

## **Tooth Brushing Schemes in Dubai Schools, A Step Forward in Oral Health Prevention**

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### **Abstract**

**Purpose:** This paper assess the effectiveness of a tooth brushing activity delivered in primary schools in the Emirate of Dubai, UAE as part of a preventive program. The tooth brushing activity was designed with the intention of improving the oral health of young children and emphasizes on the importance of daily good oral hygiene habits.

**Methods and Materials:** The evaluation was based on a pre and post visible plaque index examination, an interview with the school nurse responsible for the follow up and a feedback questionnaire for the parents.

**Results:** Children accepted the activity and they enjoyed participating in daily tooth brushing. Children were more aware of the importance of daily brushing and the consequences of poor oral hygiene. The activity was more successful when the school administration and school nurse embraced and accepted the idea of their students brushing daily in schools.

Feedback from the parents showed children involvement in such an activity were more keen to brush at home and had a positive influence on their siblings.

**Conclusions:** The results of the activity suggest that tooth brushing in schools could be an effective method to encourage and enforce good oral hygiene habits. This paper gives an overview on how this could be implemented and the possibility of setting up policies and guidelines to govern its application in all schools of Dubai.

**Keywords:** Oral Health; Oral Hygiene; Supervised Tooth-Brushing; Schools; Evaluation; Fluoridated Toothpaste

### **Abbreviations**

WHO: World Health Organization; Dmft: Decayed, Missing, Filled teeth; UAE: United Arab Emirates; UNICEF: United Nations Children's Emergency Fund; UNESCO: United Nations Educational, Scientific and Cultural Organization; VPI: Visible Plaque Index

### **Introduction**

The World Health Organization (WHO) considers caries, periodontal diseases, loss of teeth, oral cancers, and trauma as major causes of health burdens [1,2]. Of note, dental cavities can be found in 60-90% of children of school-going age [3]. Not only is there an alarmingly high prevalence of dental disorders worldwide, but there is also sufficient evidence to suggest that the benefits of the current interventions aimed at reducing this burden are not reaching the populations at risk [4].

In similarity with the global trend, surveys in the United Arab Emirates (UAE) [5,6], have also revealed a startlingly high prevalence of various dental diseases. Surveys have revealed that 83% of children aged 5 years are affected by caries; and 52% have 4 or more decayed,

missing or filled teeth (dmft). In a study conducted in Abu Dhabi, an Emirate within the UAE, the mean dmft score was recorded at 8.4, 8.6, and 5.7 for children aged 5 years in various regions of the Emirate [7]. The latest study concentrating at the Emirate of Dubai shows similar high numbers, with caries prevalence of 65%. 10% of these children have more than five teeth with untreated caries [8]. Data from these studies highly suggest that there is an urgent need for action to counter the wide spread dental diseases in the UAE. The WHO has suggested a number of cost-effective and holistic interventions to counter the increasing prevalence of dental diseases [9].

Preschools and Schools provide an important base to promote oral health as they reach large numbers of students who pass on these messages to their families. Schools can make a substantial contribution to a student's health and well-being. This has been increasingly recognized by many international initiatives including those from the World Health Organization (WHO), UNICEF and UNESCO. This means that the oral health messages reinforced in schools will eventually reach the whole community. The early years of a child's life is the most influential time to reinforce habits and attitudes, therefore targeting the students at this age with proper oral health habits will have a lifelong effect. They will be healthier and more productive individuals in their community, having better quality of life with a potential to long term cost saving.

In a study conducted in schools in London Boroughs of Kensington, Chelsea and Westminster on 517 students of daily supervised tooth brushing using fluoridated toothpaste showed promising results in decreasing the level of caries prevalence [9]. In another study, an evaluation of an oral health intervention delivered in selected primary schools for 1000 students in an area of Yorkshire and the Humber in the North of England. The evaluation sought to assess the effectiveness of the intervention and to explore process issues related to its co-ordination and delivery. It aimed to introduce tooth-brushing as a 'life skill' and improve the oral health of young children [11].

The aim of the tooth-brushing scheme was to introduce forms of preventive activities that would decrease the high levels of caries prevalence in the students of Dubai schools. The tooth-brushing in schools scheme is an evidence-based intervention, drawing on principles and learning from comparable programs in Scotland [12] and other research which shows that the application of fluoride toothpaste in a supervised school-based intervention can have a significant effect on children with high caries risk [13].

