

An Effectiveness of Oral Health Promotion Program on 12 Year Old School Going Children of Davangere

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ABSTRACT

Aim: Dental caries is the highly prevalent disease, although primary preventive techniques exist, they do not confer total protection in many populations. Thus, a study was undertaken to test lecture aid method for providing oral health education to 12 year school going children.

Materials and Method: A sample size of 200 was selected randomly from 6 different schools of Davangere district. Students who were of chronological age of 12 year from the selected schools were included in the study. Before giving lecture aid all the study groups is assessed about their self-implemented oral hygiene practices through questionnaire. The study groups were assessed immediately and 6 months after given lecture aid through a questionnaire which was designed to evaluate the knowledge, attitude, and practices of 12 year old school children regarding their oral health. The data thus collected was tabulated, assessed and statistically analyzed using student paired T-test and Mc Nemar test.

Results: There was statistically significant ($P < 0.001$) improvement in the knowledge and behavior regarding oral health amongst study group with the overall improvement in correct answers immediately after instruction noticed 56%. There was significant reduction ($P < 0.001$) in the memory in study group after 6 months of oral hygiene instructions.

Conclusion: The lecture method was effective in improving oral hygiene attitudes and skills. It appears to have the potential to make a major contribution towards education and motivation problem related to oral health. After 6 months, there was a significant reduction in memory gained after interventional program dictates the need for regular reinforcement of educational and motivational programs.

Keywords: Children, dental caries, plaque, oral health.

INTRODUCTION

Oral disease constitutes one of the most prevalent chronic diseases amongst Indian children. The developing economy, lack of qualified dental

manpower, poor awareness towards oral health, lack of required infrastructure and lack of political will are some possible reasons which have contributed to this picture. Many of the oral diseases and conditions affecting children are

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almost entirely preventable. Programs to educate and promote preventive measures have been shown to increase knowledge and also the ability to recall information related to oral health and general health.[1] Various models and programs to educate and promote preventive measures were undertaken.

Oral health is an integral component of general health [1]. Oral health has also been found to profoundly influence the quality of life. Furthermore, oral health promotion is not directed simply at reducing disease and injury to the teeth and their supporting structures but may have instead as its aim, promotion of feelings of well-being, social acceptability or articulate speech.[2] This is because oral health is a term which refers to much more than the simple possession of natural healthy teeth and is defined as “a standard of health of the oral and related tissues which enables an individual to speak and socialize without active disease, discomfort or embarrassment and which contributes to well-being”, then it becomes almost impossible to quantify the burden of oral ill-health in the population.

The lecture can be provided to different age groups in schools to increase awareness regarding oral health, behavior and attitude towards oral hygiene practices. Lecture can be provided using black board present in the school premises to educate school going children. To provide effective lecture to school going children needs well trained person who can effectively provide education for maintaining their attention span. It is possible to increase oral-health-related knowledge following a simple teaching program. [3]

SUBJECTS AND METHOD

The study area was Davangere, district in Karnataka State. There are totally 2191 primary and higher primary schools in Davangere city according to the list obtained from block education officer from which 6 higher primary schools were randomly selected on convenience basis, consisting of both private and public schools. The samples were selected randomly from 6 different schools of Davangere district. A sample size of 200 was estimated. All children who were chronological age of 12 year from the selected schools were included in the study.

Questionnaire:

Self-designed questionnaire was prepared to collect the information pertaining to study. The questionnaire was tested initially among 30 school children and these students were not included in the main study. It was prepared in such a way to assess child awareness, behavior, knowledge and their self-implemented oral hygiene practices. The questionnaire was also translated to the local language (kannada) and it was tested for its validity. A questionnaire consists of 16 key questions covering the basic information to test the knowledge before and after giving lecture. (appendix 1)

Method of collecting data:

Before giving lecture aid all the study population was assessed about their self-implemented oral hygiene practices through questionnaire. The study groups were assessed immediately after and after 6 months after given lecture aid through a questionnaire which was designed to evaluate the knowledge, attitude, and practices of 12 year old school children regarding their oral health and dental treatment.

