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The child's first dental visit. Age, reasons, oral health status and dental treatment needs among children in Southern Poland

ABSTRACT

Aim The aim of this study was to determine the age at and the reasons for the child's first dental visit, and to assess the oral health status and treatment needs in the analysed group of paediatric patients.

Material and methods The study involved 320 children (154 girls and 166 boys) aged between 0.7 months and 13.5 years, visiting the dentist for the first time. All parents/legal guardians of the study participants gave written informed consent for participation in the study. Data on the child's age and reason for the dental visit were collected from interviews with parents. The state of oral health and dental treatment needs were assessed based on clinical examination, according to recommendations of the World Health Organization. Statistical analysis: collected data were entered into an Excel spreadsheet and analysed using IBM SPSS software (version 24). Research hypotheses were verified using the Chi-square independence test at the level of statistical significance $p < 0.05$.

Results The mean age of children at their first dental

visit was 3.79 years (+/- 1.82 years). The most common reasons (60%) for the first dental visit were pain followed by dental caries (33.1%) and the presence of decayed teeth (26.9%). The frequency of caries in the population was 75.9%, which means that only one out of four examined children was free from dental caries. Only 23.1% of patients did not require dental treatment and as many as 76.9% of the studied population needed dental treatment.

Conclusions Polish children make their first dental visit too late (usually at the age of 4 years) in relation to medical recommendations (between 6 and 12 months of life). The predominant reason for the child's first dental visit is caries and its complications. The results of this study indicate the bad oral health of Polish children making their first dental visit and low health awareness of parents and guardians.

Keywords Dental caries, Dental treatment needs, First dental visit, Oral health.

Introduction

Dental caries is still a very serious health problem in the paediatric population in Poland. Findings from aepidemiological studies carried out by the Ministry of Health under the programme "Monitoring of oral health in the Polish population" indicate the poor dental status of Polish children: caries affects as many as 53.8% of 3-year-olds, 79.9% of 5-year-olds, 85.6% of 6-year-olds, and 90.5% of 7-year-olds [Monitoring of Oral Health in the Polish population, 2013-2015]. Over 60% of 3-year-olds and about 25% of 5-year-olds in Poland have never visited a dentist [Monitoring of Oral Health in the Polish population, 2013-2015, 2016-2020]. Such a high incidence of caries in young children is disturbing, and reaching the oral health goal formulated by the World Health Organization for the year 2020, when at least 80% of 6-year-olds should be caries free, will be very difficult [Monitoring of Oral Health in the Polish population, 2016-2020; Strużycka et al., 2014]. The observed health profile of Polish children is determined by many factors, and the most important of them include the lack of an effective model of dental health care aimed at prophylaxis and treatment, and the low awareness of healthy behaviour among parents [Szymańska and Szalewski, 2011]. One of the reasons for unsatisfactory dental health among the youngest population is the delay in the first visit of the child to the dentist. The American Academy of Pediatric Dentistry (AAPD) and the American Dental Association (ADA) recommend that the child's first visit to the dentist should take place within 6 months of eruption of the first primary tooth and no later than at the age of 12 months [American Academy of Pediatric Dentistry, 2014; American Dental

Association, 2000], while other sources suggest 12–18 months as the optimal time for the first visit [Adamowicz-Klepalska, 2009; Marcinkowska et al., 2013B]. Argentine researchers Furze and Basso [2003] indicate, that the first dental visit of a preventive character should take place about the fourth month of intrauterine life. During this visit the expectant mother receives information about caries, its infectivity, is instructed that the mother is the main source of transmittable *Streptococcus mutans*, and is advised on how to provide oral care to the child and possible preventive procedures. The aim of this visit is to stimulate the interest of the pregnant woman in her own health, but also in the health of her unborn child [Furze and Basso, 2003].

It is extremely important that the first adaptation visit of a child to the dentist takes place at an early stage of the child's life, and no later than 18 months of age. The purpose of this early visit is not only to assess child's dentition, but first and foremost to give parents guidance on proper child's oral hygiene, to correct improper dietary and eating habits, to provide information on the infectivity of dental caries and factors affecting the development of malocclusions, to improve knowledge of the risks for traumatic injuries, and to advice on caries prevention. Information presented to parents at the first visit may stimulate greater interest in the child's dental health, and consequently may mitigate the course of caries [Hale and Shah, 2001; Paulsen, 2003]. After that, the child should have regular visits to the dentist (every 6 months) to check the dental conditions, implementation of preventive procedures, early detection of caries, and preparation of the young patient for potential dental treatments [Grzesiak and Kaczmarek, 2006]. It is worth noting that the child's first dental visit has a significant impact on shaping a positive attitude towards further treatments, and helps to develop trust in the dentist [Kaczmarek, 2009; Wilk-Sieczak et al., 2005].

