International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Knowledge and Practices of Bulgarian Pediatricians Regarding Children's Oral Health: A Cross-Sectional Assessment

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Abstract: ***Pediatricians are critical to promoting children's oral health through guidance, risk assessment, and early referrals. This cross-sectional study assessed the knowledge, attitudes, and practices of 48 Bulgarian pediatricians regarding oral health in children using a structured questionnaire. While 77.1% recognized the link between oral and general health, only 35.4% consistently discussed oral hygiene, and just 20.8% had formal collaboration with dental professionals. Fluoride recommendations were reactive, with 43.8% providing advice only when prompted. Although most respondents supported early dental visits, over half did not counsel parents on timing. These findings reveal important gaps in preventive practice and interprofessional collaboration, underscoring the need for targeted training and systemic support to integrate oral health more effectively into pediatric care.***

Keywords: Pediatric oral health, preventive care, fluoride recommendations, dental collaboration

1. Introduction

Pediatricians play a pivotal role in the prevention, early identification, and management of oral health issues in young children. The American Academy of Pediatrics (AAP) recommends that pediatricians conduct oral health risk assessments at every well-child visit starting at 6 months of age, provide anticipatory guidance on oral hygiene and diet, provide counseling on the proper use of fluoridated toothpaste (a smear or grain-of-rice–sized amount for children under 3 years, and a pea-sized amount for children 3 years and older), and apply fluoride varnish according to established schedules [1-3]. Additionally, pediatricians are tasked with advising parents to supervise brushing until children reach 10 years of age and to minimize sugar exposure to reduce caries risk [1]. The AAP further underscores the importance of establishing a dental home by age 1 and fostering collaborative relationships with dental professionals to ensure timely referrals and coordinated care [1, 4]. Pediatricians are also encouraged to be knowledgeable about local dental resources and to advocate for policies that to improve access to preventive dental care, including coverage for fluoride varnish [1, 3].

Training for pediatricians includes the use of structured oral health risk assessment tools and education on fluoride use, caries risk, and preventive strategies, supported by resources like the Smiles for Life curriculum and AAP oral health practice tools [2]. These recommendations aim to reduce the incidence and severity of dental caries, improve overall child health, and lower long-term healthcare costs through early intervention [1]. Recent data suggest that pediatricians' involvement in oral health has grown over the past decade, particularly in fluoride varnish application and early dental referrals. However, gaps persist in the consistent performance of comprehensive oral screening examinations and caries risk assessments, especially for children under 3 years old. While pediatricians report increased confidence and fewer barriers to integrating oral health into practice, the frequency of detailed oral health evaluations in infants and toddlers remains suboptimal [5]. Time constraints, limited training, and inadequate reimbursement for oral health services continue to pose challenges [5, 6].

Given their frequent contact with young children, pediatricians are uniquely positioned to provide anticipatory guidance, identify at-risk children, and facilitate early dental referrals. Collaboration with dental professionals through interprofessional education, shared care protocols, and streamlined referral pathways is critical for comprehensive care [5, 6]. Continued education and system-level support are essential to enhance pediatricians' knowledge, confidence, and effectiveness in addressing oral health issues in early childhood. This study is significant as it provides insight into how pediatricians in Bulgaria contribute to early oral health prevention, highlighting gaps that, if addressed, could lead to improved child health outcomes and reduced prevalence of dental caries.

Aim: The aim of this article is to assess the knowledge of pediatricians in Bulgaria regarding oral health-related themes to identify gaps and opportunities for improving oral health integration in pediatric care.

2. Materials and methods

This cross-sectional study assessed the awareness and attitudes of Bulgarian pediatricians regarding children's oral health through a questionnaire survey. The target population included pediatricians registered and working in Bulgaria.

A structured questionnaire was developed based on a review of existing literature on pediatric oral health. The structured questionnaire included yes/no, multiple-choice, and open-ended items grouped into six thematic categories:

- Demographic characteristics (gender, age, years of professional experience);
- Impact of oral health on children's general health;
- Communication with parents regarding oral health;
- Collaboration with dentists;
- Dietary habits and nutrition recommendations;
- Need for additional training and preferred information sources.

The questionnaire was distributed electronically via Google Forms from June 1 to August 31, 2025. Participation was voluntary and anonymous, with informed consent obtained

digitally before survey completion. A total of 48 responses were received.

