

Use of Dentifrices and Fluoride Supplements by Preschool Children – a Pilot Study

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Aim: The purpose of this pilot study was to collect information about tooth brushing habits of preschool children in Targu-Mures and to identify the usage of fluoride (F) supplements.

Material and methods: A structured questionnaire was completed by the parents of 81 children aged 3 to 6 years (37 girls and 44 boys) regarding the tooth cleaning habits of their children and use of F supplements. Chi-square test for independence and trend was used to determine the relation between age of children and quantity of toothpaste used and frequency of tooth brushing, respectively.

Results: All parents claimed that fluoride dentifrices were used and tooth brushing of children was supervised. 24.69% of the children have started tooth brushing before the age of 2 years. Most of the children brushed their teeth at least twice a day (59.25%) and used more than an optimal amount of toothpaste (60.49%). A statistically significant association between children's age and amount of dentifrice used ($p = 0.0496$) and also a significant linear trend ($p = 0.0216$) was found. We also found a significant association ($p = 0.0246$) and a significant linear trend ($p = 0.0029$) between the age of children and frequency of tooth brushing. Only 13.58% of the children received F supplements.

Conclusion: Special attention should be given to the amount of toothpaste used by children younger than 6 years in order to avoid uncontrolled fluoride ingestion. Before administration of F supplements, the fluoride intake from other sources should be investigated.

Keywords: tooth brushing habits, fluoride supplements, preschool children, questionnaire

Introduction

There is strong evidence that fluoride (F) has played an important role in the decline of caries [1,2]. Fluoride toothpaste is the most common source of fluoride and it was introduced in the late '60s and early '70s. There has been a rapid and remarkable increase in its market share, followed by massive decrease in dental caries in many countries during '70s and '80s [1].

Tooth brushing with fluoride toothpaste is close to an ideal public health measure, its use is convenient, inexpensive, culturally approved, and widespread. Using a fluoride dentifrice daily is now considered as a main factor in the substantial decline of dental caries because it combines the regular disruption of dental plaque, the factor responsible for caries, with the therapeutic interference of F with the caries process [3].

The protective action of fluoridated toothpaste is almost exclusively topical but the ingestion of fluoride from this source is frequent, especially by young children. Several studies established that the early use of fluoride toothpaste is one of many factors that may be associated with an increased risk of fluorosis because a high percent of children under the age of 6 years can swallow up to 25–33% of the fluoride toothpaste used for brushing. It is a fact that their swallowing reflex is not fully developed at this age [4,5,6,7].

Where fluoride toothpaste is used in conjunction with other fluoride vehicles, the cumulative effect of fluoride must be taken into account for children younger than 6

years. Fluoride may be present in diet, mainly in fish and tea, fluoridated water, salt or milk and fluoride supplements [1,6,8]. Care must be taken to ensure that a balance is maintained between the prevention of dental caries and minimizing the risk of dental fluorosis [9]. Fluoride excretion may be a good indicator of fluoride intake especially in first infancy children, who are susceptible to develop dental fluorosis [10,11,12].

The purpose of this pilot study was to collect information about tooth brushing habits and toothpaste used among 3 to 6 years old children in Tîrgu Mureș and also to identify others sources of fluoride, especially fluoride supplements, in order to estimate the fluoride intake in this age group.

Material and method

Our pilot study was based on a questionnaire regarding tooth brushing habits and use of fluoride supplements by children aged 3 to 6 years in Tîrgu Mureș. Questionnaires were delivered to randomly selected kindergartens in Tîrgu Mureș and parents were asked to complete them. We collected the following data: age at which the children began tooth brushing; frequency of tooth brushing; parental supervision; type (fluoridated or non-fluoridated) and amount of toothpaste used; and the use of fluoride supplements, such as drops, tablets and vitamins.

Results were introduced into a data base and statistic analysis was performed with statistical software GraphPad InStat 3.10. Chi-square test for independence and trend was applied in order to determine the relation between children's age and the quantity of toothpaste. The relationship between the age of children and the frequencies of

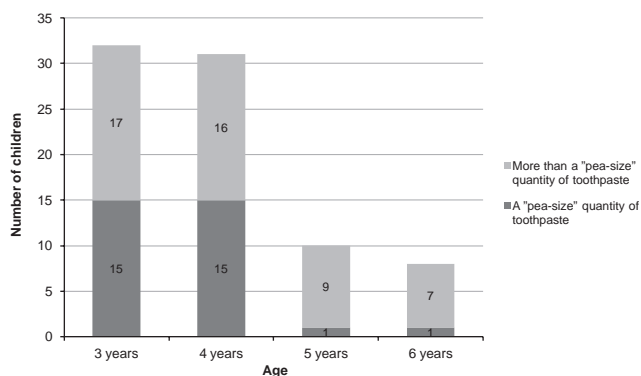


Fig. 1. Relationship between children's age and quantity of toothpaste used

tooth brushing was assessed using also chi-square test for independence and trend, and p value less than 0.05 was considered statistically significant.

