of a firstborn child aged 0-18 or expecting their second child. Each participant completed an anonymous online questionnaire with closed-ended questions to collect information on oral hygiene habits, children's risky behaviours, and preventive measures.

Objectives

The study aimed to assess parental knowledge regarding children's oral health, to clarify doubts about oral disease prevention methods, and to promote a more conscious and informed approach to health management from early childhood.

Materials and methods

Study Design

A cross-sectional observational study was conducted on a voluntary sample of parents to study oral health habits in children and adolescents. The primary objective was to understand the level of knowledge and daily practices families adopt concerning preventing oral diseases in childhood.

Setting

The sample consisted of 114 participants, including 112 women and two men, selected among those expecting a child and who attended childbirth preparation courses at the Family Counseling Center of Cesano Boscone between March 2023 and September 2024. Participation in the study was voluntary: all parents who met the selection criteria were invited to participate. Two individuals chose not to participate, while the remaining 114 accepted and completed the questionnaire and informant consent (Fig 1). During the reference period, 12 childbirth preparation groups were activated. The selection of participants followed well-defined criteria:

Participants

Inclusion criteria:

- Parents who attended childbirth preparation courses during the study period.
- Presence of a firstborn child.
- Child's age between 0 and 18 years old.

Exclusion criteria:

- Parents with more than one child.
- Children with pathological conditions such as syndromes, congenital disorders, or other health conditions that could affect oral health (fig. 4).

Variables

The study variables include:

- Outcomes: Parental knowledge level on infant oral health, frequency and methods of children's oral hygiene, dietary habits, and risk behaviours associated with dental health.
- Exposures: Parental education received, family-adopted oral hygiene habits, educational level, and access to health information.
- Predictors: Firstborn's age, parental education level, use of preventive tools (fluoride, occlusal sealants, early dental visits).
- Potential Confounders: socioeconomic context, support received from healthcare professionals, cultural influences, and differences in access to dental services.
- Effect Modifiers: Gender differences in parents, personal preferences regarding the use of preventive tools, and level of health awareness.

Data Sources/Measurements

Data were collected through a structured online questionnaire administered to 114 parents attending prenatal courses at the Family Counseling Center of Cesano Boscone. The questionnaire

PROMOTION OF ORAL HEALTH IN CHILDHOOD: PARENT EDUCATION FROM PREGNANCY TO BIRTH

Note: This study is aimed at parents with a firstborn child between 0 and 18 years old. The following 20 questions address oral health and prevention in subjects aged 0-18 years. The questions are multiple-choice, and only one answer can be selected per question. The questionnaire is anonymous, and responses will be used solely for research purposes, in compliance with privacy regulations.
For convenience, the questions are formulated in the masculine form.

1. Indicate your gender: **a.** Male **b.** Female
2. Indicate your level of education: **a.** Primary school **b.** Middle school **c.** High school diploma **d.** University degree
3. Indicate your child's age: **a.** 0-2 years **b.** 2-4 years **c.** 5-6 years **d.** 7-10 years **e.** 11-16 years **f.** 17-18 years (not yet completed)
4. Was your child breastfed for at least six months? **a.** Yes **b.** No
5. Does or did your child use a baby bottle? **a.** Yes **b.** No
6. If yes, what did it contain? **a.** Only breast milk
7. How many times a day does your child eat?
a. 1-2 times a day **b.** 3 times a day **c.** 5 times a day (e.g., 3 main meals + 2 snacks) **d.** More than five times a day
8. How often does your child consume sugary, highly processed foods? (e.g., pastries, candies, cereals...) **a.** Almost never **b.** Once a day **c.** More than once a day
9. How often does your child consume sugary drinks? (e.g., Coca-Cola, tea, Gatorade...) **a.** Almost never, rarely **b.** Once a day **c.** More than once a day
10. Did your child suck their thumb or use a pacifier beyond the age of four? **a.** Yes **b.** No
11. How often does your child brush their teeth per day? **a.** Less than once a day **b.** Once a day **c.** Twice a day **d.** More than twice a day
12. Can you estimate how long your child spends brushing their teeth? **a.** I don't know **b.** Less than one minute **c.** Between one and two minutes **d.** Two minutes or more
13. Does your child use an electric toothbrush? **a.** Yes **b.** No
14. Does the toothpaste your child uses contain fluoride? **a.** I don't know **b.** Yes **c.** No
15. Do you know what dental sealants are? **a.** Yes **b.** No
16. Does your child have dental sealants? **a.** Yes **b.** No
17. Has your child ever had cavities? **a.** No, never **b.** Yes, more than a year ago **c.** Yes, this year
18. At what age should a child first visit the dentist? **a.** 0-3 years **b.** 3-6 years **c.** 6-9 years **d.** 9-12 years **e.** 12-15 years **f.** Over 15 years
19. When should oral hygiene care begin? **a.** Before the first baby tooth erupts **b.** When the first baby tooth erupts **c.** When the first permanent tooth erupts **d.** When all permanent teeth have erupted
20. Does your child fear the dentist? **a.** I don't know **b.** Yes, they are afraid **c.** No

FIG. 1 Questionnaire Administered to Study Participants.

