

## “Effectiveness of Oral health education on Oral hygiene of School children aged 13-15 years by Dentist and School teacher - A Randomized Control Trial”

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### Abstract

**Purpose:** To assess the effectiveness of oral health education by dentist and school teacher on school children oral hygiene status in Dharwad city.

**Materials and Methods:** Randomized controlled trial was conducted by selecting 6 schools and were divided into 2 government, 2 un-aided and 2 aided school. One government school was selected for dentist to provide oral health education and another government school for school teacher to provide oral health education. Similarly, with the un-aided and aided school. At the baseline Plaque index (Silness and Loe) and Gingival index (Loe and Silness) of school children was assessed. After 1 and half months reinforcement of oral health education was done followed by assessment of Plaque and Gingival index of school children after 3 months. Data was analyzed using SPSS version 21.0. Intergroup comparison was done using Chi square test, Kruskal wali test.

**Result:** Dentist educating school children showed statistical significant difference in plaque and gingival score in all the 3 school (P < 0.05). School teacher group showed Statistical significant difference in only unaided school (P < 0.05).

**Conclusion:** Dentist is effective in improving oral hygiene status of school children in all the 3 school. Whereas, school teacher are effective in only un-aided school.

**Keywords:** Oral health education, Plaque index, Gingival index, Oral hygiene status, School children

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### Introduction

In South East Asian countries a significant percentage of adolescents are having poor oral hygiene and betel nut chewing habit. Both of which have serious public health consequences.<sup>1</sup>

A basic oral health programme was introduced by World health organization for developing countries includes oral health education, but it emphasizes on integration of oral health education with other oral health activities such as provision of preventive, restoration and emergency dental care. All these programme have shown significant improvement in the knowledge, attitude, behaviour and oral hygiene status among school children.<sup>2</sup>

Goal of the oral health education is to improve knowledge, which may lead to change in the oral health behavior that contributes to better oral health.<sup>2</sup>

There are different modes of oral health education in the form of chalk and talk, charts and posters, overhead projectors, mass media and internets given by dentist, school teachers and multipurpose health workers. Few studies have showed positive use of plaque staining device discovery learning and a token of reward system approach to oral health education.<sup>3</sup>

Oral health education programme which has its objective in improving oral hygiene status of the population would have obvious benefits. Several factors are important for effective dental health education such as reinforcement and motivation of oral hygiene instruction. These concept show significant long term effect.<sup>4</sup>

School teachers on the other hand can provide oral health education to the school children provided they are trained by the dentist. School children have regular communication with the school teachers and they listen better to the teachers in the school.

Although there are many studies which suggests that providing oral health education to school children improves their oral hygiene status but there is dearth of information on which approach is best.

The objective of the current study was to assess the effectiveness of oral health education given by dentist on one side and School teacher on other side in the form of oral hygiene status of school children aged 13-15 years in Dharwad city, Karnataka.

### Materials and Methods

A study of 3 months duration was conducted in Dharwad City to assess and compare the effectiveness of school DHE, conducted by Dentist and trained school teachers. Located in the heart of Karnataka State, with a population of approximately 600000, Dharwad is a reputed centre of educational, cultural, financial, and health care activities.

**Study sample:** Sample size was calculated based on the known target population in the Dharwad city (20,865) with 10% precision and at 95% confidence level, the required sample size came upto (n) = 512. Keeping in view the attrition due to school children absentees or due to migration into other place, the sample size was increased to 10% and sample size came upto 563, which was rounded to 565 in both study and control population.

**Study design:** The study design required six schools. Details of schools and permission to carry out the study were obtained from the Block Education Officer (BEO). School selection was based on the following criteria: (1) consent of the school authorities (2) no DHE programs conducted in the past or during the study period (3) at least 50 children in the age group of 13 to 15 years. Eleven schools fulfilled the above criteria, were selected by stratified random sampling. The stratification was based on 3 strata consist of government school, aided school and unaided school. From each strata 2 schools were selected from government school, 2 from aided and 2 from unaided school, for the purpose of the study, out of 2 schools, one school was selected for dentist to provide oral health education, another school was selected for school teacher to provide oral health education. The samples were collected from 6 different school in a proportionate manner which consists of 240 school children from government school, 98 school children was selected from aided and 88 school children were selected from unaided school. Within each school, the study subjects were selected based on Inclusion criteria: (a) male and female children of age 13 to 15 years, (b) intact permanent teeth, and (c) good general health; Exclusion criteria: (a) presence of oral mucosal lesions, (b) intake of medications affecting oral health [antibiotics, mouthwashes] in two weeks leading to the study and before each examination, (c) presence of crowding/overlapping of teeth resulting in severe gingival inflammation, (d) children undergoing orthodontic treatment, and (e) children requiring any emergency dental treatment. Children requiring emergency dental treatment were referred to the nearest centre for appropriate care.