The data was analysed using SPSS version 11. The effectiveness of lecture method to increase knowledge and change in behavior and attitude were associated by student paired T-test and McNemar test.

RESULTS

The pilot study revealed a relative lack of knowledge about oral health in 12 year old school going children. It also demonstrated need for preventive oral health education programs directed to 12 year school going children.

The responses concerning boys and girls were combined as no substantial differences in knowledge, attitude or behavior were found. The questionnaire results were evaluated on an individual basis and summarized for the whole group to check the effectiveness of the educational material presented in the lecture (table-1, graph-2). Answers provided before the lecture revealed a lack of knowledge about oral health, as evidenced by the proportion of incorrect (21.25%) responses. Significant improvement [11.7(71.8%) SD 3.5;

p<0.001] in knowledge was achieved by the proportion of correct responses following lecture demonstration regarding oral health and oral hygiene(Graph-1).Graph-1, table-2 represents the

reduction in memory by comparing scores of the questionnaire just after giving lecture and 6 months from it.

Table 1: Analysis of individual questions before and after giving lecture.

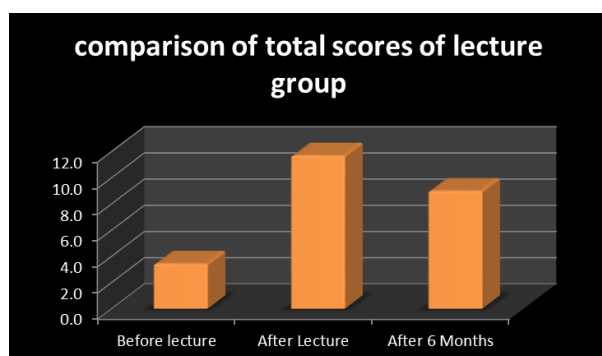
Lecture method	Percentage of correct answers		Improvement (After-Before) (%)	P* Value, sig
	Before (%)	After (%)		
What tooth is made up of?	15.5	80	64.5	P<0.001 HS
What is plaque?	0	62	62	P<0.001 HS
What is dental caries?	25	78	53	P<0.001 HS
What type of food causes tooth decay?	68	93.5	25.5	P<0.001 HS
What you should do to prevent tooth decay?	2.5	33	30.5	P<0.001 HS
How you should clean your teeth?	62.5	86	23.5	P<0.001 HS
How many times you should brush your teeth?	43	84.5	41.5	P<0.001 HS
How long you should brush your teeth?	5.5	62	56.5	P<0.001 HS
Is it important to clean in between tooth surfaces?	11.5	65.5	54	P<0.001 HS
What you should use to clean in between tooth surfaces?	2.5	66	63.5	P<0.001 HS
Should we snack in between meals?	22	73	51	P<0.001 HS
How many times you eat toffee, candy, chocolates per day?	12.5	80.5	68	P<0.001 HS
Fluoride prevents tooth decay?	20	74	54	P<0.001 HS
When you should visit dental doctor?	26.5	85.5	59	P<0.001 HS
What are the effects of abnormal oral habits on teeth?	18	74.5	56.5	P<0.001 HS
What is the effect of coke, pepsi and cold drinks on teeth?	9	79	70	P<0.001 HS
* McNemer Test				

Table2: Analysis of individual question for retention in lecture group after six months.

