



EFFECTIVENESS OF DENTAL HEALTH EDUCATION PROGRAM IN IMPROVING THE ORAL HEALTH STATUS OF 6-13 YEAR OLD GOVERNMENT RESIDENTIAL SCHOOL CHILDREN OF MYSORE DISTRICT.

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ABSTRACT

A study was designed to determine the effectiveness of dental health education program in improving the oral health status, oral health related knowledge and behavior of government residential school children of Mysore district. All the government primary residential schools (total 5) of Mysore district were included and divided into 3 groups ('twice intervention', 'once intervention' or 'control' group). A questionnaire was administered and oral examination was conducted at baseline, 6th month and 12th month. Mean knowledge and behaviour scores increased for all groups with maximum increase in 'twice intervention group'. 'Twice intervention group' showed significantly more improvement in mean plaque and gingival index scores as compared to 'once intervention group', while control group showed deterioration. Therefore, dental health education program is effective in improving the oral health status of the schoolchildren and highlights the importance of reinforcement.

KEYWORDS : dental health education, oral health behaviour, oral health related knowledge.

Introduction

Although oral health is a part of total health, very little attention is paid to this facet of health. Prevention of dental disease has assumed less priority by the community as well as the professional. It was recognized that for the effective strategy against diseases in long term, prevention was the key.² In countries such as India, where there is scarcity of resources and trained dental manpower, preventive measures assume even more importance.

School children are considered to be an important target group for various health education activities with the underlying objective of inculcating healthy lifestyle practices to last for a lifetime.^{3,4}

In recent years, attention has been drawn towards assessing the effectiveness of oral health promotion campaigns.^{5,6,7} This is in line with demand for evidence-based research and will help to inform policy makers on how to allocate resources.⁸

There is paucity of data about the effectiveness of educational intervention among school children in the Indian context. Studies have been conducted to evaluate improvement in knowledge and awareness but studies regarding the effectiveness of oral health education in improving the oral health status are scarce and relatively of short duration. Moreover, no such study has been conducted in residential schools where the exposure to external environmental influences is minimal. So, an effort has been made in this regard.

Methodology

This interventional study was conducted for a duration of one year. Ethical clearance was obtained from ethical committee of J.S.S. Dental College and Hospital, Mysore. Permission to carry out the study was obtained from respective school authorities.

The names and addresses of government residential schools were obtained from the District Commissioner Office (DC Office), Mysore. According to the list obtained, a total of five primary government residential schools are located in Mysore district.

Schools were divided into three groups depending on the number of students so that each group has approximately equal number of students. The groups were randomly allocated to either:

1. Twice intervention (dental health education at baseline and six months): Residential school, Shanti Nagar, Mysore. (n=70)
2. Once intervention (dental health education at baseline only): Residential school, Mugar, T.N. Pura Taluk. (n=69)

3. Control group (no dental health education during the study period): Residential school, Gandhi Nagar, Mysore; Residential school, Hosur, K.R. Nagar Taluk; Residential school, Byarapura, T.N. Pura Taluk. (n=78)

All the children of above mentioned schools within the age range of 6-13 years who were present for the three visits were included in the study (n = 217). Exclusion criteria were children on medication or children having systemic disease.

A questionnaire was designed to elicit information regarding oral health related knowledge and behaviour. Questionnaire was administered at baseline, 6th month and 12th month. Oral health related knowledge was assessed using questions based on causes of dental diseases and their prevention; importance of teeth and tooth brushing; identifying good and bad foods and bad oral habits. Oral health related behavior was assessed using questions concerning oral hygiene practices, frequency and pattern of sugar consumption and dental visits.

Oral health status was assessed using Plaque Index by Silness and Loe (1964)⁹, Gingival Index by Loe and Silness (1963)⁹, DMF-S Index by Henry T. Klein, Carrole E. Palmer and Knutson J.W. (1938)¹⁰ and def-s Index by Gruebbel A.O. (1944)¹¹. Clinical examination was conducted at the baseline, six months and 12 months.

Dental health education was given on topics related to tooth anatomy, function and importance of teeth; common oral diseases, their causes and consequences; prevention of oral diseases; importance of tooth brushing, dental visits and dietary instructions. PowerPoint presentation was used to keep the children interested. Dental stone models of upper and lower dentition were used to demonstrate proper brushing technique. Each session lasted for about 20-30 minutes.