Responses were exported from Google Forms to Microsoft Excel 2019 for data cleaning and organization, and then analyzed using the SPSS v.16.0 software package (SPSS Inc., Chicago, IL, USA). Descriptive statistics, including frequencies and percentages, were calculated for all variables. Chi-square tests were used to examine associations between demographic characteristics and responses to key questions (e. g., awareness of oral health's impact).

The study adhered to the ethical principles outlined in the Declaration of Helsinki. Participants were informed of the study's purpose, and no personally identifiable data were collected.

3. Results

A total of 48 pediatricians (21 men and 27 women) participated in the survey. After analyzing the results, the participants were grouped according to their professional experience into four categories: less than 5 years; 5 to 10 years; 11 to 20 years; and more than 20 years of practice. The data are presented in Figure 1.

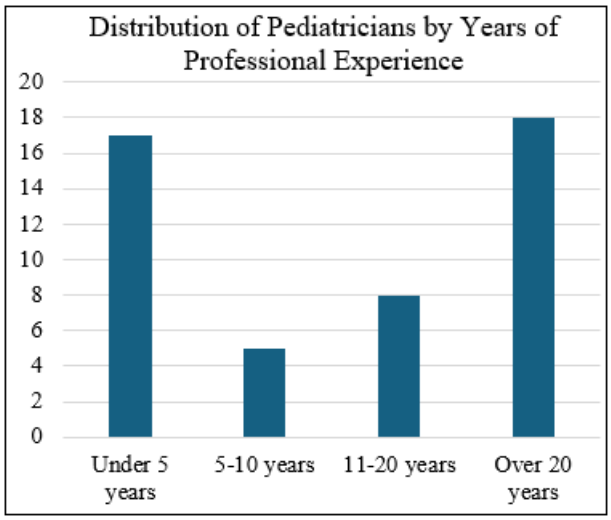

Figure 1: Distribution of participants by years of professional experience

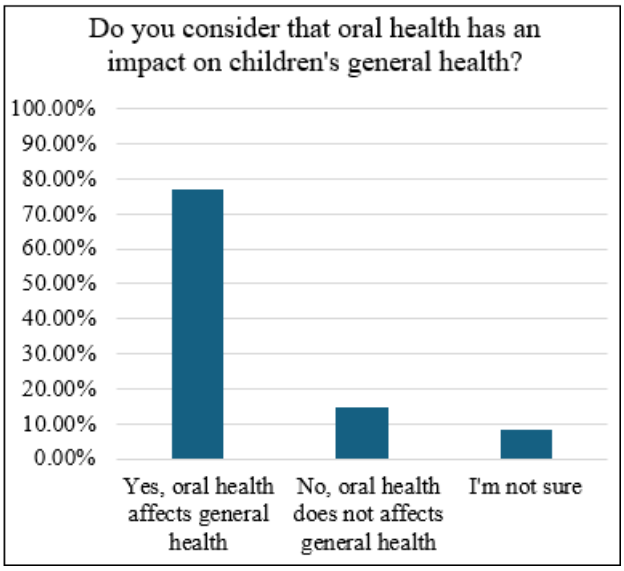

Figure 2: Responses to the question about the relationship between oral and general health

Of all surveyed pediatricians, 77.1% believe that dental health affects children's general health, while 14.6% do not consider that a child's dental health influences their overall health status. The remaining 4 participants (8.3%) were uncertain whether oral health impacts a child's general health.

The questionnaire also included items addressing pediatricians' communication with parents regarding children's oral health, as well as providing advice on proper oral hygiene practices. The data are presented in the following figure.