Aim

the aim of this study was to determine the age at and the reasons for the child's first dental visit, and to assess the oral health status and treatment needs in the analysed group of paediatric patients.

Materials and methods

The study group consisted of 320 children, who had their first dental visit (154 girls, 48.13% and 166 boys, 51.88%). All subjects were from Małopolskie province (Southern Poland): 173 (54.06%) lived in rural areas and 147 (45.94%) lived in urban areas (99 children in towns with a population up to 100,000 and 48 children in cities with a population over 100,000). The study was carried out in four private dental clinics by four dentists, following study protocol no. AMW1, approved by the Bioethics Committee of the Regional Medical Chamber in Kraków, decision no. 214/KBL/OIL/2016 of 12 December 2016.

All parents/legal guardians of the study participants gave written informed consent for participation in the study. Data on the child's age and reason for the dental visit were collected from interviews with parents. Four reasons for the child's first dental visit were identified based on interviews: 1. adaptive visit (A); 2. tooth pain (T); 3. decay noted by parents (D); 4. tooth injury (I). The adaptive visit (A) was defined as a prophylactic examination of a child, and a visit for preventive purposes, while a visit due to tooth pain (T), decay (D) and tooth injury (I) were grouped together as visits due to the need for dental treatment and intervention. The state of oral health and dental treatment needs were assessed based on clinical examination, using a dental mouth mirror and a dental probe under a shadow-free lamp, according to recommendations of the World Health Organization. The total number of teeth and number of teeth affected by decay (d,D) in every child were recorded. The intensity of caries was estimated based on the average dmf/DMF number, i.e. caries intensity index. Because all children had no previous dental treatment, the number of teeth missing due to decay (m, M) and the number of teeth filled (f,F) were assumed to be 0. The frequency of caries was calculated using the formula:

$$\frac{\text{number of children with caries}}{\text{number of examined children}} \times 100\%$$

Frequency of caries = number of examined children x 100%

Collected data were divided into two main categories:

1. children visiting the dentist for prophylactic and adaptive reasons (A);
2. children visiting the dentist due to the need for dental treatment and intervention (NT).

The NT group was divided into 3 subgroups:

- subgroup (T) children visiting due to tooth pain;
- subgroup (D) children visiting due to decay noted by parents;
- subgroup (I) children visiting due to tooth injury.

Statistical analysis

Collected data were entered into an Excel spreadsheet and analysed using IBM SPSS software (version 24). Research hypotheses were verified using the Chi-square independence test at the level of statistical significance $p < 0.05$.

Results

Of 320 children only 36.9% (118) made their first visit to the dentist for adaptive and preventive purposes (A). As many as 63.1% of children (202) made their first visit due to the need for dental treatment (NT); of these 106 (33.13%) had tooth pain (T), 86 (26.88%) had decay noted by parents (D) and 10 (3.13%) had tooth injury (Fig. 1).

The mean age of patients was 3.79 years (SD=1.82). Only 0.63% (2/320) of them had their first visit to the dentist before the age of 1 year, 26.88% (86/320) between age 1

and 3, 64.69% (207/320) between age 3 and 7, and 7.8% (25/320) at the age of 7 or later.

The youngest patient was a 7-month-old boy who had an adaptive visit to the dentist. He had 2 erupted teeth, neither with decay (d=0), dmf index= 0, and required no treatment. The oldest child who had the first visit to the dentist was a boy aged 13.5 years, and the visit was due to tooth pain. The boy had 25 permanent teeth, one tooth with decay (D=1), DMF index =1, and required surgical treatment.