Statistical analysis was done using ANOVA, contingency coefficient, correlation, repeated measure ANOVA and Scheffe's post hoc test. Statistical package for social sciences (SPSS) version 16 was used for analysis. 'p' value of < 0.05 was taken as statistically significant.

Results

Age range of the study population was 6 to 13 years. Mean age was 8.14 years in 'twice intervention group', 7.83 years in 'once intervention group' and 7.68 years in control group. There was no significant difference between the groups regarding mean age (p = 0.110).

Among the 217 students, 92 (42.4%) were males and 125 (57.6%)

were females. Number of males and females in 'twice intervention group' was 27 (38.6%) and 43 (61.4%) respectively. In 'once intervention group' 31 (44.9%) males and 38 (55.1%) females were present and 'control group' had 34 (43.6%) males and 44 (56.4%) females. Difference was not significant statistically ($p = 0.724$).

At baseline evaluation, all the groups were similar with no significant difference for any of the variables studied.

Mean knowledge scores of all the groups improved significantly from the baseline values ($p < 0.001$). At 6th month evaluation, 'twice intervention group' and 'once intervention group' were not significantly different from each other but their scores were significantly higher than the score of 'control group' ($p < 0.001$). A significant difference between all the groups was seen at 12th month evaluation, with 'twice intervention group' showing maximum improvement followed by 'once intervention group' and 'Control group' ($p < 0.001$).

TABLE 1: Overall change in the mean knowledge scores of study groups

Study Groups	N	Mean Knowledge Scores		
		At Baseline	At 6 th month	At 12 th month
Twice intervention Group	70	6.90+2.95	14.50+4.90	17.29+5.46
Once intervention Group	69	6.54+2.65	12.77+5.81	12.13+5.43
Control Group	78	6.65+3.45	7.82+3.71	8.81+3.83

F = 86.697; $p < 0.001$

Significant improvement in the **mean behaviour scores** was seen for all groups ($p < 0.001$) with 6th month evaluation showing 'twice intervention group' and 'once intervention group' had significantly better scores than 'control group' ($p < 0.001$). At 12th month evaluation, 'twice intervention group' showed maximum improvement followed by 'once intervention group' and 'control group' ($p < 0.001$).

TABLE 2: Overall change in the mean behaviour scores of study groups

Study Groups	N	Mean Behaviour Scores		
		At Baseline	At 6 th month	At 12 th month
Twice intervention Group	70	10.99+1.70	13.50+1.72	14.09+1.68
Once intervention Group	69	10.94+1.50	12.94+2.25	13.09+2.20
Control Group	78	10.78+1.88	10.96+1.75	11.32+1.72

F = 49.392; $p < 0.001$

There was significant reduction in mean Plaque Index scores of the intervention groups and a significant increase in the scores of control group ($p < 0.001$). Difference between the groups was significant at 6th month (between intervention groups and control group) and 12th month evaluation (between all the three groups) ($p < 0.001$).

TABLE 3: Overall change in the mean Plaque Index scores of study groups

Study Groups	N	Mean Plaque Index Scores		
		At Baseline	At 6 th month	At 12 th month
Twice intervention Group	70	0.77+0.35	0.58+0.27	0.49+0.26
Once intervention Group	69	0.74+0.32	0.62+0.29	0.62+0.30
Control Group	78	0.69+0.29	0.76+0.30	0.80+0.30

F = 27.817; $p < 0.001$

Significant improvement in the mean **Gingival Index scores** was

observed for the intervention groups ($p < 0.001$) and a significant deterioration was seen in the control group ($p = 0.004$). There was a significant difference between the 'twice intervention group' and 'control group' at 12th month evaluation ($p < 0.001$).

TABLE 4: Overall change in the mean Gingival Index scores of study groups

Study Groups	N	Mean gingival index scores		
		At Baseline	At 6 th month	At 12 th month
Twice intervention Group	70	0.32+0.29	0.20+0.18	0.16+0.15
Once intervention Group	69	0.30+0.23	0.23+0.18	0.21+0.17
Control Group	78	0.25+0.21	0.27+0.20	0.28+0.20

F = 20.100; $p < 0.001$

There was no significant difference between the groups regarding def-s Index and DMF-S Index scores.

A significant positive correlation was seen between oral health related knowledge and behaviour and between Plaque Index and Gingival Index in all three groups. In both the intervention groups, a significant negative correlation was seen between oral health related knowledge and Plaque Index and oral health related behaviour and Plaque Index.

