

EFFECTIVENESS OF SUPERVISED TOOTH BRUSHING EXERCISE ON THE ORAL HYGIENE STATUS OF SCHOOL GOING CHILDREN IN PESHAWAR

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ABSTRACT

Objective: To determine the effects of supervised tooth brushing exercise on the oral hygiene status of school going children in Peshawar.

Study Design: Prospective observational study.

Place and Duration of Study: This study was conducted at a girl's government school in university town, Peshawar, from Jul to Dec 2018.

Methodology: All girls between age 7-10 years with mixed dentition, minimum plaque index score 2 and gingival index score 0 were included in the study. Sixty four girls were allocated into group A (intervention) and group B (control) using computer generated random numbers. Intervention group (32 subjects) was exposed to video plus supervised tooth brushing on a cast model while control group (32 subjects) only exposed to video on brushing technique. The plaque index score was recorded for oral hygiene status as outcome measure of intervention after one month.

Results: The mean age of the participants was 9.53 ± 1.08 years. There was statistically significant difference in the plaque scores of interventional and control group after one month (0.3125 ± 0.470 vs. 1.312 ± 0.644 , $p < 0.001$) as compared to baseline data (1.90 ± 0.296 vs. 2.0 ± 0.00 , $p = 0.83$). The difference for frequency of tooth brushing between the two groups was not statistically significant ($p = 0.088$). Parental watch during tooth brushing between the two groups was statistically insignificant ($p = 0.055$).

Conclusion: Supervised tooth brushing improved the oral hygiene status of the children therefore oral health education was effective in establishing good oral health among school children.

Keywords: Dental caries, Decayed missing filled teeth, Oral hygiene, Plaque index, Supervised tooth brushing, School children, Tooth brushing.

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INTRODUCTION

Good oral hygiene is an essential part of the overall health of an individual. Currently millions of children are affected by oral health problems because of lack of knowledge about the oral hygiene maintenance, practices and treatment services¹. Evidence shows that good knowledge of oral hygiene reflects into better practices and education further improves it². Dental caries and periodontal diseases can be initiated by the accumulation of dental plaque and were reported to be the most prevalent dental diseases of mankind³. Supervised tooth brushing programs in schools can be effective in improving the oral health of young children⁴. Tooth brushing with fluoride toothpaste has managed to decrease caries globally in the last decades and therefore supervised tooth brushing can be a way of assuring that the children will be sufficiently exposed to fluoride toothpaste daily⁵. So, an efficient preventive measure is required for school going children⁶.

Curnow *et al* concluded that supervised tooth-

brushing regimen along with fluoridated toothpaste had significantly reduced caries in high-caries-risk children⁷. They also found that the quality rather than quantity of tooth brushing matter. In this context it can be suggested that tooth brushing meticulously once a day is enough for dental caries prevention. Supervision literally means an act of direction, management or close observation. When a well-trained practitioner supervised a brushing method, they have a responsibility to guide a child to use the correct quantity of toothpaste, and make sure that each surface of teeth is brushed for adequate amount of time⁸. The developed countries have reduced the prevalence of poor oral hygiene and its complications through proper tooth brushing technique, flossing and mouth rinses⁹. There are several tooth brushing techniques, each having their merits and demerits including manual and automatic toothbrushes but the modified bass method is the most evidence-based tooth brushing technique, which is used for improving oral hygiene¹⁰. In Pakistan the habit of regular tooth brushing has been promoted mainly by business enterprises.

Some research has been done on knowledge, attitudes and practices which includes teaching the

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students on a cast models, audiovisual and instructions on child as a model but there was paucity of knowledge about the association of supervised teacher based correct tooth brushing technique and its outcome on the oral hygiene as a whole which was very important for children to understand from the very beginning. The objective of the study was to determine the effects of supervised tooth brushing exercise on the oral hygiene status of school going children in Peshawar This study would help to reduce the overall prevalence of oral diseases among the children of our community.