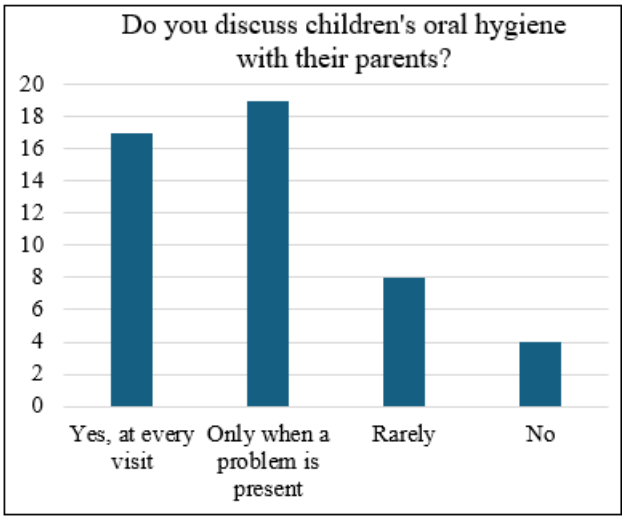

Figure 3: Frequency of pediatricians discussing oral hygiene with parents

Analysis of the results showed that 35.41% of respondents discuss issues related to the child's oral hygiene with parents at every visit. Meanwhile, 39.58% address oral health topics with parents only when complaints are reported. Eight respondents (16.67%) indicated that they rarely discuss matters related to their child's oral hygiene with parents.

The surveyed pediatricians also provided responses with varying levels of agreement regarding whether the pediatrician bears responsibility for the prevention of oral

diseases in children, with the results presented graphically in figure 4.

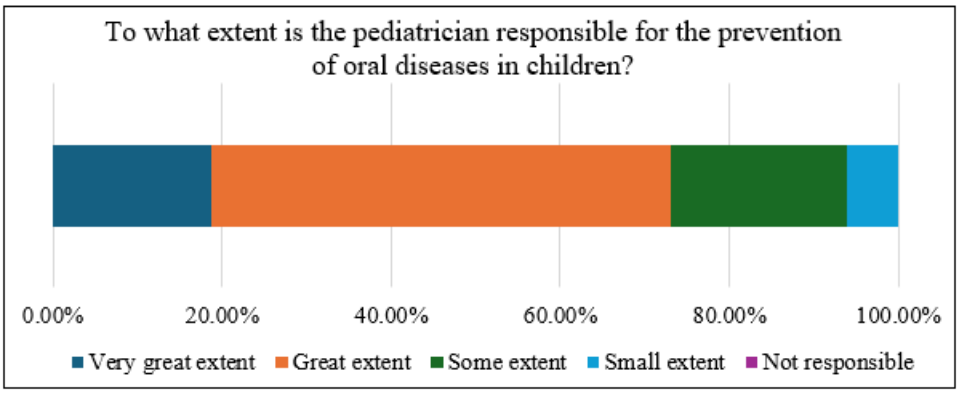

Figure 4: Responses to the question regarding the extent to which the pediatrician is responsible for the prevention of oral diseases

Following the analysis of the survey data, it was found that the largest proportion of participants (54.2%) believe that pediatricians are largely responsible for the prevention of oral diseases in childhood. An additional 18, 8% of respondents consider this responsibility to be very significant, while 20, 8% selected the option "to some extent". A small proportion (6, 2%) believe that pediatricians are responsible to a small extent. Notably, none of the respondents indicated that pediatricians are not at all.

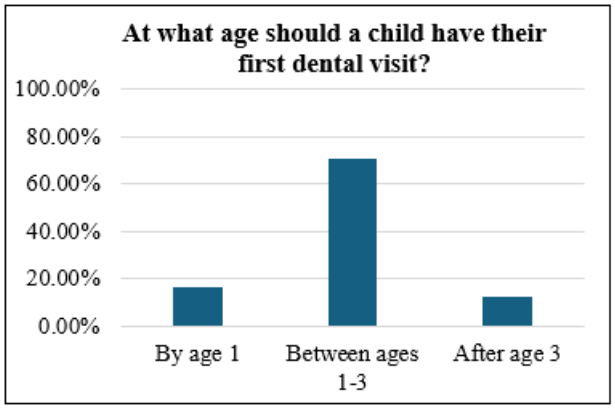

Figure 5: Recommended age for a child's first dental visit – respondents' opinion

The responses of the surveyed pediatricians concerning the timing of the first dental visit showed that the majority (70.8%) indicated that the visit should take place between the ages of 1 and 3 years. Another group of respondents (16.7%) reported that the first visit should occur around the age of one year. Similarly, 12.5% of pediatricians believed that the first dental examination should take place after the age of 3 years.

Participants were also asked whether they advise parents on when to schedule the first dental visit. The majority (n=31; 64.6%) reported that they do not provide such recommendations, while (n=17; 35.4%) stated that they give this advice during the first consultation or meeting with the child's parents.