Results

Out of 105 questionnaires, 81 were completed entirely and correctly (response rate 77.14%).

The survey comprised 37 (45.68%) girls and 44 (54.32%) boys. The subjects mean age was 3.9 (SD 0.9) years. Age groups distribution was as follows: 39.51% aged 3 years; 38.27% aged 4 years; 12.35% aged 5 years and 9.88% aged 6 years.

All children used fluoride content dentifrice. Most of the children included in the study were using an amount of toothpaste that covers more than a quarter of the tooth-brush surface (60.49%), and 13.58% of the subjects used dentifrice for adults. 24.69% of the children have started to brush their teeth before the age of two years. More than half of the subjects (59.25%) brush their teeth at least twice a day. A few children (13.58%) used fluoride supplements (tablets) and from these, only three without a medical recommendation.

Between children's age and the quantity of toothpaste used, a statistically significant association was found ($p=0.0496$). Chi-square test for trend showed that there was also a significant linear trend ($p=0.0216$) (Figure 1).

Regarding the age of children and the frequency of tooth brushing a statistically significant association was found using chi-square test for independence ($p=0.0246$). Between these two parameters significant linear trend could be observed ($p=0.0029$) (Figure 2).

Discussions

It was estimated that more than 90% of the children brush their teeth using toothpaste before aged 2 years and most of them twice a day. A significant number of children brush their teeth without adult supervision [2,9]. Our study revealed that much less children started tooth brushing before the age of 2 years and all of them are supervised by parents. Previous studies highlighted that even the children comprised in the study used mostly children's toothpaste (with low concentration of F), in some cases the F

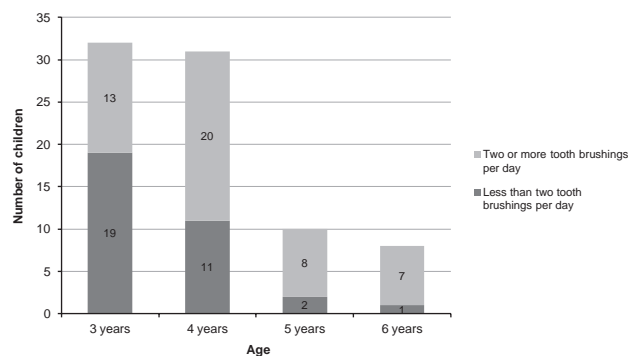


Fig. 2. Relationship between children's age and frequency of daily tooth brushing

intake evaluated by their urinary excretion exceed the optimal limit (0.03–0.06 mg/kg body weight) [13]. Excluding the intake from other sources, the potential source of F in children was fluoridated toothpaste [14]. In our study an increased number of children used the "family" toothpaste with a higher content of F, which may increase the F intake. Studies regarding ingestion of fluoride by children from children's toothpaste and "family" toothpaste, respectively, were made by Bentley et al. They found a statistically significant difference between these two groups [2].

A study showed that the percentage of fluoride intake was not influenced by the flavor of toothpaste [15]. However, other studies proved that the taste of dentifrices constitutes an important factor in the high level of toothpaste swallowed by children [14]. In our study more than one third of the respondents claimed that taste of the toothpaste was the main factor of their selection. This might enhance the amount of swallowed tooth paste, however, current study was not performed to evaluate this issue.

It has been reported that even in regions considered non-endemic area for dental fluorosis, according to its low concentration of fluoride in drinking water, children comprised in the study presented epidemiological indicators of overexposure to F [14]. The risk of fluorosis is related to the dose of fluoride ingested and is a function of both the amount of toothpaste ingested and its fluoride concentration. Recently, a "pea-size" or "smear" of fluoride dentifrice has been more consistently recommended for preschoolers [5,15,16]. The current study showed that most of the children used more toothpaste each time.

The use of F supplements has decreased in the last decades as a result of numerous studies which have shown that the anti-caries effect of fluoride were primarily topical and the systemic benefits are minimal [9,16,17]. Our pilot study confirmed this trend. However, it seems distressing that some respondents provided fluoride supplements for their children without medical recommendation.

There have been some reports where no association was found between the F supplement usage and the development of fluorosis [11,18]. In one of these studies the fluorosis found in 322 children was attributed to the swallowing of fluoride toothpaste rather than to the supplements

[18]. On the other hand, there is a vast literature in which fluorosis has been associated with the use of F supplements [16,19]. Therefore, before recommending any F supplements, the dentists should estimate the fluoride intake of the children from all F sources.

It might be argued that the results are not strictly valid on a community basis due to the small number of subjects. However, this pilot study could provide data to evaluate the feasibility of an epidemiological study. Further research is needed to determine the fluoride intake of preschool children in Țirgu Mureș.

Conclusions

In order to avoid uncontrolled F ingestion and the risk of fluorosis in children under six years, parents should be strongly advised:

- ▶ to use dentifrices for children with low fluoride content;
- ▶ to use only a pea-size toothpaste for each tooth brushing;
- ▶ to supervise their children during tooth brushing.

Before administration of fluoride supplements the fluoride intake from other sources should be investigated.

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