The study subjects were assessed for the intra examiner reliability using plaque index (Silness and Loe) and gingival index (Loe and Silness), Spearman's rank correlation was done to check the reliability and was found correlation in the r value i.e. 0.9284 for plaque index and 0.9772 correlations for gingival index.

Before providing oral health education, the data was collected among all the 6 schools using Plaque

index (Silness and Loe) and gingival index (Loe and silness) at baseline among school children.

After collecting the baseline data, the 6 schools were categorized into 2 groups. The 1<sup>st</sup> group consists of dentist educating school children of government school, aided school and unaided school and in another group consist of school teacher educating school children of another government, aided and unaided school. Two school from similar social class were taken as in each group, to prevent 'contamination' of the program within schools due to the children talking to each other.

Among dentist group a twenty minutes interactive session with school children was provided by the dentist in providing oral health education in the form of flip charts and models, containing information which includes normal tooth structure, different types of the teeth, two sets of dentition, various dental disease in the oral cavity such as dental caries, periodontal disease, malocclusion and oral cancer, its cause, symptoms and how it can be prevented and brushing technique (Modified Bass technique was demonstrated on a dentoform model) was explained to the school children using models.

Similarly, the selected schools for school teacher oral health education, was provided by dentist to school teacher followed by the issue of flip charts and models to school teachers. Further, similar oral health education was provided by school teachers to school children.

After six weeks the reinforcement of oral health education was given by dentist to school children and dentist ensured that oral health education was given to school children by school teachers. School children were re-examined after 12 weeks using Plaque index (Silness and Loe) and Loe and gingival index (Loe and silness).

### Statistical analysis

Data obtained from questionnaires were subjected to the SPSS Version 21.0. Differences proportions were compared using the Chi square test and the Kruskal-Wallis's test and Mann - Whitney U Test. A difference was considered to be of statistical significance if ( $P \leq 0.05$ ).

### Results

A total of 550 subjects were included in the present study with the mean age of 13.98. Only those subjects who completed the follow up visits were included in the final analysis.

**Table 1: Distribution and demographic characteristics of the study subjects at baseline and follow up**

School	Mean age	No. of Male (%)	No. of Female (%)	No. of subjects at Baseline	No. of subjects after 3 months	No. of Drop outs (%)
Govt. School 1	14.12	56 (40.87%)	81 (59.12%)	144	137	7 (4.86%)
Govt. School 2	14.14	72 (57.6%)	53 (42.4%)	144	125	15 (10.41%)
Unaided School 1	13.98	40 (68.96%)	18 (31.03%)	64	58	6 (9.375%)
Un-aided School 2	14.125	40 (66.6%)	20 (33.33%)	64	60	4 (6.25%)
Aided School 1	13.55	32 (54.23%)	27 (45.76%)	67	59	8 (11.94%)
Aided School 2	13.58	40 (66.66%)	20 (33.33%)	67	60	7 (10.44%)
Total	13.98	280 (56.11%)	219 (43.88%)	550	499	47 (8.54%)

**Table 1** Shows the distribution of study subjects in dentist and school teacher group at the baseline and after 3 months and also the number of dropouts in six schools.

The government school 1, unaided school 1 and aided school 1 represents the dentist group and government school 2, unaided school 2 and aided school 2 represents school teacher group. A Total of 550 subjects were included in the present study with the mean age of 13.98. After 3 months 499 subjects were present, the total number of drop outs in all six schools were 47 (8.54%). The number of drop outs in all the six schools are as follows 7 (4.86%) in government school 1, 15 (10.41%) in government school 2, 6 (9.375%) in unaided school 1, 4 (6.25%) in unaided school 2, 8(11.94%) in aided school 1 and 7 (10.44%) in aided school 2.