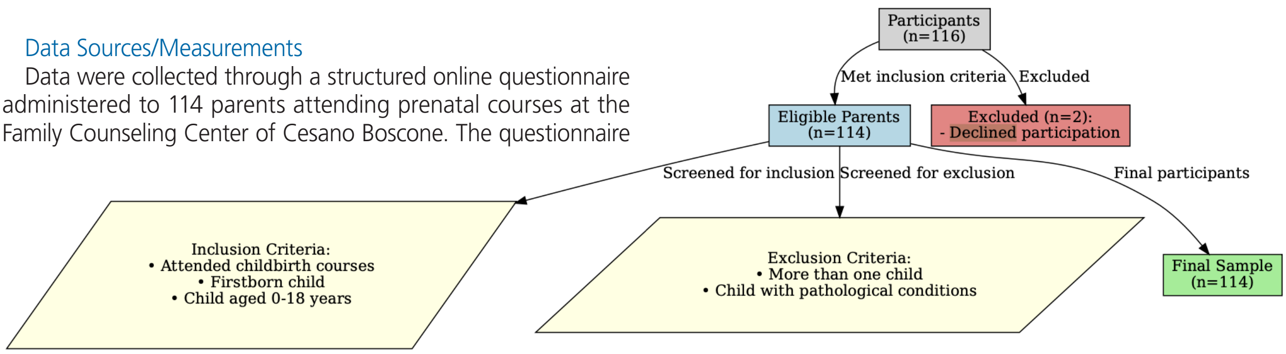


FIG. 2 Selection Criteria.

consisted of 20 questions divided into five thematic areas:

1. Socioeconomic context – 3 questions
2. Dietary habits – 6 questions
3. Risk behaviours (use of bottle and pacifier) – 2 questions
4. Oral hygiene practices – 4 questions
5. Strategies for preventing oral diseases – 5 questions

The collected data were analysed using descriptive statistics in Microsoft Excel, with tabular and graphical representations to identify participant trends and differences.

Bias

To reduce selection bias, the study included only parents who attended prenatal courses between March 2023 and September 2024. Anonymity was ensured to minimise response bias. However, the predominance of mothers (98.24 % of the sample) could represent a gender bias, limiting the generalisability of the results to fathers. Additionally, the self-assessment of parental habits may introduce social desirability bias.

Study Size

The sample size was determined based on the population of parents attending courses during the period considered. All eligible parents were invited (n=116), with a participation rate of 98.27 % (n=114). This number was deemed sufficient for an initial exploratory analysis of knowledge and practices related to oral health prevention.

Quantitative Variables

The variables were managed in the analysis as follows:

- Categorical data: Frequencies and percentages (e.g., use of an electric toothbrush: yes/no, fluoride use: yes/no/don't know).
- Ordinal data: Predefined categories (e.g., brushing frequency: never, once a day, twice a day, more than twice a day).
- Continuous data: Not included in the study.

Statistical Methods

a) Methods for controlling confounders: Descriptive analyses were used to identify potential differences between groups based on educational level and parental habits, reducing the effect of known confounders.

b) Subgroup and interaction analyses: Differences among parents with varying educational levels were examined to assess their impact on oral hygiene knowledge and practices.

c) Handling of missing data: The questionnaire required participants to answer all questions, minimising missing data.

d) Loss to follow-up: Not applicable, as this was a cross-sectional study.

e) Sensitivity analysis: Not conducted due to the study's exploratory nature.

The study provides a preliminary basis for further exploring the role of parental education in preventing childhood oral diseases and assessing more effective strategies to enhance awareness of oral health. Data was collected through a structured, anonymous digital questionnaire with closed-ended questions administered via Google Forms. The questionnaire was developed in full compliance with privacy regulations and specifically designed for this research. Data analysis was performed using Microsoft Excel, employing tabular and graphical processing tools to clearly and comprehensively represent the collected responses. Calculating absolute frequencies and percentages for categorical variables provides a precise overview of parents' knowledge and habits concerning infants and adolescent oral hygiene. This study offers valuable insights into family-adopted practices and potential areas for improving the prevention of oral diseases in children and adolescents. Person correlation test was used to evaluate statistical correlations between preventive behaviours, socioeconomic factors and health outcomes.

Results

Participants

Number of individuals at each study phase:

- 116 parents invited
- 114 participants
- 2 parents did not participate in the study

Descriptive statistics (Table 1)

Descriptive statistics summarise key behavioural and preventive variables among participating parents. The high mean values for breastfeeding until six months (M = 0.7368), regular toothbrushing (M = 1.754), and early oral hygiene initiation (M = 2.254) indicate moderately good adherence to recommended practices. However, lower means for fluoride toothpaste use (M = 0.5351), knowledge of sealants (M = 0.3772), and actual sealant application (M = 0.1140) highlight critical gaps in parental awareness of preventive strategies. The relatively high mean for sugary drink intake (M = 1.623) and caries experience (M = 1.333) further underline the need for targeted educational interventions. The data also reveal a notable proportion of children experiencing dental fear (M = 0.3421), which may be associated with delayed prevention or negative past experiences. Collectively, these indicators emphasise the influence of parental education and socioeconomic factors on children's oral health behaviours.

Question 1: Gender of participants (Fig. 3).

Women were predominantly represented in the analysed sample, as they voluntarily responded to the questionnaire request. The two male participants specifically replaced the mother due to linguistic difficulties in understanding Italian. The sample consiste of 98.24 % mothers and 1.75 % fathers.

Question 2: Educational Level (Fig. 4).

Within the sample, 2.63 % of parents had completed primary school, 6.14 % had a lower secondary school diploma (first-level secondary education), the majority (57.89 %) held an upper

NAME	MEAN	MEDIAN	MODE	RANGE
SocioEco	1.702	1.000	1.000	3.000
Breastfed_6m	0.7368	1.000	1.000	1.000
Used_Bottle	0.2281	0.000	0.000	1.000
Bottle_Content	0.8509	1.000	0.000	2.000
Meals_Per_Day	0.9737	1.000	1.000	2.000
Sugary_Foods_Frequency	1.237	1.000	1.000	1.000
Sugary_Drinks_Frequency	1.623	2.000	2.000	1.000
Pacifier_Over4	0.7982	1.000	1.000	1.000
Toothbrushing_Frequency	1.754	2.000	2.000	2.000
Brushing_Time	1.246	2.000	2.000	2.000
Electric_Toothbrush	0.3333	0.000	0.000	1.000
Fluoride_Toothpaste	0.5351	1.000	1.000	1.000
Knows_Sealants	0.3772	0.000	0.000	1.000
Child_Has_Sealants	0.1140	0.000	0.000	1.000
Caries_Experience	1.333	2.000	2.000	2.000
First_Dentist_Visit_Age	2.035	2.000	2.000	3.000
Oral_Hygiene_Start	2.254	2.000	2.000	3.000
Child_Fears_Dentist	0.3421	0.000	0.000	1.000

TABLE 1 Selection Criteria.