The group of 118 children (36.88% of all subjects), who came for the adaptive visit (A) for prophylactic purposes was comprised of 59 girls and 59 boys. Fifty-seven of these patients lived in rural areas (48.30% of group A, and 17.81% of all analysed subjects), and 61 lived in urban areas (51.70% of group A and 19.07% of all analysed subjects) (Table 1). The mean age of patients in this group was 3.25 years (SD=1.54). The youngest patient who came for an adaptive visit (A) was a 7-month-old boy from a village. He had 2 erupted teeth, neither with decay (d=0), dmf index= 0, and required no treatment. The oldest patient who made an adaptive visit (A) was a boy aged 8.09 years from a village. The boy had 14 deciduous teeth and 10 permanent teeth, 3 decayed deciduous teeth (d=3), no decayed permanent teeth (D=0), dmf/DMF index =3, and required conservative dental treatment.

The group of 202 children (63.12% of the total number) who visited the dentist due to the need for dental treatment and intervention (NT) was comprised of 107 girls and 95 boys; 116 of these patients lived in a rural area (57.42% of group NT, and 36.25% of all analysed subjects), and 86 lived in an urban area (42.58% of group NT and 26.87% of all analysed subjects) (Table 1). The mean age of patients in this group was 3.99 years. Analysis of individual subgroups: visit due to tooth pain (T), visit due to decay noted by parents (D) and tooth injury (I), yielded the following results.

- Subgroup (T): 106 children (33.13% of all patients) visiting the dentist due to tooth pain, 58 girls and 48 boys; 65 from a rural area (61.32% of subgroup B and 20.31% of all patients), 41 from an urban area (38.68% of subgroup T and 12.81% of all patients). The mean age in subgroup T was 4.35 years (SD=1.74). The youngest patient who made a visit due to tooth pain (T) was a 2.08 year-old girl from a small town. She had 15 erupted teeth, 8 teeth with decay (d=8), dmf index = 8, and required conservative dental treatment. The oldest patient who came for the first visit due to tooth pain (T) was a 13.5 year-old boy from a village. The boy had 25 permanent teeth, one tooth with decay (D=1), DMF index =1, and required surgical treatment.
- Subgroup (D): 86 children (26.88% of all respondents) visiting the dentist for the first time due to decay noted by parents, 46 girls and 40 boys; 45 from a rural area (52.32% of subgroup D and 14.06% of all patients), 41 from an urban area (47.68% of subgroup D and 12.82% of all patients). The mean age of patients in

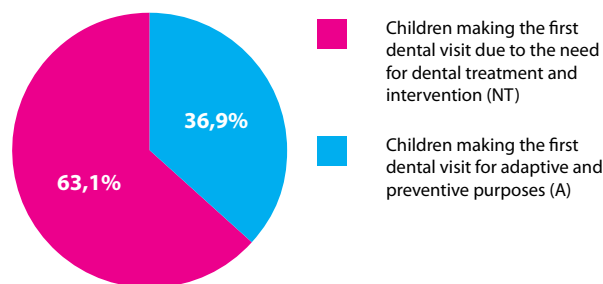


FIG. 1 Reasons for the first dental visit in the population analysed.

	urban area (U)	rural area (R)	total (U+R)
adaptive visit (A)	19.07% (61 subjects)	17.81% (57 subjects)	36.88% (118 subjects)
visit for dental treatment (NT)	26.87% (86 subjects)	36.25% (116 subjects)	63.12% (202 subjects)
total (A+NT)	45.94% (147 subjects)	54.06% (173 subjects)	100% (320 subjects)

TABLE 1 The number and percentage of children from urban and rural areas making an adaptive visit (A) and a visit due to the need for dental treatment (NT).

subgroup D was 3.84 years (SD=2.06). The youngest patient who made the first visit due to decay noted by parents (D) was a 1.3 year-old girl from a village. She had 11 erupted deciduous teeth, 4 teeth with decay (d=4), dmf index = 4, and required conservative dental treatment. The oldest patient making the first visit due to decay noted by parents (D) was an 11.4 year-old girl from a village. She had 5 deciduous teeth, 18 permanent teeth, 2 deciduous teeth with decay (d=2), 3 permanent teeth with decay (D=3), dmf/DMF index = 5, and required conservative and surgical treatment.