The total number of males and females present at the baseline and after 3 months were 280 (56.11%) and 219 (43.88%). Only those subjects who completed the follow up visits were included in the final analysis

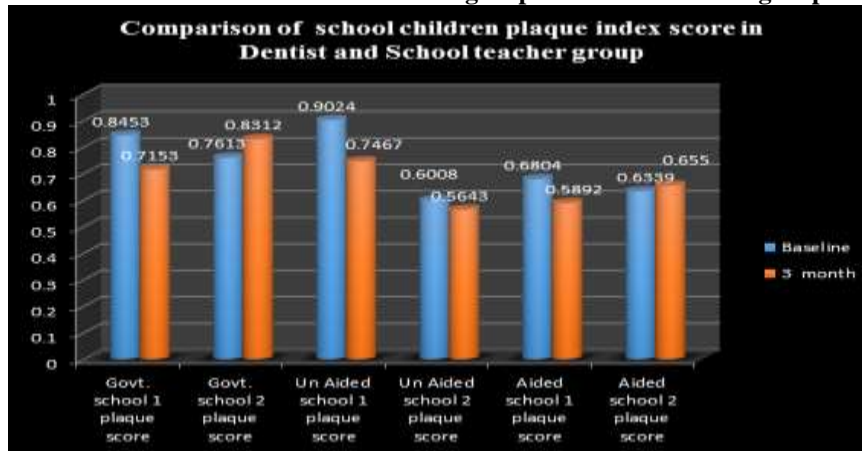
**Table 2: Pair wise comparison of Plaque score of the school children in government, Un-aided and Aided school from baseline to 3 month in Dentist group and school teacher group using Kruskal Walli's test**

School	School children plaque score in Dentist group			School teacher	School children plaque score in School teacher group		
	Initial	Final	P value		Initial	Final	P value
	Plaque score mean				Plaque score mean		
Dentist							
Govt. School 1	0.8453	0.7153	0.000*	Govt. School 2	0.7613	0.8312	0.070
Unaided school 1	0.9024	0.7467	0.000*	Unaided school 2	0.6008	0.5643	0.000*
Aided school 1	0.6804	0.5892	0.000*	Aided school 2	0.6339	0.6550	0.332

( $P \leq 0.05$ )

Table 2 shows intergroup comparison of plaque score of the school children in government, Un-aided and Aided school from baseline to 3 month in Dentist group and school teacher group. The result showed statistically significant difference ( $P \leq 0.05$ ) in the plaque score of all the school children in dentist group i.e.in government school 1, aided school 1 and unaided school 1. In School teachers group only unaided school 2 showed statistically significant difference ( $P \leq 0.05$ ) in the plaque score from baseline to 3 months interval. Government School 2 and aided school 2 did not show any significant difference in the plaque score from baseline to 3 months interval respectively.

**Graph 1: Pair wise comparison of Plaque score of school children in government, Unaided and Aided school from baseline to 3 month in Dentist group and school teacher group**



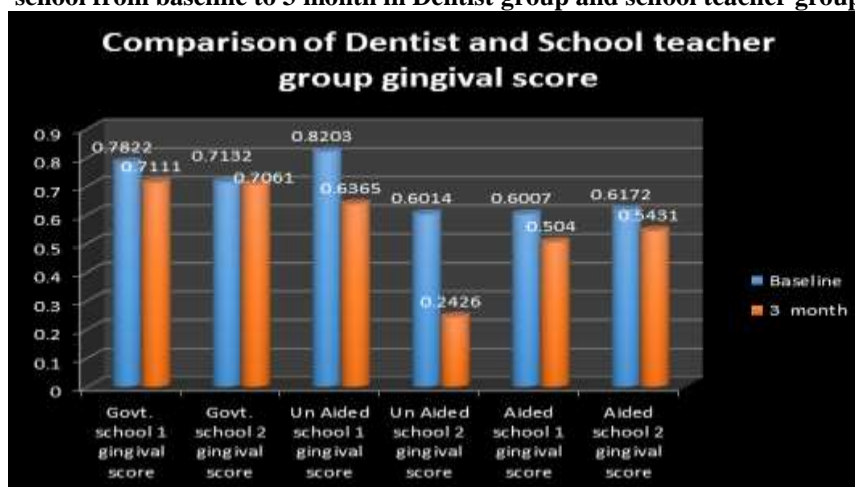
**Table 3: Pair wise comparison of Gingival score of the school children in government, Aided and Unaided school from baseline to 3 month in Dentist group and school teacher group using Kruskal Walli’s test**

School	Dentist group			School	School teacher group		
	Gingival score mean				Gingival score mean		
Dentist	Initial	Final	P value	School teacher	Initial	Final	P value
Govt. School 1	0.7822	0.7111	0.000*	Govt. School 2	0.7132	0.706	0.314
Unaided school 1	0.8203	0.6365	0.000*	Unaided school 2	0.6014	0.2426	0.000*
aided school 1	0.6007	0.5040	0.000*	Aided school 2	0.6172	0.5431	0.231

(P ≤0.05)

Table 3 shows intergroup comparison of gingival score of the school children in Government, Un-aided and Aided school from baseline to 3 month in Dentist group and school teacher group. The result showed statistically significant difference (P ≤0.05) in the gingival score of all the school children among dentist group i.e. in government school 1, Un-aided school1 and Aided school 1. In School teachers group unaided school 2 showed statistically significant difference (P ≤ 0.05) in the gingival score from baseline to 3 months. Government School 2 and Aided school 2 did not show any significant difference in the gingival score from baseline to 3 months interval respectively.