FIG. 3 Gender of participants.

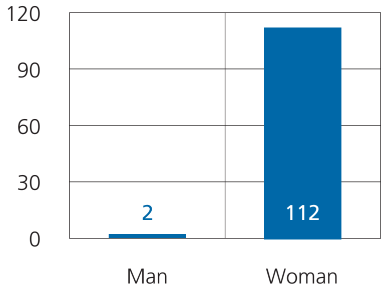


FIG. 4 Educational Level.

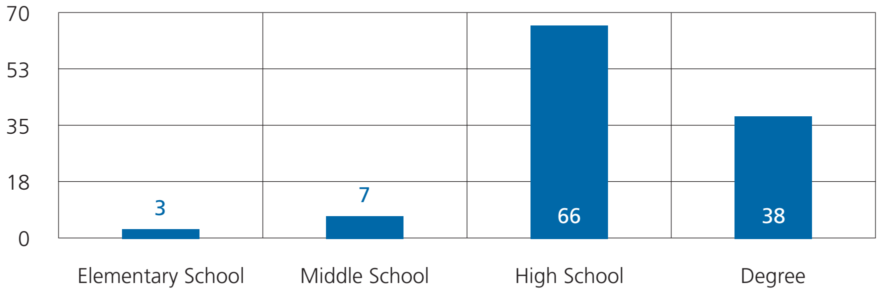


FIG. 5 Child's Age

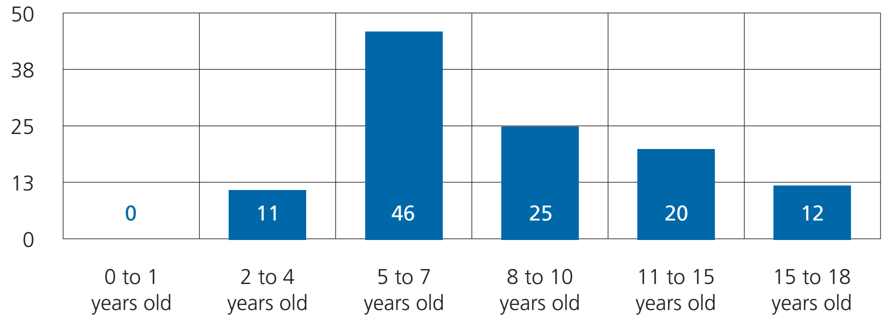


FIG. 6 Natural breastfeeding until six months of life.

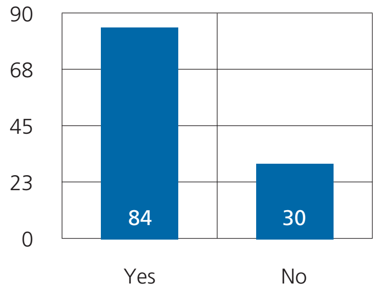


FIG. 7 Baby Bottles.

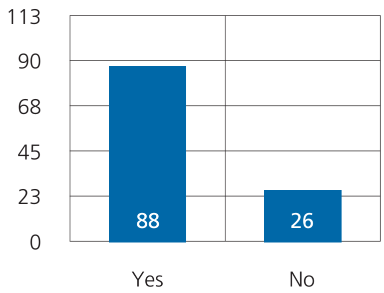
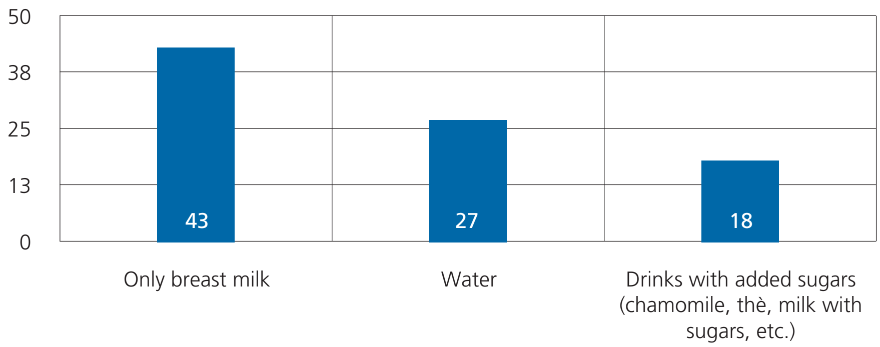


FIG. 8 Baby Bottle Contents.



secondary school diploma (second-level secondary education), and 33.33 % had a university degree.

Question 3: Child's Age (Fig. 5).

In the sample, the age group from 0 to 1 year is not represented (it is unlikely, though not impossible, to have a first child in this age range while already at the end of a second pregnancy). The distribution is as follows: 9.64 % of children are between 2 and 4 years old, 40.35% are between 5 and 7 years old, 21.92 % are between 8 and 10 years old, 17.54 % are between 11 and 15 years old, and the remaining 10.52 % are between 15 and 18 years old.

Question 4: Natural breastfeeding until six months of life (Fig. 6).

73.68 % were breastfed for at least six months, compared to 26.31 %.

Question 5: Baby Bottles (Fig. 7).

Among the respondents, 77.19 % use or used a bottle, compared to 22.80 %.