METHODOLOGY

This was a prospective observational study conducted in a government school of Peshawar between July 2018 and December 2018. The sample size was 64. The sample size was calculated by software STATA 13 by taking follow up mean plaque score of 0.67 (0.15) in the supervised teaching group and 0.52 (0.16) in the control group, at confidence level 95% and power of the test 80¹¹. In the study 7-10 year old female children who had plaque index not >2 and gingival index 0 were included in the sample and those with high decayed, missing filled teeth (DMFT) score, suffering from any systematic disease, periodontal disease or children with learning difficulties were excluded from the study. The list of children was entered in Microsoft excel and random selection of the students was done. Informed written consent was taken from the parents/guardians of the selected students and permission was obtained from the school principal. Ethical approval for the study was granted by Khyber Medical University Ethics committee (ref ltr No: Dir/KMU-EB/ES/000579). Prior to the allotment of students in the intervention and control group all the selected children were shown a video of the correct tooth brushing technique and then thirty two students were allotted in each intervention and control group by blocked randomization. Two teachers who were willing to participate in the study were selected and assigned to intervention group. The teachers were trained by teaching them the tooth brushing technique on a cast model and the students of intervention group were also taught the tooth brushing technique on the cast models. The plaque index score was recorded at the baseline of both groups. A closed ended questionnaire containing questions regarding the oral hygiene status was administered to both the groups to assess their oral hygiene habits.

Under supervision of the teachers assigned to the intervention group these children brushed their teeth

regularly every day in front of the teachers in the morning before the commencement of their classes. After 1 month of the intervention the plaque index score was again recorded to compare the differences between the two groups.

Data was entered and analyzed by using SPSS-22 statistical software. Descriptive statistics were recorded in terms of percentages and frequencies for categorical data and means and standard deviation for numerical data. Independent t-test was used to compare the mean plaque scores between the intervention and control group. Paired t-test was used to compare the pre and post difference of plaque mean score of both the groups. The *p*-value of ≤ 0.05 was considered significant.

RESULTS

In this study 64 children were included, 32 each in intervention and control group. Mean age of the children was 9.531 ± 1.083 . The mean plaque score at baseline and after follow up of both the groups are given

Table-I: Comparison of mean plaque index score at baseline.

Groups	n	Mean \pm SD	<i>p</i> -value
Intervention group	32	1.91 \pm 0.296	0.078
Control group	32	2.00 \pm 0.000	

Table-II: Comparison of mean plaque index score after follow up (one month).

Groups	n	Mean \pm SD	<i>p</i> -value
Intervention group	32	0.31 \pm 0.471	<0.001
Control group	32	1.31 \pm 0.644	

Table-III: Comparison of mean difference in plaque scores between two groups.

Groups	n	Mean \pm SD	<i>p</i> -value
Supervised Group	32	1.59 \pm 0.56	<0.001
Control group	32	0.69 \pm 0.64	

in table-I & II respectively. No statistically significant differences were observed at baseline with regards to plaque index (*p*-value 0.078). At the follow up after one month the differences observed in the plaque score were statistically significant (*p*-value 0.000). Statistically significant association (*p*-value ≤ 0.001) was found in the comparison of mean difference of plaque score between the two groups (table-III).

The Frequency and percentages of the oral hygiene practices in children are illustrated in table-IV.

DISCUSSION

This study showed the effects of supervised tooth brushing in improving the oral hygiene of the children. By the supervised tooth brushing children had reduction in their plaque index scores, a study conducted in

Mexico also reveals that supervised tooth brushing at school was effective in reducing gingivitis and dental plaque¹².

Table-IV: Oral hygiene practices (n=64).

Baseline Characteristics	n	Percentage (%)
Frequency of Tooth Brushing Per Day		
Once	13	(20.3%)
Twice	45	(70.3%)
More than twice	6	(9.4%)
Cleaning Teeth With		
Brush and toothpaste	59	(92.2%)
Dental Floss	1	(1.6%)
Toothpicks	1	(1.6%)
Other	3	(4.7%)
Tooth Brushing in Morning		
Yes	55	(85.9%)
No	9	(14.1%)
Tooth Brushing in Noon		
Yes	3	(4.7%)
No	61	(95.3%)
Tooth Brushing Before Going to Bed		
Yes	1	(1.6%)
No	63	(98.4%)
Duration of Tooth Brushing		
Less than one minute	4	(6.3%)
One minute	19	(29.7%)
Two minutes	29	(45.3%)
More than two minutes	12	(18.8%)
Parental Supervision during Tooth Brushing		
Yes	19	(29.7%)
No	45	(70.3%)
Bleeding Gums Means		
Don't know	36	(56.3%)
Healing gums	6	(9.4%)
Inflamed gums	16	(25.0%)
Gum recession	6	(9.4%)
Plaque Means		
Don't know	40	(62.5%)
Inflammation of gums	12	(18.8%)
Staining of teeth	6	(9.4%)
Hard debris on teeth	6	(9.4%)
Dental Plaque Leads to		
Don't know	43	(67.2%)
Inflammation of gums	3	(4.7%)
Staining of teeth	5	(7.8%)
Dental caries	13	(20.3%)
Visit to Dentist		
Never	19	(29.7%)
Regularly (6-12 months)	6	(9.4%)
Occasionally	10	(15.6%)
When I need	29	(45.3%)

Modified Bass tooth brushing technique was used in the study because this technique brought an important advancement in the oral hygiene maintenance^{11,12}.