**Graph 2: Pair wise comparison of gingival score of school children in government, Un-aided and Aided school from baseline to 3 month in Dentist group and school teacher group**



## Discussion

WHO has recommended oral health promotion through school for improving knowledge, attitude and behaviour related to oral health and for the prevention and control of oral disease among school children.<sup>9</sup>

The present study was conducted among high school children in Dharwad city to assess the effectiveness of dentist educating school children and school teacher educating school children in the form of oral hygiene status.

Reinforcement of oral health education or booster dose resulted in significant improvement in oral hygiene status in the form of plaque and gingival score.

Pair wise comparison of plaque score (Silness and Loe) of the school children in government, Un-aided and Aided school from baseline to 3 months was done in dentist group and school teacher group. It was found statistically significant difference ( $P \leq 0.05$ ) in dentist group in all the 3 school children. Whereas, in school teacher group only unaided school children were found statistically significant difference in plaque score (Silness and Loe).

Among dentist group, government school children were found 33% reduction in the plaque score, in un-aided school children 36% reduction in the plaque score and in aided school children 30% reduction in plaque score from baseline to 3 months.

Whereas, in school teacher group only unaided school children were found 24% reduction in plaque score which was statistically significant.

The present study is similar with the study conducted by Worthington HV et al in 2001. Which showed 20% reduction in plaque score.<sup>5</sup> Hortono et al in 2002 found 42% reduction in plaque score.<sup>6</sup>

Among school teacher group the government school and aided school children did not found statistical significant difference in plaque score even after they were trained by dentist. This may be attributed to the fact that majority of school children

studying in government school and aided school are from rural areas. And are large in number as compared to un-aided school.

In government school and aided school the number of school teachers are lesser in number and they have many sessions to take classes to school children regarding their academics. In spite of their routine schedule in their academics, additional oral health education might have been work load for school teacher who are of lesser in number, they might have failed in providing all the information of oral health to school children in the form of oral health education. There by oral hygiene status of school children was not significant in government school and aided school as compared to un-aided school.

Whereas, among dentist group it was found statistical significant difference in plaque score in all the 3 school children i.e. government school, aided school and unaided school. This might be because dentist are directly providing oral health education to school children and they are well trained in their own speciality in providing oral health education and awareness among school children.

Similarly, Pair wise comparison of gingival score (Loe & Silness) of the school children in government, Un-aided and Aided school was done from baseline to 3 months in dentist group and school teacher group.

It was also found statistically significant difference ( $P \leq 0.05$ ) in dentist group in all the 3 school children. Whereas, in school teacher group only unaided school children were found statistically significant difference in gingival score (Loe & Silness).

Among dentist group, government school children were found 27% reduction in the gingival score, in un-aided school children 34% reduction and in aided school children 31% reduction in gingival score from baseline to 3 months.

Whereas, in school teacher group only unaided school children were found 46% reduction in gingival score which was statistically significant.

### Limitations of the study

School teachers of government and aided school might have skipped some of the information regarding oral health knowledge, attitude and behaviour and oral hygiene status, as they were busy with their regular school curriculum, addition of one more tool of health education in the form of oral health to school children might have felt difficult in explaining all the aspects to school children.

One more aspect may be the socio economic barrier i.e. government school children were from low socio economic status as compared to un-aided school children, which might be the cause of less improvement in the oral hygiene status in the government school as compared to un-aided school children.

### Conclusion

1. Oral health education given by dentist to school children was effective in the form of oral hygiene and gingival health status in all the 3 categories of schools i.e. government school un-aided school and aided school.
2. Oral health education given through school teacher to school children was effective only in un-aided school in the form of gingival health and oral hygiene status.
3. School teachers can be recommended to provide oral health education in future in order to improve the oral hygiene and gingival health to unaided school.
4. Dentist can also be recommended to provide oral health education to school children in order to improve the oral hygiene and gingival health of school children in government school, aided school and unaided school.

**Conflict of interest:** There is no conflict to declare

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