- Subgroup (I): 10 children visited the dentist due to tooth injury, 3 girls and 7 boys; 6 children from a rural area (60% of subgroup I and 1.88% of all patients) and 4 children from an urban area (40% of subgroup I and 1.25% of all patients). The mean age of patients in subgroup I was 3.8 years (SD=1.99). The youngest patient who visited the dentist due to tooth injury (tooth 51) was a 1.7-year-old boy from a town. He had 14 erupted deciduous teeth, no teeth with decay (d=0), dmf index = 0, and required conservative dental treatment. The oldest patient who visited the dentist due to tooth injury was an 8-year-old girl from a town. She had an injury of a tooth no.21. The girl had 11 permanent teeth and 12 deciduous teeth, 3 deciduous teeth with decay (d=3), no permanent teeth with decay (D=0), dmf/DMF index =3, and required conservative treatment.

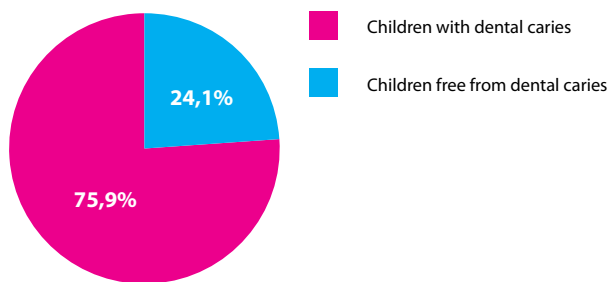


FIG. 2 Frequency of dental caries in the group of children making the first dental visit.

Group	Frequency of dental caries (%)
A	38.98%
T	100%
D	100%
I	50%

TABLE 2 Frequency of dental caries in subgroups:

- A - children visiting the dentist for adaptive purposes
- T - children visiting due to tooth pain
- D - children visiting due to decay noted by parents
- I - children visiting due to tooth injury

The differences in the reason for the first dental visit between children from rural and urban areas ($p=0.415$) or between boys and girls ($p=0.472$) were not statistically significant. The percentage share of individual groups, both in urban and rural areas, and the percentage of boys and girls was similar, and there was no significant correlation between these variables ($p>0.05$).

Decay (d,D) affected 243 children out of all 320 analysed, and the frequency of caries was 75.9%. Only 77 (24.1%) children were free from decay (Fig. 2).

Differences in the frequency of caries between individual groups were statistically significant ($p=0.012$) (Table 2).

- In the group of 118 children who made the first adaptation visit (A), 72 were free from decay ($d,D=0$), and 46 had deciduous teeth affected by decay ($d>0, D=0$). The frequency of caries in the group of children who made the adaptive visit (A) was 38.98%.
- The group of 202 children who made the first visit due to the need for dental treatment and intervention (NT) included 5 children free from decay ($d,D=0$) and visiting the dentist due to tooth injury, and 197 children had teeth with decay ($d,D>0$). The frequency of caries in group (NT) was 97.52%, and in the subgroups: visit due to tooth pain (T), visit due to decay noted by parents (D), and visit due to tooth injury (I) the following results were obtained:
- All 106 children who visited the dentist due to tooth

pain (T) had decayed teeth ($d,D>0$). The frequency of caries in children visiting the dentist due to tooth pain (T) was 100%.

- All 86 children who visited the dentist due to decay noted by parents (D) had teeth with decay ($d,D>0$). The frequency of caries in this group (D) was also 100%.
- In the group of 10 children who visited the dentist due to tooth injury (I) 5 were free from decay ($d,D=0$), and 5 had deciduous teeth affected by decay ($d>0,D=0$). The frequency of caries in the group of children visiting the dentist due to tooth injury (I) was 50%.

The mean dmf/DMF index for the total analysed paediatric population visiting the dentist for the first time was 3.82, and its components were as follows: the number of deciduous teeth with decay $d=1202$, the number of permanent teeth with decay $D=21$, while in all analysed subjects the number of teeth missing due to decay (m,M) and number of teeth filled (f,F) was assumed as 0.

The mean dmf/DMF index for individual groups and subgroups was as follows.

1. Group (A): $d=142, D=0$; mean dmf/DMF index=1.2.
2. Group (NT): $d=1060, D=21$; mean dmf/DMF index=5.35;
 - subgroup (T): $d=641, D=10$; mean dmf/DMF index=6.14;
 - subgroup (D): $d=402, D=11$; mean dmf/DMF index=4.8;
 - subgroup (I): $d=17, D=0$; mean dmf/DMF index=1.7.

The highest value of dmf/DMF index was found for a boy aged 2 years and 9 months, living in a town, who made his first visit to the dentist due to tooth pain and required conservative dental treatment.

The assessment of needs for prevention and dental treatment in the studied population of 320 patients revealed as follows.