Question 6: Bottle Contents (Fig. 8).

Among the respondents who reported using a bottle, 48.86 % contained only breast milk, 30.68% contained only water, and 20.45 % contained a sugary beverage.

Question 7: Meal Frequency (Fig. 9).

In one day, 0.87 % eat only 1 or 2 times, 7.89% eat at least 3 times, 80.70 % eat 5 times (3 meals + 2 snacks), and 10.52 % eat more than 5 times a day.

Question 8: Sugar Intake (Fig. 10).

The intake of highly sugary foods is almost none for 23.68% of the sample, once a day for 50.87 %, and more than once a day for 25.43 %.

Question 9: Sugary Beverages (Fig. 11).

The intake of sugary beverages is almost none for 62.28 %, once a day for 25.43 %, and more than once a day for 12.28 %.

Question 10: Pacifier and Thumb-Sucking (Fig. 12).

Among subjects with children over 4 years old, 11.65 % used a pacifier or had the habit of thumb-sucking beyond 4, while 88.34 % did not.

Question 11: Toothbrushing Frequency (Fig. 13).

In 7.01 % of cases, the respondents' children do not brush their teeth daily, 27.19 % brush them on average once a day, 56.14 % brush at least twice a day, and only the remaining 9.64 % brush more than twice.

Question 12: Brushing Time (Fig. 14).

In 6.14 % of the sample, respondents do not know how long they brush their teeth, 31.57 % report brushing for less than 1 minute, 38.59 % for a duration between 1 and 2 minutes, and

FIG. 9 Meal Frequency.

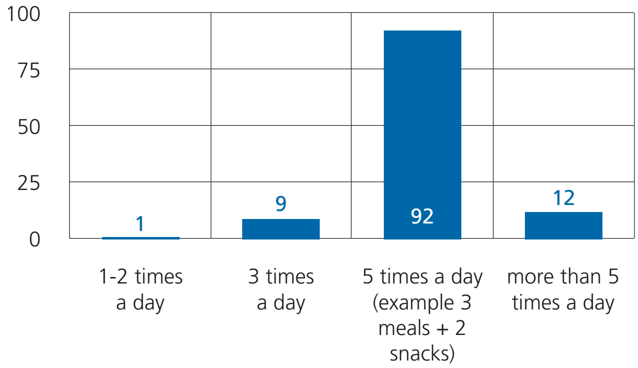


FIG. 10 Sugar Intake.

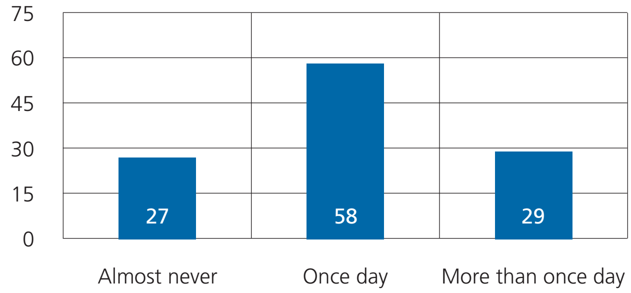


FIG. 11 Pacifier and Thumb-Sucking.

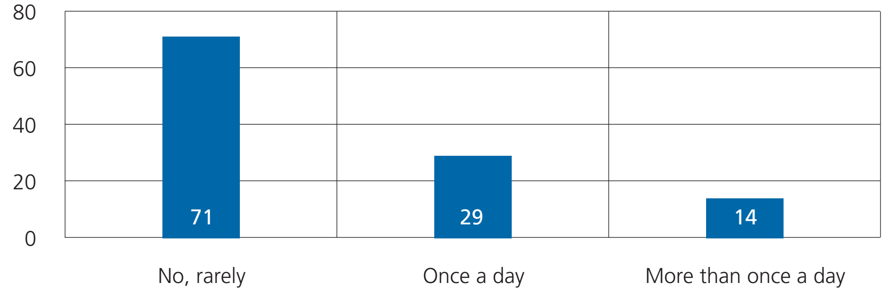


FIG. 12 Toothbrushing Frequency.

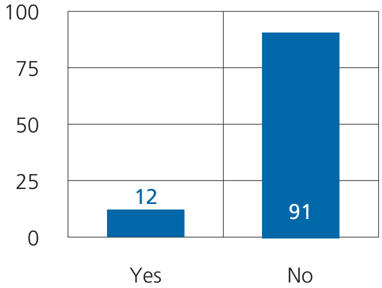


FIG. 13 Toothbrushing Frequency in a Day.

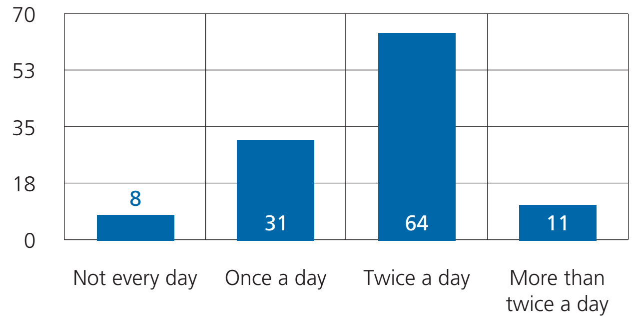
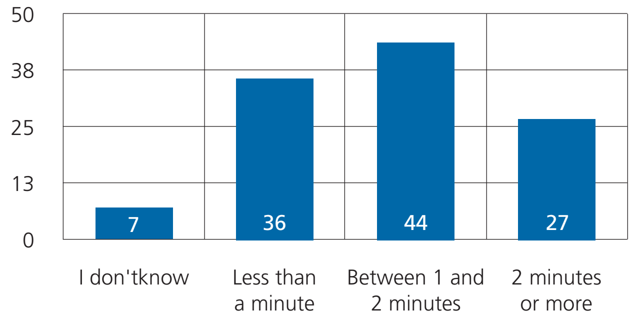


FIG. 14 Brushing Time.