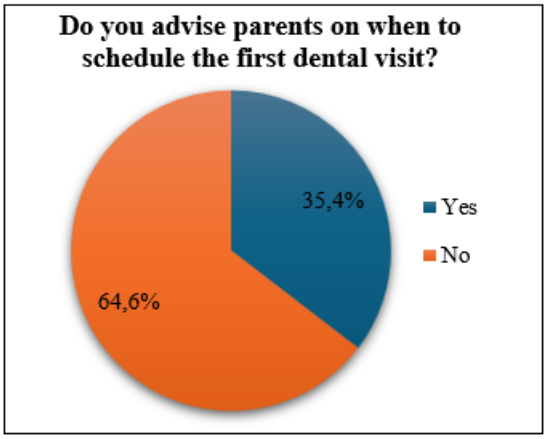

Figure 6: Pediatricians' Guidance regarding the first dental appointment.

Table 1 presents the results regarding pediatricians' collaboration between pediatricians and dental practitioners.

Table 1: Distribution of pediatricians according to their collaboration with dental practitioners

Answer	Count (n)	Percentage (%)
Yes, I have established communication with a dentist and refer patients to them	10	20, 8%
Yes, occasionally/only when necessary	16	33, 3%
No, but I refer them to their personal dentist	14	29, 2%
No, I do not refer patients to a dentist	8	16, 7%

In relation to the established collaboration with dental practitioners, 16 respondents reported that they have such collaboration, but refer patients only if the child presents with subjective complaints. Nearly 20% stated that they also maintain communication with a dental practitioner and refer patients accordingly. About 30% of the participants indicated that they do not have established communication or collaboration with a dental specialist and instead direct children to their personal dentist. A small proportion of respondents (n=8) noted that they neither have established communication with a dental specialist nor refer patients to one.

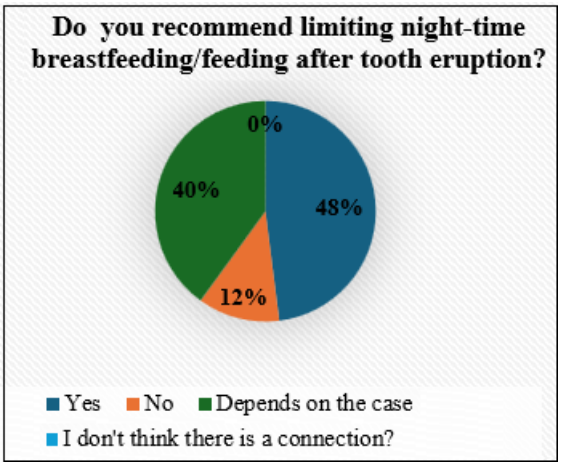

Figure 7: Pediatricians' responses regarding nighttime breastfeeding after tooth eruption

With respect to recommendations on limiting nighttime breastfeeding/feeding after tooth eruption, the majority of respondents (n=23) reported giving positive advice. Another group (n=19) stated that they provide such recommendations depending on the specific case. A smaller proportion (n=6) indicated that they do not give any advice on limiting nighttime feeding/breastfeeding.

To the question "Do you think that emotional breastfeeding/breastfeeding on demand or for comfort creates a risk for the development of caries in primary teeth?", 25 pediatricians (52.2%) responded that it does create a risk, while 18 (37.5%) did not consider breastfeeding a risk factor. The remaining 5 (10.4%) did not believe there is a connection.

Table 2: Pediatricians' responses regarding the relationship between emotional breastfeeding and the risk of caries in primary teeth

Answer	Count (n)	Процент (%)
Yes, it creates a risk	25	52, 2%
No, it does not pose a risk	18	37, 5%
There is no association	5	10, 4%

Most of the surveyed pediatricians (52.2%) believe that emotional breastfeeding/breastfeeding for calming poses a risk of caries in primary teeth, especially after the eruption of the first teeth. In addition, all respondents expressed the opinion that frequent consumption of sugary foods is associated with an increased risk of developing carious lesions.