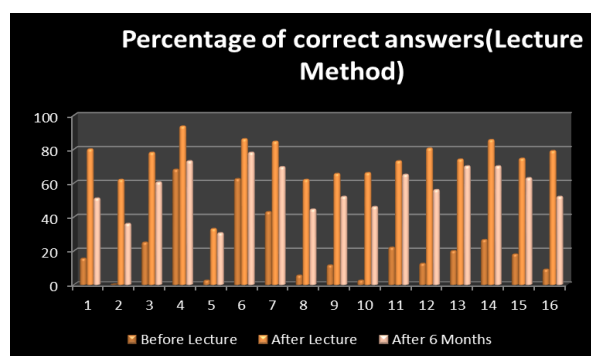
Lecture method	Percentage of correct answers	Improvement (After 6
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Questions	Before (%)	6 Months (%)	months- Before) (%)	P* Value, sig
What tooth is made up of?	15.5	51	35.5	P<0.001 HS
What is plaque?	0	36	36	P<0.001 HS
What is dental caries?	25	60.5	35.5	P<0.001 HS
What type of food causes tooth decay?	68	73	5	0.002 S
What you should do to prevent tooth decay?	2.5	30.5	28	P<0.001 HS
How you should clean your teeth?	62.5	78	15.5	P<0.001 HS
How many times you should brush your teeth?	43	69.5	26.5	P<0.001 HS
How long you should brush your teeth?	5.5	44.5	39	P<0.001 HS
Is it important to clean in between tooth surfaces?	11.5	52	40.5	P<0.001 HS
What you should use to clean in between tooth surfaces?	2.5	46	43.5	P<0.001 HS
Should we snack in between meals?	22	65	43	P<0.001 HS
How many times you eat toffee, candy, chocolates per day?	12.5	56	43.5	P<0.001 HS
Fluoride prevents tooth decay?	20	70	50	P<0.001 HS
When you should visit dental doctor?	26.5	70	43.5	P<0.001 HS
What are the effects of abnormal oral habits on teeth?	18	63	45	P<0.001 HS
What is the effect of coke, peps and cold drinks on teeth?	9	52	43	P<0.001 HS

Graph 1: Comparison of total scores of lecture group: before, just after and after six months.



Graph 2: Comparison of correct answers before, just after and after six months of lecture group.



DISCUSSION

"Dental caries is the most common chronic disease on the planet..." according to the FDI, despite being preventable and with known etiology.[4]The etiology and pathogenesis of dental caries are known to be multifactorial. Numerous host, agent and environmental factors play a role in the development of dental caries.[5]Extensive research of last several decades has shown the crucial role played by dental plaque in the initiation and progression of dental caries.

As children spend much time in school, teachers can assist with dental health education programs. These programs have proven successful in improving knowledge and motivating oral hygiene practices via activities such as group participation, coloring/activity books, films, and interactive computer programs, parent-child information nights, contracting and rewarding behavioral changes. Behavior modeling by authority figures in a child's life such as a teacher, dentist, auxiliary or sibling can be a powerful tool. [6]

A. Chapman, S. J. Copestake and K. Duncan(2006) evaluated the efficacy of a teaching program based on the national curriculum for use in a primary school setting. There was a significant increase in knowledge after teaching had taken place ($P<0.001$). After the 7-weeks gap and at the administration of the third questionnaire, there was no significant decrease in knowledge ($P=0.215$) whereas in the present study there was a significant reduction ($P<0.001$) in knowledge after 6 months. The reason may be because the duration of evaluation in the present study was longer compared to chapman study which was done only 7-weeks after teaching program.[3]

Although Albaret et al [7] in a study with teenagers had found that even with the introduction of an educative program it was not possible to change the habits of those who did not take care of themselves, present study showed significant improvement, probably this occurred because of the better motivation of students through instruction program.

Previous studies involving Jordanian children by Mahmoud K. Al-Omari et al (2006) showed only 15 % of the study population knew the

significance of dental plaque, while the rest either did not know or reported wrong answers.[8] In the present study, none of the subjects answered this question. This difference may be attributed to the lack of knowledge regarding oral health amongst school children in India or wide range of age group taken in the former study (10-16 years).

At the age of 11- 13 years most of the permanent teeth are erupted in the oral cavity and many of the teeth are still undergoing post eruptive maturation and hence are susceptible to dental caries. In a study by Mahmoud K. Al-Omari et al 76.8% of the study population knew the effect of caries in contrast to our study in which only 25% of the study population had the knowledge of caries before the intervention.[8]

Knowledge and behavior about the association of diet and dental caries:

