

# Effectiveness of oral health education on knowledge, attitude, practices and oral hygiene status among 12–15-year-old schoolchildren of fishermen of Kutch district, Gujarat, India

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## ABSTRACT

**Background:** To assess the effectiveness of oral health education on oral health knowledge, attitude, practices and oral hygiene status among 12–15-year-old schoolchildren of fishermen of Kutch district, Gujarat, India.

**Materials and methods:** A before-and-after experimental study was conducted among all ( $n = 205$ ) the 12–15-year-old children from two schools of Bhadreshwar village of Mundra taluka of Kutch district, Gujarat, India from January 2013 to December 2013. At baseline, children were assessed for oral health knowledge, attitude and practices using a self-administered structured questionnaire and oral hygiene was assessed using Oral Hygiene Index-Simplified (OHI-S). Oral health education was provided after baseline assessment, at 3 months and at 6 months. Follow up study was done after 1 year from baseline. Statistical tests applied were Independent t test, paired t test and McNemar test. Level of significance and confidence level were set at 5% and 95%, respectively.

**Results:** Mean OHI-S scores reduced significantly at 1 year follow up interval. All the questions showed statistically significant improvement in knowledge, attitude and practices except the frequency of change of tooth brush which showed no improvement.

**Conclusions:** The results of the study reflects the accomplishment of upgrading oral health knowledge, attitude, practices and oral hygiene status of fishermen children through school oral health education programme. Organizing oral health education in high schoolchildren of fishermen community could lead to improvement in students' oral hygiene to ultimately enhance their oral health.

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**Key words:** attitude, knowledge, oral health education, oral hygiene, practice



## INTRODUCTION

Oral health is now recognised as equally important in relation to general health. Dental caries and periodontal diseases are the two foremost oral pathologies that remain widely prevalent and affect all populations throughout the lifespan. Various factors like nutritional status, tobacco smoking, alcohol, hygiene, stress, etc. are linked to a wide range of oral diseases forming the fundamental basis of the common risk factor approach (World Health Organisation, 2000) to prevent the oral diseases [1]. Among these, oral hygiene is the most significant factor in terms of prevention of oral diseases. The oral health concern of an individual is dependent on the attitude of a person. These attitudes naturally reflect their own experiences, cultural perceptions, familial beliefs, and other life situations and strongly influence the oral health behaviour [2–5].

The risk behaviours that can be detrimental to the oral health could be habitual from early childhood or be initiated during adolescence related to an emerging autonomy from parental influence. Indeed, adolescence is a crucial period of transition with personal responsibility for preventing dental disease beginning at this age and determining future oral health [6]. The school years cover a period that runs from childhood to adolescence. These are influential stages in people's lives when lifelong sustainable oral health related behaviours, as well as beliefs and attitudes, are being developed. Children are particularly receptive during this period and the earlier the habits are established, the longer lasting the impact. Children may also be equipped with personal skills that enable them to make healthy decisions, to adopt a healthy lifestyle and to deal with stressful situations such as violence and conflicts [7]. So school may be considered as an ideal setting for conducting successful health programmes.

Fishermen have poor oral health when compared with that of general population [8, 9]. Fishermen have lower socioeconomic status and their illiteracy might influence their general and oral health. Their access to dental services is very limited owing to their prolonged working hours making regular check-ups and treatments difficult [10]. Hence fishermen children may be considered as a high risk target group.

A number of well-planned preventive/educational programs, based on the mechanical control of dental biofilm and on the motivation of individuals, have obtained favourable results in reducing dental biofilm [11]. The goal of oral health education is to improve knowledge, which may lead to adoption of favourable oral health behaviours that contribute to better oral health. It is surmised that well-designed educational intervention studies may improve awareness levels in children. Hence the objective of the present study

is to assess the effectiveness of oral health education on oral health knowledge, attitude, practices and oral hygiene status among 12–15-year-old schoolchildren of fishermen of Kutch district, Gujarat, India.

## MATERIALS AND METHODS

### STUDY POPULATION, STUDY DESIGN AND STUDY SETTING

A before and after experimental study was conducted among all (n = 205) the 12–15-year-old children from two schools of Bhadreswar village of Mundra taluka of Kutch district, Gujarat, India from January 2013 to December 2013.