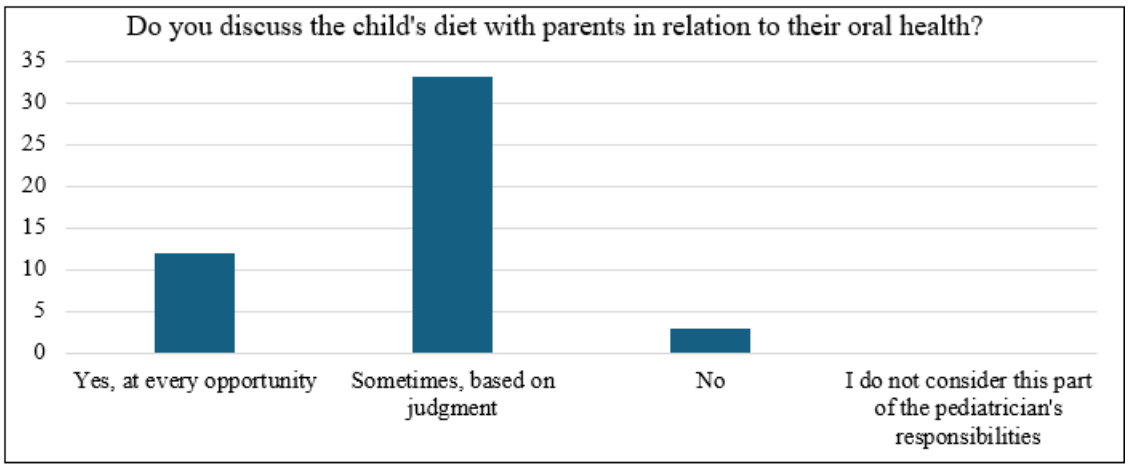

Figure 8: Pediatricians' responses regarding discussions with parents about the child's diet

With regard to discussing the child's diet with parents in the context of dental health, a significant proportion of pediatricians (n=33) indicated that they address the topic depending on the case. Another group (n=12) reported that they discuss the child's diet whenever possible, while only three respondents stated that they do not raise this topic with parents.

Table 3 presents the results concerning pediatricians' knowledge about fluoride.

Table 3: Pediatricians' responses regarding recommendations for the use of fluoride toothpaste

Answer	Percentage	Процент (%)
Yes, regularly	6	12, 5%
Yes, if the parent asks	21	43, 8%
No, I do not, I recommend consultation with a dentist	18	37, 5%
No, I am not sufficiently informed about the effect of fluoride on teeth	3	6, 3%

Regarding recommendations for the use of fluoride toothpaste, 43.8% of participants reported that they recommend fluoride toothpaste only if the parent asks. A further 37.5% stated that they do not recommend fluoride toothpaste themselves but refer this question to a dental practitioner. A relatively small proportion of respondents (12.5%) reported that they regularly provide recommendations for the use of fluoride toothpaste. Only three pediatricians (6.3%) indicated that they are not sufficiently informed about the action of fluoride, which is the reason they do not recommend its use.

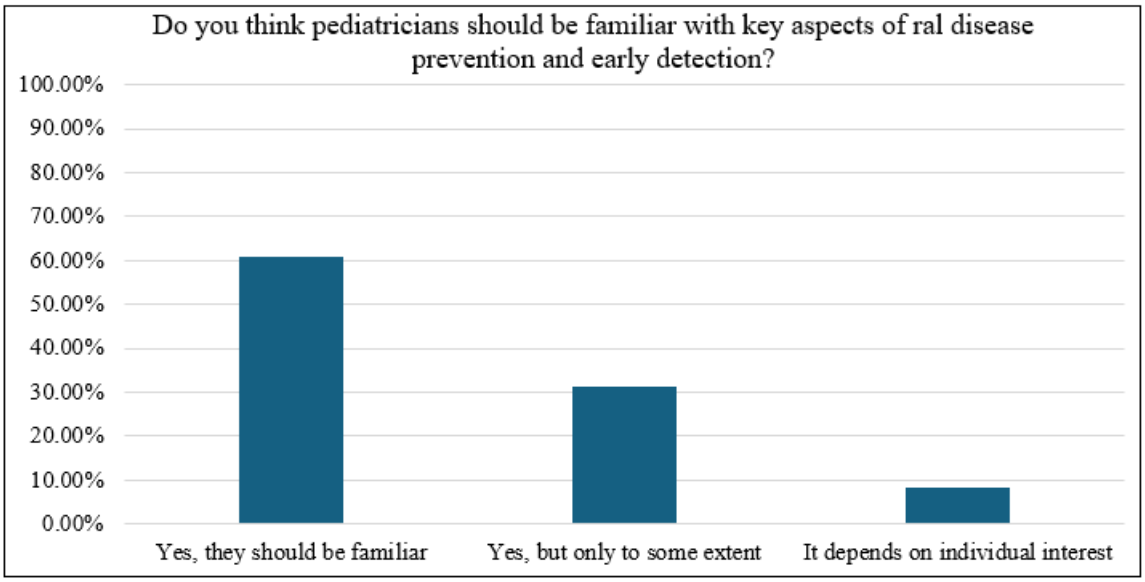

Figure 9: Distribution of pediatricians and their awareness of the key aspects of prevention and early detection of oral diseases in children