23.68 % for 2 minutes or more.

Question 13: Electric Toothbrush (Fig. 15).

Among the respondents, only 33.33 % use an electric toothbrush, while 66.6 % prefer a manual one.

Question 14: Fluoride Toothpaste (Fig. 16).

53.50 % of the sample reports that their children's toothpaste contains fluoride, 25.43 % say it does not, and the remaining 21.05 % do not know.

Question 15: Sealants (Fig. 17).

37.71 % are aware of sealants, while 62.28 % have never heard of them.

Question 16: Sealants 2 (Fig. 18).

Only 11.40 % of the total have undergone the procedure for sealing occlusal surfaces, while a significant 88.59 % have never done so.

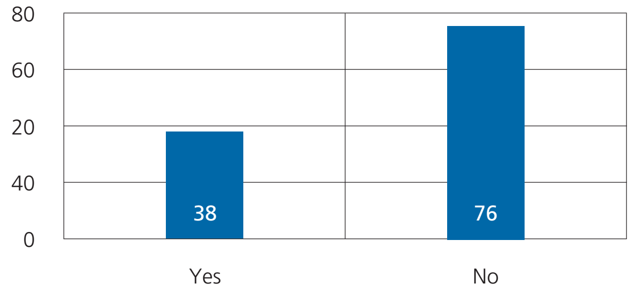
Question 17: Experience of Cavities (Fig. 19).

In the sample examined, 64.03 % of participants reported that their child has never had a cavity, while among the remaining group, 5.26 % had at least one cavity more than a year ago, and 30.70 % stated that they had had one in the past year.

Question 18: First Visit (Fig. 20).

According to the responses, 34.21 % would send their children to the dentist for the first time before the age of 3; 42.10 % between the ages of 3 and 6, 16.66 % between 6 and 9 years old, 3.5 % between 9 and 12 years old, 2.63 % between 12 and 15 years old, and 0.87 % after the age of 15.

FIG. 15 Use of Electric Toothbrush.



Question 19: Oral Hygiene Care (Fig. 21).

According to the sample, the best time to start focusing on oral hygiene is from birth for 36.84 %, at the eruption of the first baby tooth for 53.50 %, at the eruption of the first permanent tooth for 7.89 %, and the complete eruption of all permanent teeth for 1.75 %.

Question 20: Dental Anxiety (Fig. 22).

Overall, 50.87 % of children, according to their parents, have

FIG. 16 Fluoride Toothpaste.

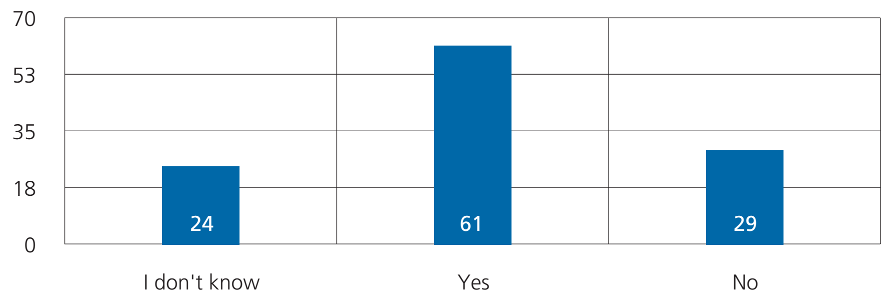


FIG. 17 Sealants.

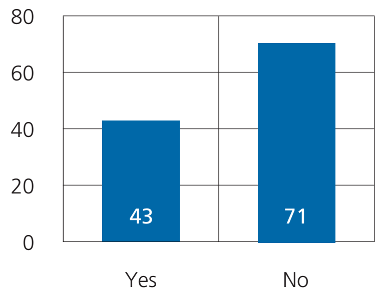


FIG. 18 Performance of Occlusal Sealants.

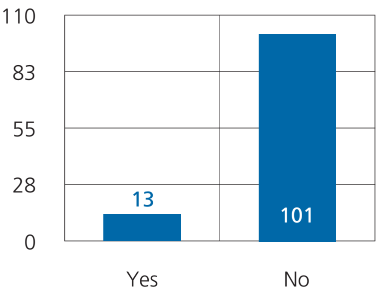


FIG. 19 Experience of Cavities.

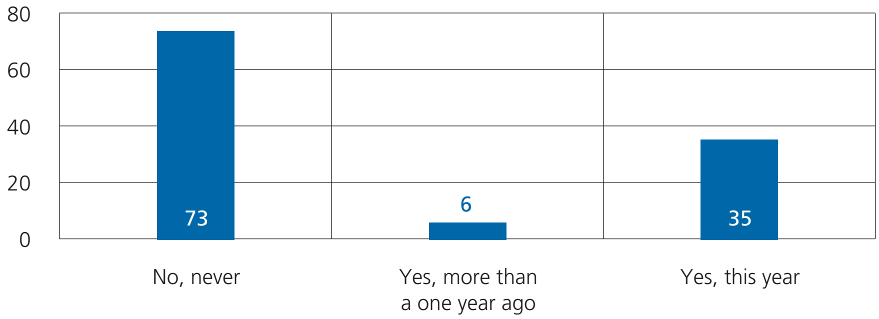
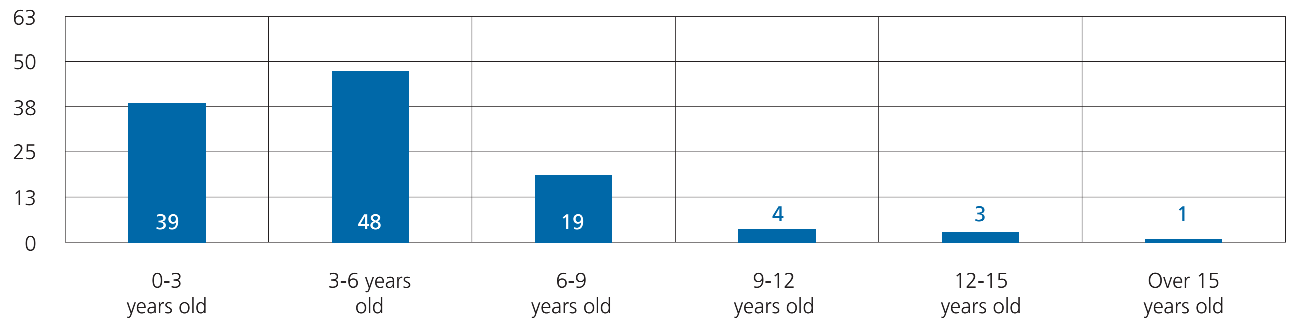