### OFFICIAL PERMISSION, ETHICAL CLEARANCE AND INFORMED CONSENT

The study protocol was reviewed by the Ethical Committee of Pacific Dental College and Hospital and was granted ethical clearance.

An official permission was obtained from the District Education Officer, District Education Office (Primary and middle; Secondary), Kutch.

A written consent was obtained from the school authorities and parents of all the study participants.

### PRETESTING OF QUESTIONNAIRE

When face validity was assessed, it was observed that 92% of the participants found the questionnaire to be easy [12]. Mean content validity ratio was calculated as 0.87 based on the opinions expressed by a panel of total 6 academicians.

Prior to finalising the questionnaire, it was pilot tested among a convenience sample of 15 children. Upon completion of the pilot response format, each subject was interviewed to gain feedback on the overall acceptability of the questionnaire in terms of length, language clarity, and on the feasibility of children completing and returning it. Cronbach's coefficient was found to be 0.81, which showed a high internal reliability of the questionnaire. Based on this analysis, all necessary changes were introduced before the main study.

### PROFORMA DETAILS

The first part of proforma consisted of the self-administered structured questionnaire comprising of:

- demographic questions including name, age, sex, school name.
- specific research questions: It consisted of 22 close ended multiple choice questions which were divided into 3 categories: knowledge (11 questions), attitude (3 questions), practices (8 questions) (Appendix).

**Table 1.** Comparison of mean Oral Hygiene Index-Simplified score before and after oral health education programme

	N	Debris Index*	P	Calculus Index*	P	Oral Hygiene Index*	P
Before	200	1.52 ± 0.56	0.000	0.40 ± 0.38	0.481	1.92 ± 0.85	0.000
After	200	0.83 ± 0.62		0.38 ± 0.37		1.21 ± 0.82	

Test applied: Paired t test; \*simplified

**Table 2.** Assessment of differences in oral health knowledge, attitude and practices before and after oral health education programme

	Gender	Mean ± standard deviation	P
Before	Male (n = 92)	8.07 ± 2.03	0.99
	Female (n = 108)	8.06 ± 2.22	
After	Male (n = 108)	12.41 ± 2.17	0.906
	Female (n = 108)	12.44 ± 2.31	

Test applied: Independent t test

The second part of proforma consisted of the index to be recorded, that is, Oral Hygiene Index-Simplified (OHI-S) [13].

## METHODOLOGY

**Sample selection.** Multi-stage random sampling was employed to select the study population. Mundra Taluka was randomly selected from Kutch district. Further, one village (Bhadreshwar) was randomly selected from Mundra Taluka. List of schools at this village was obtained from District Education Office, Kutch. From this list, two schools were randomly selected. From these two schools all the 12–15-year-old schoolchildren whose parents were involved in fishing as their livelihood were selected. The sample size obtained was 205.

**Before study.** On the predecided days, investigator visited the schools. The children were interviewed in the classroom with the help of questionnaire and Type III clinical examination [14] was done to record the OHI-S.

**Educational programme.** This included a 1 hour oral health education session for children on the same day, after 3 months, and 6 months. Oral health education involved instructions on oral hygiene, use of fluorides, dietary habits and dental attendance, the basic concepts of oral health promotion. The importance of topical fluorides as a protective agent was emphasized, advising toothpaste as the preferred carrier three times a day. Diet counselling focussed on the danger of frequent intake between meals of sugar rich food and beverages.

**After study (follow up).** After 1 year, investigator again visited the same schools, questionnaire was administered to the study subjects and Type III clinical examination was done to record the OHI-S index. There was attrition of 5 subjects, hence the final sample which was analysed consisted of 200 children.

## STATISTICAL ANALYSIS

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 15 (SPSS Inc. Chicago, IL, USA) Windows software program. Descriptive statistics were calculated. Statistical tests applied were Independent t test, paired t test and McNemar test. Level of significance and confidence level were set at 5% and 95%, respectively.

## RESULTS

Mean Debris Index score of the study population before the dental health education programmes was 1.52 ± 0.56. After 1 year from baseline, mean Debris Index score was significantly ( $p = 0.000$ ) reduced to 0.83 ± 0.62. Mean OHI-S score of the study population also showed significant ( $p = 0.000$ ) reduction from 1.92 ± 0.85 to 1.21 ± 0.82 (Table 1). When compared according to gender, mean oral health knowledge, attitude and practices of males and females did not differ significantly ( $p > 0.05$ ) before and after oral health education programme (Table 2).