When asked whether pediatricians should be familiar with the key aspects of prevention and early detection of oral diseases, 29 respondents (60.9%) stated that it is necessary for them to be knowledgeable about these aspects. Another group (31.3%) noted that pediatricians should be familiar, but only to a certain extent. Only 4 respondents (8.3%) expressed the opinion that this depends on the individual physician's interest.

4. Discussion

This study aimed to evaluate the knowledge, attitudes, and practices of pediatricians in Bulgaria concerning children's oral health, identifying gaps and opportunities for enhancing oral health integration in pediatric care. The survey, conducted among 48 pediatricians, revealed that while 77.1% recognized the link between oral and general health (figure 2), inconsistencies exist in providing anticipatory guidance, collaborating with dental professionals, and addressing dietary and fluoride-related recommendations. Notably, only 35.41% discussed oral hygiene at every visit, 20.8% had established communication with dentists, and 43.8% recommended fluoride toothpaste only when prompted (figure 3). These findings highlight the need for enhanced training and system-level support to align practices with American Academy of Pediatrics (AAP) recommendations.

The findings of this study provide valuable insights into the awareness, attitudes, and practices of pediatricians in Bulgaria regarding children's oral health. The results align with global trends indicating that while pediatricians recognize the importance of oral health, there are gaps in consistent application of preventive practices, collaboration with dental professionals, and provision of anticipatory guidance, consistent with challenges identified in the literature [1, 5, 6].

A significant proportion of pediatricians (77.1%) acknowledged the connection between oral health and children's overall health, which is encouraging (figure 2). However, the 14.6% who did not consider oral health influential and the 8.3% who were unsure suggest a need for targeted education to reinforce the systemic impact of oral health, such as its links to nutrition, speech development, and chronic conditions like diabetes or cardiovascular disease [7]. This knowledge gap may hinder proactive engagement in oral health prevention.

Recent literature further supports the association between poor oral health and developmental outcomes, including speech and language development, oral health-related quality of life, and school performance. A 2024 rapid review found that early childhood caries and premature tooth loss are associated with changes in speech sounds, physical and psychomotor deficiencies, and increased preschool absenteeism, underscoring the need for health professionals—including pediatricians—to implement strategies that address these impacts [8]. The review also notes that oral health professionals and pediatricians should collaborate to ensure children reach their developmental potential.

The US Preventive Services Task Force and the American Academy of Pediatrics both emphasize that pediatricians are often the first point of contact for young children and are uniquely positioned to address oral health as part of comprehensive care, but that barriers such as lack of training and awareness of systemic links persist [7]. These knowledge gaps may limit pediatricians' ability to identify and address oral health issues that contribute to nutritional deficiencies, speech delays, and increased risk for chronic conditions, reinforcing the need for targeted education and interprofessional collaboration.

Our study revealed variability in communication practices with parents. Only 35.41% of pediatricians discussed oral hygiene at every visit, while 39.58% addressed it only when prompted by parental complaints, and 16.67% rarely engaged in such discussions (figure 3). Regular discussions about oral hygiene, including brushing techniques and dietary habits, are essential for preventing early childhood caries (ECC), particularly in children under 3 years, where caries prevalence remains high globally.

Communication practices between pediatricians and parents regarding oral hygiene are indeed variable. A recent survey of Australian pediatricians found that only 10% reported broaching the issue of oral health with all patients, while a larger proportion addressed it only when prompted by parental complaints or rarely discussed it at all. The most frequently cited barriers to regular discussion were lack of professional training (52%) and competing priorities during visits (67%) [9]. These findings are consistent with US data showing that oral health activities such as caries risk assessment and oral screening remain underutilized in pediatric practice, with time constraints and limited training identified as persistent barriers [5].