216 children (67.5% of the total number) required conservative treatment for caries (subjects with $d,D>0$), 25 children (7.8%) required conservative and surgical treatment for caries-related complications (tooth extraction), and 2 children (0.6%) required only surgical treatment for caries-related complications (tooth extraction). In the group of 77 children free from caries ($d,D=0$), 3 patients visiting the dentist due to tooth injury were recommended conservative treatment (0.9%), and another 74 patients with $dmf/DMF=0$ required no treatment (23.1%) and were recommended regular check-up visits for prophylaxis. In total 219 (68.4%) patients required conservative treatment (Fig. 3).

There were statistically significant differences in the needs for dental treatment and prevention between the groups ($p=0.000$). In the group of 118 children who made an adaptive visit to the dentist (A) 44 required conservative treatment, 2 required surgical and conservative treatment, and another 72 required no treatment and were given

advice on prophylaxis.

All children (106) visiting the dentist due to tooth pain (T) required treatment: 90 conservative, 14 conservative and surgical, and 2 surgical. In the group of 86 children with decay noted by parents (D) 78 patients required conservative treatment, and 8 required conservative and surgical treatment. In the group of 10 children with tooth injury (I) 7 required conservative treatment (including 4 children with caries and 3 without caries), one patient required conservative and surgical treatment, and 2 patients required no treatment, just prophylaxis.

The youngest patient who required surgical treatment (tooth extraction) due to caries-related complications was a boy aged 2.3 years, living in a town, and visiting the dentist due to toothache. He had 18 erupted teeth in total, 9 affected by decay $d=9$, dmf index=9, and 6 teeth qualified for extraction.

Discussion

The optimal time for the first dental visit is considered to be 6-12 month of a child's life [American Academy of Pediatric Dentistry, 2014; Rayner, 2003], but some sources suggest 12-18 months [Adamowicz-Klepalska, 2009; Marcinkowska et al., 2013b]. However, Polish children make their first visit to the dentist later than they should. Aepidemiological studies conducted by the Ministry of Health show that more than 60% of children aged 3 years and about 25% of children aged 5 have never been to the dentist [Monitoring of Oral Health in the Polish population, 2013-2015, 2016-2020]. A study conducted by Grzesiak and Kaczmarek [2006] in 1.5-3-year-olds demonstrated that 33% of children made their first visit to the dentist at a mean age of 2.7 years. Marcinkowska et al. [2013b] reported that 22% of 4-6-year-olds have never been to the dentist, and the mean age at the time of the first visit was 2.9 years. Nainar and Straffon [2003] analysed children from Iowa, USA, younger than 3 years, and reported that only 2% of them visited the dentist before age 1, 11% before age 2, and 31% before age 3. Studies by Slayton et al. [2002] also carried out in the USA among children younger than 3 years showed that only 2% of parents declared that their child had the first visit to the dentist before age 1. Savage et al. [2004] found that in North Carolina, USA, 73% of children under 5 years had never been to the dentist.

Indian researchers reported an older age range for the child's first dental visit: Nino et al. [2010] indicated that children visit the dentist for the first time at age 7, while a retrospective study by Meera et al. [2008] found that 59% of children have their first visit at the age of 6-12 years, and only 8.52% by the age of 3 years. Studies carried out in Bulgaria by Mileva and Kondeva [2010] revealed that the greatest number of children making their first dental visit were 3-6-year-olds (51.9%), and the smallest number were those younger than 1 year (1.73%). Ghimire et al.

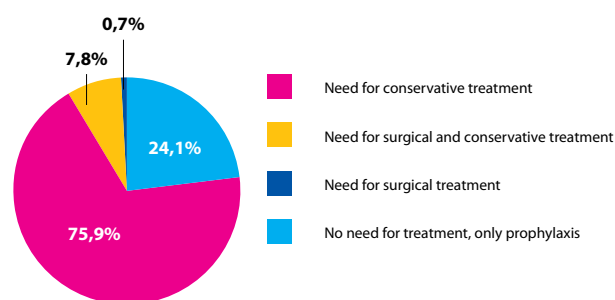


FIG. 3 Distribution of needs for dental treatment and prevention in the studied population.