This statement was supported by Poyato-Ferrera *et al*¹³. They made a comparison on the efficacy in removing supragingival plaque during normal tooth brushing and a special tooth-brushing technique (modified Bass method). Their results showed that the modified Bass method is significantly superior to usual tooth-brushing technique in removing supra-gingival plaque.

This trial showed that there was no statistically significant difference in the mean baseline plaque score w between two groups. This showed that oral health status of both groups was similar before the intervention. The study on effectiveness of supervised tooth brushing by Damle *et al* and another study by Hebbal on plaque scores reported similar results to the present study^{14,15}.

Table-V: Association between baseline characteristics with follow up mean plaque score (Univariable regression analysis).

Characteristics of Sample	R square	p-value
Age	0.04	0.623
Frequency of tooth brush	0.002	0.755
Cleaning teeth	0.049	0.078
Tooth brush in the morning	0.002	0.729
Tooth brush in the noon	0.057	0.057
Tooth brush before going to bed	0.037	0.128
Duration of Tooth brushing	0.006	0.536
Parental supervision during brushing	0.011	0.402
Meaning of bleeding gums	0.003	0.663
Gum bleeding protected	0.076	0.027
Meaning of plaque	0.100	0.011
Dental plaque leads	0.183	0.000
Visit to dentist	0.004	0.622

The difference in mean plaque score after one month follow up was statistically significant ($p < 0.001$) between the two groups. This shows supervised tooth brushing techniques improve oral health by reducing plaque accumulation and better removal plaque. Damle *et al* in his had similar results to the present study¹⁴. Tsamtsouris *et al* in his study also showed that supervised tooth-brushing with instructions to pre-school children had positive association in reducing dental plaque scores¹⁶.

A study conducted by Amin *et al* in Saudia Arabia on oral hygiene practices, dental knowledge, dietary habits and their relation to caries among male primary school children showed that most of the participants (48.9%) brushed their teeth once per week¹⁷. This is in contrast to our study results because in the present study 70% children informed that they brush twice

a day every day this could be because of more awareness of their parents regarding oral hygiene maintenance and also because certain tooth paste companies organize commercial programs in schools for the awareness of oral hygiene maintenance.

The children in the study informed that most commonly they use tooth paste and tooth brush for cleaning their teeth these results are in line with the results of another study conducted by Dixit *et al* on oral health knowledge and practice among indigenous Chepang school children of Nepal¹⁸. In the present study the results revealed that most of the children do not brush their teeth at noon and bed time and majority of the children brush in the morning. These results are in accordance to the study conducted by Pullishery *et al* on tooth brushing habits in preschool children of Mangalore, Karnataka. They reported that most of the children brushed their teeth in the morning¹⁹.

Ozbek *et al* reported that among school children, 41.3% brushed their teeth for >2 minutes, 35.7% for <1 minute, 21.4% for <2 minutes, and 1.6% for 2 minutes²⁰ in the present study majority of the children reported tooth brushing for 2 mins. Most of the school children (62.5%) in the present study do not know the meaning of plaque and protection of gum and these results are similar to a study conducted by Al-Darwish about oral health knowledge, behavior and practices among school children in Qatar, they reported that 48.4% could not define the meaning of plaque²¹. The school children in the present study reported that they visit dentists when needed for relief from pain. Most of the time, they do not go to dentists for routine examination. A study conducted in India reported similar results that dental visits were found to be low in both urban and rural children²².

LIMITATION OF STUDY

The study was conducted on only female population. The sample size was small and further studies should be conducted on both male and female participants on relatively larger sample size.

RECOMMENDATION

There is a need of awareness programs for the maintaining of oral hygiene. Proper tooth brushing technique should be taught to the teachers also along with the students so that they can help children in maintaining their oral hygiene.

CONCLUSION

There was significant improvement in the plaque scores because of the supervised tooth brushing hence

prevention from caries. Most of our school children are unaware about oral hygiene and the proper brushing technique.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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