FIG. 20 Experience of Cavities.



a fear of the dentist, 34.21 % have no problem interacting with them, and the remaining 14.91 %, we cannot know.

To analyse on the relationships between behavioural and preventive variables, a Spearman rank correlation analysis was conducted due to the ordinal and categorical nature of the data. The results naturally revealed a strong inverse correlation between the use of baby bottles and the type of liquid typically administered ($\rho = -0.62$, $p < 0.0001$), suggesting that prolonged bottle use is often associated with non-recommended contents, such as sugary drinks, which may increase caries risk. Additionally, a moderate positive correlation emerged between parental awareness of occlusal sealants and the actual application of sealants in children ($\rho = 0.46$, $p < 0.0001$), underscoring the impact of knowledge on the adoption of preventive strategies, which logically occurs. Also, some correlation was found on other interesting factors such asthe socioeconomical factors and the age of the first visit, indicating that these factor might increase the social awareness and allow a premature visit for the paediatric dentist, and a lower usage of the pacifier over the age of 4. While the experience of caries was correlated majorly with the use of bottle and pacifier as well as the oral hygiene starting age. Another interesting factor was the fear of the dentist relating with the usage of sugary food, suggesting of sort of psychological sense of "guilt" resulting in fear. These findings emphasise the pivotal role of parental education in promoting effective oral health behaviours and highlight areas where targeted interventions may lead to measurable improvements in children's oral health outcomes (Fig. 23).

Discussion

Oral health in children and adolescents is the result of various factors that contribute to overall well-being. Caring for one's mouth from a young age is not just an aesthetic issue but a fundamental aspect of overall health. Analysing the collected data reveals some key elements that influence daily habits and the prevention of major dental diseases. For instance, education on oral hygiene, nutrition, and regular visits to the dentist play a decisive role in maintaining healthy teeth and gums over time. Understanding these aspects and promoting good practices from early childhood can make a significant difference in preventing future problems.

The Role of Socioeconomic Context

Socioeconomic conditions significantly impact daily choices regarding health, nutrition, and prevention. In other words, the context in which a family lives can profoundly influence habits and access to care. Numerous studies highlight a close correlation between the level of education and health status: individuals with

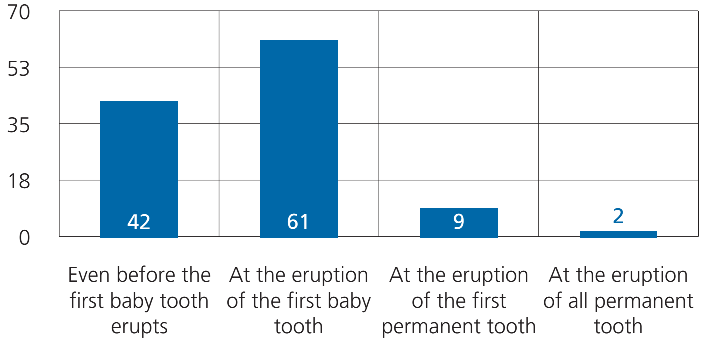


FIG. 21 Oral Hygiene.

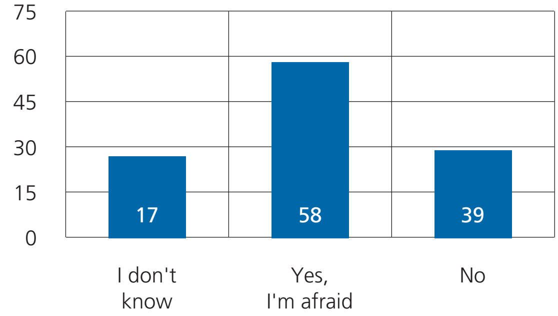


FIG. 22 Collaboration and Anxiety.