On the basis of correct answers obtained, all the questions showed statistically significant improvement in knowledge, attitude and practices except one question “How often you change your tooth brush” which showed no improvement. Most of the children were unaware about the reasons of tooth decay and bleeding gums before the programme but after the programme more than half of the children responded correctly. The knowledge about dental floss was increased from among 12% participants to 58.5% participants. After the programme, 87% of them started believing that improving and maintaining their health is in their control, in contrast to, 53% before the programme. Apart from knowledge and attitude, there was drastic improvement in the practices related to oral health after the programme. 82%, 67.5% and 91% children started rinsing after meals, started cleaning their tongue and using oral hygiene aids after the programme respectively (Tables 3–5).

## DISCUSSION

Changing personal behaviour from health damaging to health promoting is a major target of intervention strategies [15–17]. Traditionally, this has been done by providing information, education and counselling. This study demonstrated that a school-based, easy-to-organise, inexpensive

**Table 3.** Assessment of differences in oral health knowledge before and after oral health education programme

S. No.	Questions	Before	After	P
1	Is oral health a part of general health?	106 (53%)	172 (86%)	0.01
2	How many milk teeth do we have?	38 (19%)	70 (35%)	0.032
3	How many permanent teeth do we have?	102 (51%)	165 (82.5%)	0.00
4	What are the most common diseases affecting oral cavity?	69 (34.5%)	119 (54.5%)	0.011
5	Why do we get dental problems?	108 (54%)	171 (85.5%)	0.002
6	What is the reason for tooth decay?	19 (9.5%)	102 (51%)	0.004
7	What is the reason for bleeding gums?	94 (47%)	124 (62%)	0.05
8	How can we prevent dental problems?	58 (29%)	121 (60.5%)	0.05
9	What is fluoride?	94 (47%)	124 (62%)	0.013
10	What is dental floss?	24 (12%)	117 (58.5%)	0.018
11	Regular cleaning of mouth can prevent dental caries.	56 (28%)	156 (78%)	0.03

Test used: Chi square test

**Table 4.** Assessment of differences in oral health attitude before and after oral health education programme

S. No.	Questions	Before	After	P
1	Do you think maintaining healthy mouth is individual responsibility?	33 (16.5%)	42 (21%)	0.006
2	Do you think that improving and maintaining health of the mouth is in your control?	106 (53%)	174 (87%)	0.015
3	Do you think it is required to visit a dentist periodically to maintain health of your mouth?	109 (54.5%)	141 (70.5%)	0.001

Test used: Chi square test

**Table 5.** Assessment of differences in oral health practices before and after oral health education programme

S. No.	Questions	Before	After	P
1	How do you clean your teeth?	115 (59%)	122 (62.5%)	0.02
2	How often do you clean your teeth?	149 (74.5%)	180 (90%)	0.045
3	What type of toothbrush bristles do you use?	101 (50.5%)	157 (78.5%)	0.05
4	Do you rinse your mouth after meals?	94 (47%)	164 (82%)	0.011
5	How do you brush your teeth?	109 (54.5%)	141 (70.5%)	0.001
6	How often do you change your toothbrush?	94 (47%)	94 (47%)	0.08
7	Do you clean your tongue?	74 (37%)	135 (67.5%)	0.03
8	Do you use oral hygiene aids?	97 (48.5%)	182 (91%)	0.01

Test used: Chi square test

educational intervention can be effective in improving oral cleanliness in 12–15-year-old children. The subjects were randomly chosen and had comparable background characteristics; had similar age ranges and socioeconomic status, and was from the same school locations within a city. This study tested the effectiveness of a dental health program and found that the children after receiving the program had significantly lower mean OHI-S scores and greater knowledge about oral health.