### Materials and Methods

This paper reports an oral health activity that has been incorporated in the daily schedule of students in schools. Evaluation of the oral hygiene activity that was applied to 1,500 students in seven schools of Emirate of Dubai sought to measure the effectiveness of daily tooth brushing with fluoridated toothpaste on the oral hygiene of students. Schools were randomly chosen to participate and both Private and Government schools were involved. Parents' consents were obtained and children were involved in this activity over a three months period. Special charts were given to the school nurses (oral health coordinators) to distribute in classrooms and were checked daily to follow up on students brushing their teeth after mealtime in school.

Records were checked on a weekly basis and a monthly basis to ensure compliance from the students.

Materials (e.g. brushes, toothpaste and the brushing charts) were provided to all schools. A training session was provided with a workshop for all school nurses involved to ensure proper tooth brushing technique, proper hygiene standards applied to prevent cross-contamination and oral health awareness tips to be given to students. Toothpaste was placed on paper plates to help in infection control and enables the use of one toothpaste tube to be used for more than one student [11].

A dental team of two dentists and two dental hygienists visited each school and conducted dental checkups using the visible plaque index (VPI) in a mobile dental van. Main concentration was to measure the plaque accumulation on the teeth surfaces for the students aged 4 - 6 years, as they were the age group with the highest caries prevalence based on the previous screening conducted in Dubai [8].

Results were recorded for each student on oral hygiene forms and were placed in the student's medical file in the school with the supervision of the school nurse.

A visit to each classroom participating in the tooth brushing scheme was done with the presence of the of the school nurse (oral health coordinator) to check on the charts and tooth brushing storage facility.

Parents were invited on the same day to have an introduction on the tooth brushing scheme and information given on healthy diet and good oral hygiene habits and tooth brushing charts were distributed to help them follow up on the brushing at home.

Follow up from the dental team with oral health coordinator was done on a weekly and monthly basis.

At the end of the three-month activity, a second dental checkup conducted on the students to record the dental plaque accumulation and compared with the previous results. An extensive interview was done with the oral health coordinator and the feedback questionnaire from the parents were collected.

Qualitative and quantitative data was obtained to have a better understanding of the mechanism, experiences, peoples understandings and oral health levels of students [14].

## Results and Discussion

### Results

A data triangulation method was used to collect and analysis the data required to conclude the effectiveness of the tooth brushing activity. Data obtained from three resources, first dental surfaces that were free from plaque, secondly the interview with oral health coordinators in the schools and finally the feedback questionnaires from the parents.

#### Dental examinations for students involved in the brushing activity

A total number of 4600 were involved in the tooth brushing activity, parents consents for oral examination was obtained for 1500 students aged 4 - 6 years only. Students were examined for plaque accumulation on teeth surfaces using The Visible Plaque Index (VPI). The index determines the frequency of tooth surfaces covered with clearly visible plaque [10], the outcome of which was dichotomized as "present" (at least one surface covered with visible dental plaque on the buccal region of the maxillary anterior teeth) or "absent" (dental plaque not visible on any surface of the buccal region of the maxillary anterior teeth). Scores were recorded on a screening sheet. The examination was done twice for the same students one before the tooth brushing activity started and the next one was after 90 days of continuous brushing in schools.

Associations between self-reported tooth brushing frequency and The Visible Plaque Index (VPI) was assessed using the chi-square test. Statistical analyses was performed with the aid of the SPSS Statistics™ program (SPSS for Windows, version 20.0, SPSS Inc., Chicago, IL, USA).

#### Interview with School nurses (oral health coordinators)

Interviews with the school nurses (oral health coordinators) involved a half hour interview with open-ended questionnaires related to:

- Commitment and support of the school administration in allowing students to do the tooth brushing at the assigned time on a daily basis,
- If the activity had fulfilled the learning objectives of the training, they had completed before the activity took place.

- Another question was about their professional opinion if this activity contributed to children's acceptance for daily brushing and interest in oral health.
- A set of questions were asked about the mechanism of the activity and the reactions of school staff in having students brush their teeth daily in the school.
- Any barriers that effect implementation of the tooth brushing activity.

In regards to the commitment of schools, 71% of the oral health coordinators responded that if the school administration enforced the activity the compliance was high both from the teachers and students, others informed that allowing students to take a ten minute break to brush their teeth and return back to the class was considered as a disruption to the students daily schedule.

A high response was to the questions about students reaction to brushing in school and how they considered it as an enjoyable task and made the students interested in brushing their teeth more often, even in schools that didn't enforce daily tooth brushing students requested from their teachers to be given permission to brush their teeth.