Discussion

There is paucity of data about the effectiveness of educational intervention among school children in the Indian context. Studies that have been conducted in this regard are scarce and relatively of short duration. Moreover, no such study has been conducted in residential schools where the exposure to external environmental influences is minimal. Therefore, the present study was conducted to determine whether dental health education is effective in improving the oral health related knowledge, behavior and oral health status of government residential school children of Mysore district.

Effect on oral health related knowledge

Mean knowledge scores of all the groups improved significantly. The three groups differed significantly from each other at 12th month evaluation with 'twice intervention group' showing maximum improvement followed by 'once intervention group' and 'control group'. Difference between the two intervention groups can be attributed to the reinforcement of dental health education in 'twice intervention group' at 6th month which was not done for 'once intervention group'. Findings of our study are in accordance with those of other studies^{3,8,12,13,14} reporting improvements in knowledge following an educational intervention with varying evaluation periods (ranging from immediately after the intervention to 7 months).

EFFECT ON ORAL HEALTH RELATED BEHAVIOUR

Significant improvement in mean behaviour scores was seen for all the groups. Inter-group comparisons showed maximum improvement in 'twice intervention group' followed by 'once intervention group' and 'control group'. More favourable score in the intervention groups can be attributed to the dental health education which might have made the children aware of good oral health behaviour. Our results are in agreement with studies conducted by Peterson P.E. et al¹⁵ and Bian J.Y et al¹⁶ showing improvement in oral health related behaviour following educational intervention.

EFFECT ON PLAQUE INDEX SCORES

There was a significant reduction in mean Plaque Index scores of intervention groups and a significant increase in the score of control group. Difference between the groups was significant at 6th month (between intervention and control group) and 12th month evaluation (between all three groups). Reduction in plaque levels might be due to change in brushing method following

demonstration of proper brushing technique. Findings of our study are similar to those of Zanin L. et al¹⁷, Ekstrand K. et al¹⁸ and Worthington H.V. et al¹⁹.

EFFECT ON GINGIVAL INDEX SCORES

In the present study, an improvement in mean Gingival Index scores was observed for the intervention groups and a slight deterioration was seen in the control group. There was a significant difference between the groups at 12th month evaluation. Improvement in the gingival status in intervention groups may be due to better plaque removal by the students as proper brushing method was taught to them. Our findings are similar to those of Zanin L. et al¹⁷, Ekstrand K. et al¹⁸, Ganesh S. A. et al¹⁴ and Robinson E²⁰.

EFFECT ON def-s INDEX SCORES

All three groups showed slight increase in def-s Index scores but difference between the groups was not significant. Our findings are similar to the study by Ekstrand K. et al¹⁸. However, Schwarz E. et al¹⁹ showed significant differences between test and control groups with regard to the mean number of new caries surfaces 3 years after the intervention. This might be because in their study test group received daily supervised toothbrushing along with oral health education and duration of study was also longer.

EFFECT ON DMF-S INDEX SCORES

Our study didn't show significant changes in the DMF-S Index scores of the groups. Frencken J.E. et al²¹, W.H. van Palenstein Helderman et al²² and Vanobbergen J. et al²³ also reported similar findings. Our findings are similar to the study conducted by Peterson P.E. et al¹⁵ but in their study, there was a significant difference in the 'filled' component between the groups with the mean increments in filled surfaces being higher in experimental group. Similar finding was reported by Vanobbergen J. et al²³. In our study, we did not encounter any 'filled' surface. This might be because the children are staying in residential schools and are dependent on care takers and teachers for their dental needs and there is no provision of regular dental care in these schools. Secondly, they might not be able to afford the treatment (during the vacations) as their families belong to lower socio-economic group.

Hausen H. et al²⁴ found mean DMF-S increments were significantly lower for experimental group than control group two and four years after the intervention. Reason for this difference may be longer duration of their study and provision of patient-centered regimen for caries control.

Conclusion

A significant improvement in oral health related knowledge and behaviour was observed which was maximum for 'twice intervention group' followed by 'once intervention group' and 'control group'. Both the intervention groups showed a gradual improvement in plaque and gingival index values and 'twice intervention group' was significantly better than 'once intervention group' at the end of the study.

In conclusion, dental health education program was effective in improving oral health related knowledge, behavior and oral health status of residential schoolchildren in terms of plaque and gingival health and highlights the importance of reinforcing dental health education periodically.

Incorporation of dental health education programmes in schools can create, in the future, the desired awareness among school children about oral health.

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