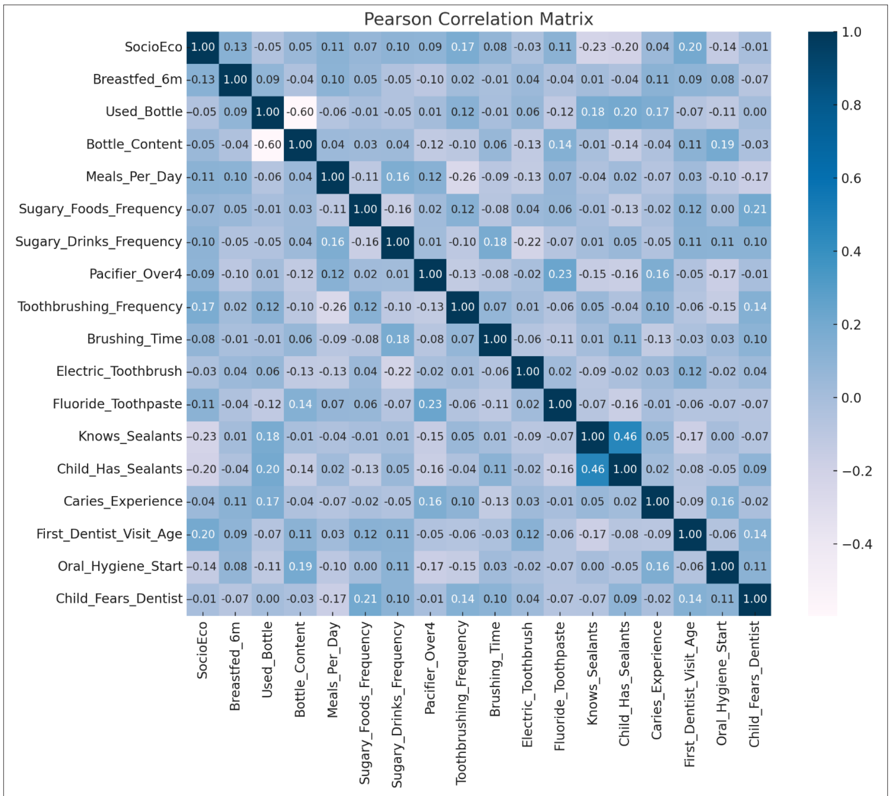


FIG. 22

higher education tend to be more aware of the importance of prevention and often have easier access to quality healthcare services [De Castilho et al., 2013]. This indicates that it is not only about individual choices but also about a set of factors that can facilitate or, conversely, hinder the ability to care for one's health adequately. In our sample, over 90 % of parents have a medium-high level of education. This may explain the relatively low percentage of children who have already experienced cavities, which is 36 %, a figure lower than the Italian average of 43.1 for those under 12 years old [Camoni et al., 2018].

Nutrition and Sugar Consumption

One of the most interesting aspects that emerged from the analysis is the attention to nutrition in the early years of life. This factor profoundly impacts the oral and general health of children. A positive aspect concerns breastfeeding: 73.68 % of parents reported breastfeeding until six months, an encouraging percentage compared to the Italian average, between 31 % and 38%. However, we are still far from the World Health Organisation's recommendations, which suggest exclusive breastfeeding until the sixth month of life. This outcome is influenced by various factors, including medical and social support received, availability of information on breastfeeding, and maternity policies that can facilitate or hinder this practice. Breastfeeding is not only an essential source of nutrition in the early months of life but also plays a crucial role in the newborn's oral health. The sucking motion during breastfeeding contributes to the proper development of orofacial musculature and the harmonious growth of the jawbones, reducing the risk of dental malocclusions [Cenzato et. al,2024]. Furthermore, breast milk contains antibodies and bioactive factors that help protect the oral cavity from infections and promote the development of a balanced bacterial flora, decreasing the likelihood of cavities in the early years of life. Recent studies have shown that breastfed children have a lower risk of developing cavities compared to those fed with formula, especially if breastfeeding is accompanied by adequate oral hygiene [Cenzato, 2023]. However, prolonged breastfeeding beyond the age of one, particularly if associated with frequent nighttime feedings and a lack of proper teeth cleaning, can increase the risk of bottle caries or early childhood caries Early Childhood Caries (ECC) . Therefore, it is essential to educate parents about the benefits of breastfeeding and the importance of early oral hygiene, such as cleaning the gums in the first months and introducing tooth brushing as soon as the first teeth emerge [Law, 2007]. Another key element concerns the consumption of sugary drinks in the early years of life. 80 % of parents claim to avoid them completely, while 20.45 % provide them in a bottle. This data, although significant, takes on even more relevance when compared to national statistics: according to the Italian Ministry of Health, between 12 and 36 months, the percentage of children who regularly consume sugary drinks is between 30 % and 40 %. This demonstrates that much work still needs to be done to raise awareness among families about the importance of limiting sugar consumption from early childhood [Harris et al., 2012; Maspero et al., 2023; Spinelli et al., 2023]. Similar findings were reported by some studies, where parents showed limited awareness of proper diet and sugar intake, oral hygiene practices and preventive strategies for their children. [Alyahya et al., 2024]. As the years go by, sugar consumption tends to increase. The data collected show that over 37 % of children and adolescents involved in the study consume sweetened beverages daily, while 83 % regularly eat ultra-processed foods. National statistics also confirm this worrying trend: among younger children, particularly those aged 3 to 5 years, processed foods are widespread, with 40-50% consuming them regularly. [Lazzeroni et al., 2025]. These dietary habits, often accompanied by a sedentary lifestyle, have a significant impact on health, increasing not only the risk of cavities and dental problems but also the likelihood of developing metabolic diseases such as diabetes and hypertension from a young age. For this reason, it is essential to promote greater awareness among parents, educators, and healthcare providers about the importance of a healthy and balanced diet, with particular attention to reducing sugar and ultra-processed food consumption from early childhood [Karjalainen et al., 2007].