Many of the Oral health coordinators (55%) agreed that the main barrier to have brushing as a daily activity in the schools was:

- Storage facility of the toothbrushes in the classrooms and maintaining infection control standards
- Allowing students to leave the class to brush their teeth
- The cooperation of the class teachers and the head administration to continue with the tooth brushing activity for a long period.

### Parents Questionnaires

Parents received a questionnaire to give feedback on their children experience with the tooth-brushing scheme. The questions asked about:

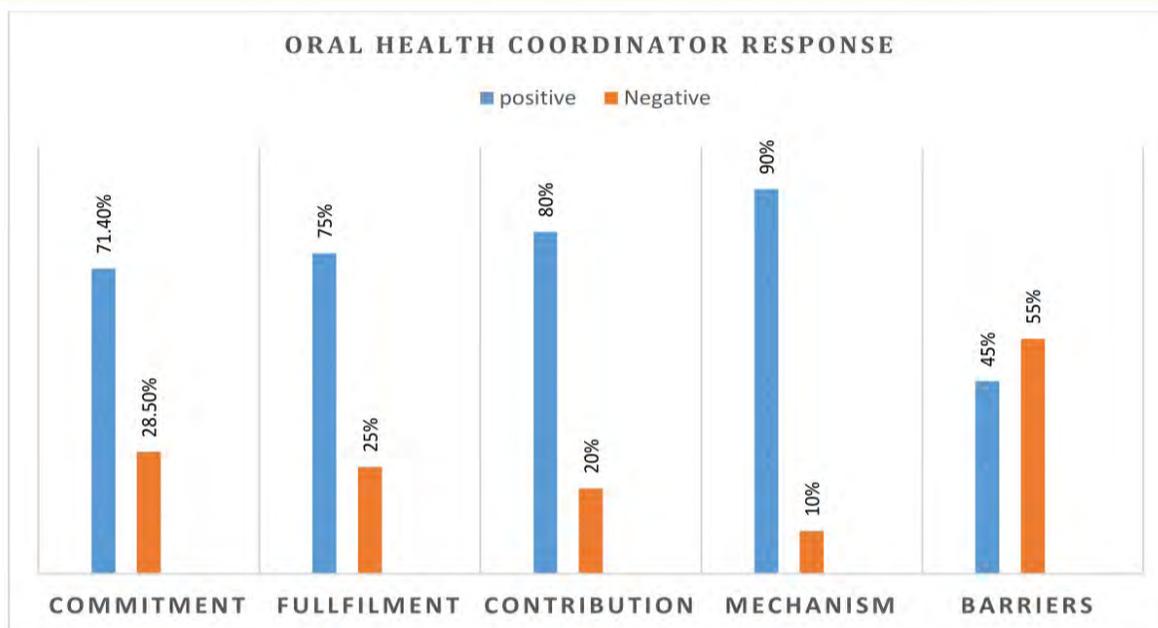
1. Did you receive information on the tooth brushing challenge from the school?
2. Would you consider tooth brushing in school for your child as a good way for her/him to establish good oral hygiene habits?
3. Have you noticed any positive behavior change from your child towards tooth brushing at home?
4. How can the oral health team support you to enhance and encourage your children to maintain their good oral health habits.
  - Parents oral health lectures in school
  - Continue tooth brushing for children in school
  - Any other suggestions .....

Response rates for the feedback questionnaire was 95%. There was a high response rate was the positive behavior change towards tooth brushing (86%). Many parents answered that the idea of their children brushing daily in school would help to establish a good oral hygiene routine (83%). They had increase interest to have more parents oral health sessions (72%). Most of the parents wanted their children to continue to brush at school (79%). There were 21% of parents who were concerned with infection control issues in regards to the storage of toothbrushes in schools.