Building on the need for proactive oral health education, our survey data indicate that 43.8% of pediatricians provided fluoride recommendations reactively, rather than proactively as part of routine anticipatory guidance (table 3). This practice pattern is corroborated by a 2024 cross-sectional study of US pediatric and family medicine providers, which found that recommendations for fluoride toothpaste were often reactive, with lack of time and limited training cited as key barriers to regular oral health counseling [10]. Such variability in provider practices is concerning given the robust evidence supporting fluoride's efficacy in caries prevention.

The United States Preventive Services Task Force, in its systematic review, found that topical fluoride—including fluoride toothpaste—significantly reduces the incidence of dental caries in children under 5 years, with a pooled risk ratio of 0.80 for incident caries compared to placebo or no fluoride intervention. [4-5] These findings underscore the importance of routine, not just reactive, recommendations for fluoride use in pediatric populations. Randomized trials and systematic reviews confirm that regular oral health education by primary care clinicians reduces the risk of incident dental caries in young children [10, 11]. The literature also notes that suboptimal frequency of these discussions is often attributed to time constraints and limited training among pediatricians, which may hinder proactive engagement in oral health prevention [9].

Collaboration with dental practitioners was another area of concern. Only 20.8% of pediatricians reported established communication with dentists, while 33.3% collaborated only when needed, and 16.7% did not refer patients at all (table 1). The AAP advocates for a dental home by age 1 and emphasizes interprofessional collaboration to ensure timely referrals [1, 4]. The limited collaboration observed in this study may reflect systemic barriers, such as a lack of referral networks or communication channels, which could be addressed through shared care protocols and interprofessional education [5, 6]. Encouragingly, 70.8% of respondents recommended a first dental visit between ages 1 and 3, aligning with AAP guidelines, though the 64.6% who did not advise parents on visit timing represent a missed opportunity for early intervention (figure 5).

Dietary counseling, particularly regarding nighttime feeding and sugary product consumption, showed mixed results. While 52.2% of pediatricians viewed emotional breastfeeding or on-demand feeding as a caries risk factor, 37.5% did not, indicating a need for clearer evidence-based guidance on this topic (table 2). The unanimous recognition of sugary products as a risk factor for caries is a strength, but only 25% of pediatricians discussed diet proactively, suggesting that dietary counseling could be better integrated into routine visits. Limiting nighttime feeding after tooth eruption, as advised by 47.9% of respondents, is a critical preventive measure, and increasing its adoption could reduce ECC incidence [1].

This recommendation is further supported by recent observational and interventional studies demonstrating that limiting nighttime feeding after tooth eruption reduces the risk of early childhood caries. Case-control data show that sleep-time feeding—whether breastfeeding or bottle-feeding—after tooth eruption is associated with a markedly increased risk of caries, with adjusted odds ratios ranging from 3.7 to 8.3 depending on the timing and type of feeding, and the addition of sweeteners further amplifies this risk [13]. Meta-analytic evidence also indicates that nocturnal breastfeeding beyond 12 months increases the risk of caries compared to no nocturnal feeding [14].

Population-based cohort studies confirm that feeding practices involving high-frequency nighttime exposure to sugars are independently associated with caries prevalence in preschoolers, even after controlling for confounders such as socioeconomic status and overall sugar intake [15]. Educational interventions targeting caregivers to modify feeding practices—including limiting nighttime feeding—have demonstrated a probable reduction in caries incidence, with a relative risk reduction of approximately 15% in randomized trials [11].

The perception of responsibility for oral disease prevention was positive, with 60.9% of pediatricians feeling responsible and 31.3% believing they should be informed to some extent (figure 9). This aligns with the AAP's call for pediatricians to act as advocates for oral health [1, 3]. However, the 8.3% who viewed it as a matter of personal interest highlight a subset of practitioners who may require additional motivation or training to embrace this role fully.

5. Conclusion

This study highlights that while Bulgarian pediatricians recognize the importance of oral health, gaps in knowledge, communication, and collaboration with dental professionals persist. Addressing these through targeted education, system-level support, and policy changes could enhance pediatricians' role in preventing early childhood caries and promoting comprehensive child health. By aligning practices with AAP recommendations, pediatricians in Bulgaria can contribute significantly to reducing the burden of oral disease in young children.

Funding: none

Conflict of interest: none

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