Although various factors directly or indirectly affect the variables that are under study, diet appears to be one of the major factors that can have a profound influence on the variables. Strong evidence indicates that the association of Lactobacilli and Mutans streptococci with caries development is linked directly to carbohydrate consumption which, in turn, is one of the indispensable factors in caries development. Many studies indicate that the levels of Lactobacilli and Mutans streptococci in plaque or saliva are very sensitive to dietary carbohydrate (Van Houte, 1980).[9] Confidence in this linkage is derived particularly from early studies involving extremes in oral exposure to dietary carbohydrate, such as a very low level of exposure during stomach-tube-feeding of animals or humans, or a very high level of exposure of children with "nursing bottle caries" (van Houte et al, 1982);[10] less extreme changes in dietary carbohydrate intake, even during periods of only a few months, can also cause significant changes in the levels of Lactobacilli or Mutans streptococci. Further evidence suggests that the linkage between the oral levels of Lactobacilli and Mutans streptococci and dietary carbohydrate consumption is associated with the pronounced acid tolerance of Lactobacilli and Mutans streptococci. [11]

Dental erosion is a pathological process, which is chronic in nature and results from

chemical etching of tooth surfaces by an acid and/or chelating agent without any bacterial involvement. Many investigators have reported a strong and significant association between the presence of dental erosion and the increased consumption of acidic drinks. The overall erosion prevalence observed by I.A. El Karim et al was 66.9% of which 45.2% was mild and 21.7% was moderate erosion. A strong association was found between erosion and private schooling (higher socioeconomic groups), carbonated drinks, herbal hibiscus drink and traditional acidic food consumption. [12]

Knowledge and behavior regarding oral hygiene habits:

A study 12 year old Thai children by Poul Erik Peterson and Niels Hoerup (2001), 97% of children agreed that brushing can prevent tooth decay, only 2% disagree as compared to present study in which 70% agree with the fact that brushing can prevent tooth decay but only 3% were able to answer that brushing, routine dental check-up and avoiding soft sticky food together will reduce the occurrence of dental caries. [13]

Tooth brushing with toothpaste is the most widely practiced form of oral hygiene maintenance in most countries. Twice daily brushing with toothpaste has significantly declined dental caries. Toothpaste has a history that stretches back nearly 4,000 years, they provide an ideal vehicle for chemical adjuncts and make brushing more pleasant and more effective. It is claimed that dentifrices have five main purposes: minimizing the build-up of plaque, strengthening teeth against caries, removing staining, removing food debris, and freshening the mouth. [14]

The effectiveness of brushing twice daily with toothpaste on caries is supported by data on reported behavior obtained from surveys and clinical trials. For example, among children aged 3.5–4.5 years, 24% of those whose teeth were brushed more than once a day had caries experience compared with 38% of those whose teeth were brushed once a day and almost half (48%) of those whose teeth were brushed less often. [15] Since twice daily brushing is considered most effective, our subjects were instructed to brush two times a day after breakfast and before going to bed.

Bin Peng et al (1997) [16] showed that 40% of 12 year school going children knew the need of tooth brushing twice daily to maintain oral health similar to the present study in which 43% of children knew the need of tooth brushing at least twice a day.

Study by Gallagher et al (2003) evaluated the effect of brushing times and dentifrice on plaque removal concluded that oral health care professionals should reinforce efforts to persuade patients to brush for longer periods of time, as increasing brushing time to the consensus minimum of two minutes increases plaque removal and effectiveness of dentifrices to an extent likely to provide clinically significant oral health benefits. Since the time of tooth brushing is also an important factor that determine the time of contact of dentifrices with the oral tissue. Hence in present study the time of brushing was standardized for about 2 minutes for all the participants. [17]

A study conducted by Abhinav Singh evaluated oral health knowledge, attitude and practice among NCC cadets and their correlation with oral hygiene in South India and stated that only 36.4% of subjects were aware for the use of dental floss as an interdental cleansing aid. [18] In contrast the present study only 2.5% knew about the use of dental floss as an interdental cleansing aid.