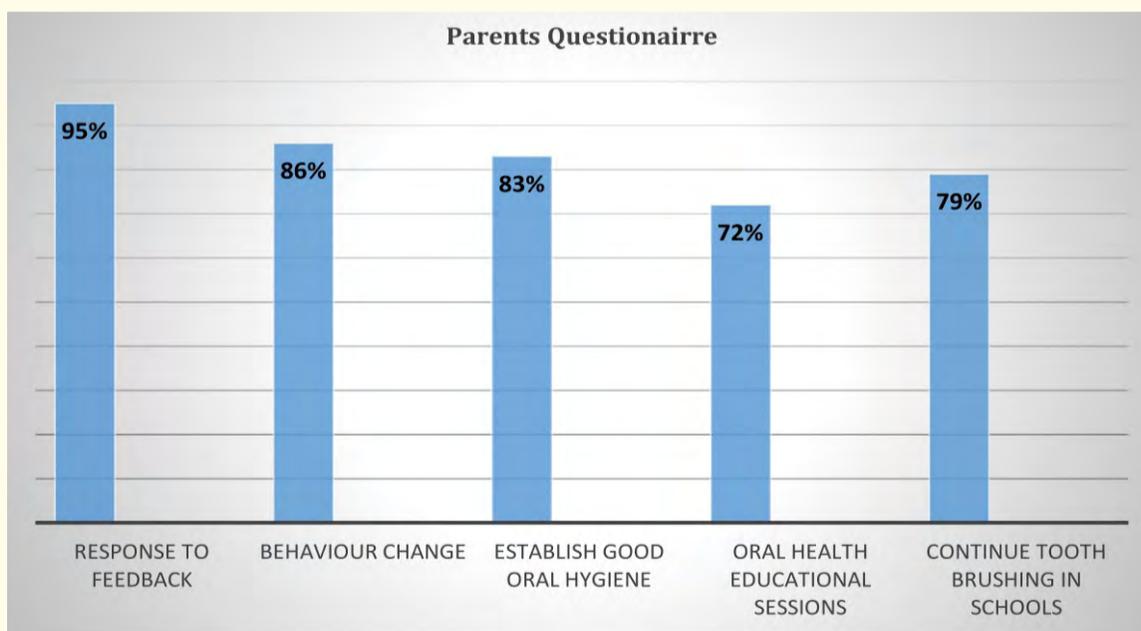
Variables	Tooth brushing in school			
	Before		After	
	N=1500	%	N=1500	%
Visible Plaque Index				
Present	1,153	(76.8)	551	(36.7)
Absent	347	(23.2)	949	(63.2)

**Table 1:** Results of the examination in the number of dental surfaces free from plaque.

\*Chi-square test



**Figure 1:** Results of the oral health coordinators responses.



**Figure 2:** Response of parents' feedback questionnaire.

**Discussions**

The main question to be clarified within the scope of the present study was whether the application of tooth brushing in schools as a preventive measure can further improve the dental health of the students aged 4 - 6 years in Dubai considering the high caries levels.

In a 2-year intervention study, Madléna., *et al.* [15] examined the effect of fluoridated toothpaste on students aged 14 - 16 years old when the study began. The intervention group showed a 34 % lower caries increment than the control group after 2 years of the program. Another study concluded that there was a decline in the caries level after the two year supervised tooth brushing with fluoride gel [16].

This explanation is in line with a systematic review of Twetman., *et al.* where the authors found strong evidence for the fact that supervised tooth brushing with fluoridated toothpaste had a strong caries-preventive effect over non-supervised [17].

Duration of tooth brushing is known to produce the strongest effect on plaque removal and should be emphasized in dental health education [18]. Hence, children were advised to brush twice daily for 2 minutes with bass method, thereby controlling the type of toothbrush and dentifrice, and the frequency and method of tooth brushing. The prime objective of the study was to boost proper oral health through supervised brushing among students in the seven schools of Dubai. The bass technique was preferred over modified bass technique as it is simpler and easier for children to learn. As the children during the initial checkups appeared to have shown signs of not brushing at all, to encourage brushing habits, the simple technique was preferred, i.e., bass technique, as the initial measure.

In the present study, reduction in plaque was observed among the children who maintained their brushing daily in school, which is attributed to the Hawthorne effect [19] i.e., by virtue of participating in the study and undergoing frequent oral examinations, the children became self-motivated to improve their brushing technique.

Although this study may have concluded similar results in other studies, the use of simple methods such as daily tooth brushing is an effective method in improving oral hygiene, raising oral health awareness in the community with minimum cost and work force.

### Conclusion

The school-based oral health preventive intervention comprised oral hygiene instructions and supervised tooth brushing education was effective in imparting oral health knowledge and establishing good oral hygiene habits in school children and in improving their oral hygiene status and the attitudes of their parents. With these positive findings, it is recommended that similar programs be supported and implemented with a larger sample size to determine the long-term effect of such programs and to improve the poor oral health situation among schoolchildren [20]. Furthermore, polices for such preventive methods should be placed to emphasis the importance of its effect and govern their implementation.

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### Conflict of Interest

Materials distributed to the students (toothbrushes, tooth paste and tooth brushing charts) were funded by the Castles General Trading, Distributers of Jordan® and Philips®. There was no involvement of Jordan® and Philips® in the methodology and implementation of the study.

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