Harmful Oral Habits

Another aspect analysed concerns harmful oral habits, such as prolonged use of pacifiers and bottles or thumb sucking beyond the age of four. About 12% of the sample reported that their child maintains these habits, a figure in line with the national average, which ranges from 10% to 15% among children aged four to six [Zuccotti et al., 2014; Tumedei et al., 2020]. Although these behaviours are typical and physiological in early life, their persistence beyond a certain age can have significant repercussions on the development of the masticatory apparatus and oral health in general.Prolonged use of pacifiers and thumb sucking, particularly beyond three to four years of age, can alter the growth and development of the jawbones and influence the position of the teeth. One of the most common effects is the appearance of dental malocclusion, which is an alteration in the alignment or relationships between the upper and lower arches that can compromise masticatory, phonetic, and respiratory functions. Malocclusions can be classified into different types based on their manifestation. In addition to orthodontic consequences, these habits can also influence the development of orofacial musculature and respiratory function [Cenzato et al.,2024]. For example, prolonged sucking can promote oral breathing instead of nasal breathing, affecting the growth of the palate and the positioning of the tongue [Cenzato et al., 2024]. A mispositioned tongue can, in turn, lead to alterations in swallowing and phonation, with possible repercussions on language and the general posture of the child. To prevent such problems, it is essential to intervene early, educate parents about the importance of limiting pacifier and bottle use by the age of two to three years, and promote strategies to help children overcome thumb-sucking. Moreover, early dental visits allow for identifying any signs of malocclusion and intervention with myofunctional therapies or orthodontic devices if necessary. Understanding the impact of harmful oral habits and adopting preventive measures can significantly affect the harmonious development of the masticatory apparatus, promoting proper occlusion and reducing the risk of complex orthodontic treatments at later ages [Paglia, 2023 ;Carrascoza et al., 2024].

Oral Hygiene: A Routine Still Not Well Established

On the oral hygiene front, some critical issues emerge that can significantly impact children's dental health. While 56.14% of children brush their teeth at least twice a day, as professionals in the field recommended, 35% do so only once a day or even less. Furthermore, only 20% dedicate the appropriate amount of time to brushing, which is at least two minutes—an essential factor for ensuring effective cleaning and reducing plaque buildup. Plaque is a thin adhesive film composed of bacteria, food residues, and saliva that constantly forms on the surface of the teeth. If not regularly removed through adequate oral hygiene, it can mineralise and turn into tartar, increasing the risk of gingivitis and cavities [Cenzato et al., 2024; Dongiovanni et al., 2023]. This is particularly relevant, considering 90% of children consume food at least five times daily, including meals and snacks. A higher frequency of eating, primarily if characterised by foods rich in sugars and fermentable carbohydrates, promotes an acidic environment within the oral cavity, temporarily lowering saliva pH and creating ideal conditions for the proliferation of cavity-causing bacteria, such as Streptococcus mutans [Tortora et al., 2023]. Saliva is fundamental in protecting teeth, thanks to its ability to neutralise acids and promote enamel remineralisation. However, if the intervals between meals are too close, the buffering process of salivary pH is continuously interrupted, leaving the tooth exposed to acid attacks for extended periods. This increases the risk of carious lesions, especially if oral hygiene is not consistent and thorough. (Marinho et al., 2013). At the national level, there are no precise data on the frequency and duration of oral hygiene in children. Still, some research suggests that only 25% of Italian children brush their teeth twice daily and that not all adhere to the recommended timings. This underscores the need for greater awareness of the importance of proper oral hygiene in terms of brushing frequency and correct techniques, fluoride toothpaste, and parental supervision, especially in the early years of life [Mehta et al.,2022]. Adequate education on oral hygiene, combined with a balanced diet and regular monitoring of dietary habits, can significantly contribute to preventing cavities and gum diseases, reducing the risk of dental issues in adulthood [Walsh et al., 2010].

Prevention and Dental Visits

Finally, a fundamental aspect of children's oral health is prevention. Our survey revealed that only 37% of parents know occlusal sealants, one of the most effective preventive measures against cavities. These sealants protect the grooves of molars from plaque and bacterial accumulation, which are the primary causes of tooth decay. Although awareness of this treatment remains limited, the data concerning the age of the first dental visit is highly encouraging. Seventy-six percent of parents would take their child to the dentist between 0 and 6 years of age, with 34% doing so before age three. This is a positive indicator, as early intervention allows for the timely detection of potential oral health issues, improving treatment outcomes and reducing the risk of future complications. Early dental prevention is crucial not only for identifying cavities or malocclusions but also for preventing the development of dental anxiety, a condition that affects many children. An early visit to the dentist enables children to become familiar with the clinical environment and dental professionals, thereby reducing the fear associated with treatment. The average age for the first dental visit in Italy is around 4–5 years, though variations exist based on socioeconomic factors. A delayed approach to dental care may compromise a child's oral health and lead to increased difficulty in establishing a positive relationship with the dentist. Studies indicate that children receiving late dental care have a higher risk of developing dental fear, which affects approximately 50% of children, according to our sample. This finding underscores the importance of early dental visits, which help mitigate fear and foster long-term oral health education. Additionally, regular check-ups and the adoption of preventive measures—such as sealants, fluoride therapy, and oral hygiene education—can significantly reduce the risk of cavities and other dental diseases [Nilchian et al., 2011]. Also was demonstrated that parental dental anxiety and limited knowledge of caries prevention can significantly affect children's oral health outcomes [Gavic et al., 2022]. Effective prevention begins with proper parental education, early dental visits, and implementing preventive techniques. These factors safeguard children's oral health and minimise future dental complications.

Conclusion

Maintaining oral health during childhood requires careful management of multiple factors, including development, nutrition, behavioural habits, and personal hygiene. Socioeconomic factors and adequate education are essential for improving oral health and a healthy diet that limits sugar and processed food intake. Monitoring harmful oral habits is critical in preventing long-term diseases, and promoting oral hygiene from early childhood is fundamental. Eventually, introducing preventive strategies - such as sealants and early dental visits - significantly contributes to preventing oral diseases. This highlights the importance of collaboration between parents and healthcare professionals in ensuring optimal oral health outcomes for children.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and authorised by the Ospedale Maggiore Policlinico, Current Research, Operative Unit 420/425, Progressive number project 3.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The authors declare no conflict of interest.

Data Availability Statement

The data presented in this study are available upon reasonable request, after the signature of a formal data-sharing agreement in an anonymous form, from the corresponding author because they are protected by privacy.

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