A survey conducted by Poul Erik Peterson and Niels Hoerup [13] amongst 12 year old school going children, 91% of children agreed that fluoride prevents tooth decay. Ernesto Smyth in his study also stated that 75.3% of children knew that the use of fluoride makes the teeth stronger in contrast to present study in which only 20% of them knew the role of fluoride in prevention of dental caries. [18]

Childhood is an important life stage for establishing adulthood behaviors; during this age young people assume responsibility for learning and maintaining health related attitudes and behaviors. Hence the children can be educated about the caries preventive measures and motivated to use these dentifrices in their routine oral hygiene procedures. Video presentation was found to be effective tool when large number of population could be reached even though this study estimated the plaque index after 6 months, there was no long term estimation of caries activity done

which needs to be emphasized in future thesis. However, any estimate of any change in caries activity requires a rather long period of time during which uncontrolled factors may interfere.

CONCLUSION

- Knowledge regarding oral hygiene measures amongst 12 year school going children in Davangere was significantly low.
- Lecture method is an effective tool in increasing awareness and knowledge regarding oral hygiene and oral health in 12 year school going children.
- After 6 months, there was a significant reduction in memory gained after interventional program dictates the need for regular reinforcement of educational and motivational programs.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Lisa H. Alsada , Michael J. Sigal , Hardy Limeback , James Fiege, GajananV. Kulkarni. Development and testing of an Audio-visual aid for improving infant oral health through primary caregiver education. Journal of the Canadian education, april 2005, vol.71, no.4.
2. Kay E, Locker D. A systemic review of the effectiveness of health promotion aimed at improving oral health. Community Dental Health.1998;15,132-144.
3. Chapman A, Copestake SJ, Duncan K. An oral health education program based on the national curriculum. International journal of pediatric dentistry; 16: 40-44.
4. Tao He, Michael Britt, Aaron R. Biesbrock. Innovations in global dentifrice technology: An advanced stannous- containing sodium fluoride dentifrice. American journal of dentistry. 2010. September Vol. 23, Sp is B
5. Cataldo W. Leone, Frank G. Oppenheim. Physical and chemical aspects of saliva as indicators of risk for dental caries in humans. Journal of dental education, Vol. 65, No. 10.
6. Flanders RA. Effectiveness of dental health education programs in schools. Journal of the American Dental Association 1987; 114: 239-242.
7. Albandar JM, Buischi YAP, Mayer MPA, Axelsson. Long term effect of two preventive programs on the incidence of plaque and gingivitis in adolescents. J Periodontol .1994;65: 605-610.
8. Mahmoud K.Al-Omari, Jor Board Ahed M. Al-Wahadni, Khaled N. Saeed. Oral health attitudes, knowledge, and behavior among school children in north Jordan. Journal of dental education, February 2006.
9. Van Houte J . Bacterial specificity in the etiology of dental caries. Int Dent J. 1980;30:305-326.
10. Van Houte J. Oral flora of children with “nursing bottle caries”. J Dent Res . 1982;61:382-385.
11. Van Houte. Microbiological predictors of caries risk. Adv Dent Res August 1993, 7(2).
12. A. El Karim, N. M. Sanhoury, N. T.T Hashim. Dental erosion among 12-14 year old school children in Khartoum: a pilot study. Community dental health. 2007; 24, 176-180.
13. Poul Erik Peterson, Neils Hoerup, Nattaporn Poomviset, Janpim Prommajan and AcharaWatanapa. Oral health status and oral health behavior of urban and rural school children in southern Thailand. International dental journal. 2001; 51. 95-102.
14. Kimberly Krust Bray. Tooth brushing behavior change. J American Dental Hygienists Association. Sept-oct 2010.
15. Saxer UP, Barbakow J, Yankell SL. New studies on actual and estimated tooth brushing times and dentifrice use. J Clin Dent. 1998; 9:49-51.
16. Peng B, Petersen PE, Fan MW, Tai BJ. Oral health status and oral health behavior of 12-year-old urban school children in the people's republic of china. Community dental health (1997) 14, 238-244.
17. Gallagher A, Sowinski J, Bowman J et al. The effect of brushing time and dentifrice on dental plaque removal in vivo. J Dent Hyg. 2009; 83: 111-6.
18. Abhinav Singh .Oral Health Knowledge, Attitude and Practice among NCC Navy Cadets and their Correlation with Oral Hygiene in South India. Oral Health Prev Dent 7 (2009), No. 4.