[2013] reported that in Nepal most children making their first dental visit were 7-11-year-olds (52.7%), and only 7% were younger than 3 years. Studies by Murshid [2016] found that in Saudi Arabia most children visit the dentist at the age of 3-5 years (52.9%), and less often at the age under 3 years (32.2%). Our study shows that the mean age of children making their first dental visit was 3.79 years, and the oldest patient was a boy aged 13.5 years; 0.63% (2/320) of analysed children younger than 1 year, 26.88% (86/320) of 1-3-year-olds, 64.69% (207/320) of 3-7-year-olds and 7.8% (25/320) of children older than 7 years had their first dental visit.

The most common reason for the first dental visit was the need for treatment: as many as 63.12% of all children (one out of three patients) visited the dentist due to pain, cavities or tooth injury. Only 36.88% of patients made their adaptation visit. Very similar findings were presented by Wilk-Sieczak et al. [2005], who reported that 63% of children made their first dental visit due to the need for treatment (tooth decay, pain). Most mothers in Poland bring their child to the dentist because of noted decay and tooth pain [Chłapowska, 1992; Giermakowska et al., 1994]. International studies also revealed that unfortunately the first dental visit is made due to symptoms, usually pain. Meera et al. [2008] reported that toothache (42.04%) and the presence of decay (28.49%) are the main reasons for the first dental visit; Murshid [2016] indicated toothache (71.5%) as the dominant reason for the first visit followed by check-up (27.3%); Ghimire et al. [2013] mentioned pain (32.4%) and dental caries (26.5%) as the main reasons for the first visit; while Mileva and Kondeva [2010] reported prophylactic examinations in 26.99% of cases, and the first visit was usually caused by symptoms of decay and its complications (59.86%). Daou et al. [2016] conducted a study among Lebanese children and found that dental caries (50.9%) and dental pain perception (29.5%) are the most common reasons for the first dental visit.

Our study did not reveal statistically significant correlations between the following variables: reason for the first dental visit and the place of residence ($p=0.415$), as well as the reason for the first dental visit and the child's sex ($p=0.472$).

We found disturbingly high indices of caries among children making their first dental visit. The frequency of caries for the total study group was 75.9%, which means that only one out of four patients was free from caries. The mean dmf/DMF index for the total studied population was 3.82. Importantly, the highest dmf/DMF index=18 was found for a boy aged 2 years and 9 months, who had only 2 teeth free from caries out of all 20 erupted deciduous teeth. The frequency of caries was 97.52% in the group of children making their visit due to need for dental treatment and intervention and 38.98% in those making their visit for prophylactic reasons. Current evidence indicates low awareness of parents in relation to oral hygiene, and unsatisfactory preventive measures taken within personal primary prevention of caries in the family. Numerous studies point to the lack of an effective model of dental care in Poland in the youngest paediatric population [Marcinkowska et al., 2013a, 2013b; Szatko et al., 2008; Szymańska and Szalewski, 2011]. Actions preventing caries implemented by institutions, such as group prevention at preschool and school populations, do not bring satisfactory results, and currently the main role is played by individual prevention which is performed by child and its parents at home, but it is still not effective enough [Marcinkowska et al., 2013a, 2013b].

The analysis of needs for prevention and treatment in the studied population of children making their first dental visit showed that only 23.1% of patients did not require dental treatment, only prevention. As many as 76.9% of the studied population needed treatment in the following modalities: conservative treatment (68.44%), conservative and surgical treatment (7.81%), and surgical treatment (0.63%). As evidenced by our research, most children making their first dental visit unfortunately have very advanced decay and require dental treatment.

Conclusions

1. Polish children make their first dental visit too late (usually at the age of 4 years) in relation to medical recommendations (between 6 and 12 months of life).
2. The predominant reason for the child's first dental visit is caries and its complications. Every third child makes their first dental visit because of dental pain, and only about one third of children visit the dentist for prophylactic purposes.
3. Children making their first dental visit have on average 3.82 teeth affected by decay. Only one out of four children does not require dental treatment.
4. The results of this study indicate the bad oral health of Polish children making their first dental visit and low health awareness of parents and guardians. There is an urgent need for educating the parents and guardians of young children about dental prophylaxis and healthy behaviours.
5. It is necessary to establish stronger cooperation

between Polish paediatricians, gynaecologists, general practitioners and dentists, and to implement in Poland an effective model of dental care focused on early diagnosis, preparation for treatment, preventive measures, and possibly early dental treatment in the youngest children.

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