At baseline, the OHI-S ( $1.92 \pm 0.85$ ) and Debris Index ( $1.52 \pm 0.56$ ) scores were fair, reasons for this may be that

no school-based oral health programmes are available for this age group in India, and no regular dental examinations are provided for adolescents. Furthermore, it can be questioned whether local dental professionals give sufficient priority to preventive care. The baseline mean calculus score was good ( $0.40 \pm 0.38$ ). This may be attributed to the younger age group. Significant reduction in OHI-S was observed at the end of 12 months. Repeated sessions would probably have brought a better impact in oral hygiene, as has been emphasized elsewhere [18, 19]. Emphasizing some immediate gains from good oral hygiene [18] (such as fresh breath; clean,

white teeth; and attractive appearance) were key aspects for motivating these students to learn and maintain good oral health. In addition, the relationship between good oral health and good general health [11] was demonstrated in this educational material. The relationship between dental caries, obesity, and a sugary diet [1, 20] was addressed, as well. These aspects might have had a positive effect on the good results achieved. How long the benefit will be retained is an important question in all health education programs.

In the present study it was found that there was increase in the overall knowledge score which was similar to the study conducted by Irlane Alves de Farias among Brazilian schoolchildren in 2009 [11]. There was no gender variation in knowledge, attitude and practices before and after oral health education. At the end of the study, children seemed to have gained improved knowledge about the cause and prevention of tooth decay. Their self-reported increase in use of oral hygiene aids and maintenance of oral hygiene as compared with the baseline, reflects their newly gained knowledge of expected behaviour which is reported by other studies also [21–29]. There was a drastic increase in knowledge in causation of dental caries (9.5% to 51%) and floss (12% to 58.5%) at the end of the study. Subjects showed increased knowledge of different oral diseases (34.5% to 54.5%) and reason for bleeding gums (47% to 62%) at the end of 12 months. A significant shift in the individual's responsibility of self oral health was observed after oral health education (53% to 87%). This was their first oral health education experience at school and the pupils might have been receptive to the new ideas. This also can be explained as an 'exposure effect': changing children's oral health attitude and behaviour by simply exposing them to a dentist's examination and a questionnaire [30]. No improvement in the practice of change of toothbrush might be attributed to the low socioeconomic status of the parents which might affect the affordability of oral hygiene aids.

According to a communication-behaviour change model [31], oral health educational programmes based on an information persuasion strategy have a positive influence on individuals' knowledge and attitudes. Health messages through educational materials, such as leaflets, can change individuals' behaviours [32]. In India, with its low level of oral hygiene and oral health knowledge, a communication-behaviour approach seems particularly appropriate to improve the oral hygiene of adolescents. People have different learning styles or characteristics for processing information. Based upon differences in learning styles, various educational methods can be effective in oral health educational programmes [33]. Maintaining any improvement in the oral hygiene of children and adolescents calls for changes in health policy, health care system, and research. Preventive

programmes in schools should be set as a high-priority goal by health policymakers in India and implementation of existing National Oral Health Policy should be of prime importance. Further research is, however, necessary to establish the long-term benefits of educational interventions with different educational aids, different providers and different age groups.

School oral health education provided by dental personnel or schoolteachers in developed countries has usually improved pupils' oral health knowledge, attitudes or status (Frazier, 1992; Brown, 1994). In African countries, the few available evaluative studies of school oral health education (Evian et al., 1978; Olsson, 1978; Doherty, 1983; Harts-horne et al., 1989; van Palenstein et al., 1992) also show more elements of success which is similar to our study and another Indian study [24]. The studies have focused on effects and seldom describe the input or processes (e.g. teachers' training in oral health education or the school oral health education sessions) which presumably affect the programme impact or outcomes among the pupils [26]. Parent-teacher meetings aimed at collaboration and coordination between home and school are frequent in India and thus facilitate the delivery of oral health-related information to parents. In view of the existing structure of schools, health-promotional aspects can be recommended for these meetings. Furthermore, from a cultural point of view, parents seem to value information received from school [34].

The study provides valuable information about the effectiveness of dental health education among fishermen schoolchildren. However there are some limitations. The effectiveness has been observed after 1 year of the programme but the substantivity of the impact requires more longitudinal research. Moreover, the poor socioeconomic status of the fishermen population might have hampered them to practice good oral hygiene due to unaffordability for oral hygiene aids. The present study has been conducted in a small geographic area, hence further multicentre studies are required for generalizability.

## CONCLUSIONS

This study shows that an easy-to-organise and inexpensive school-based intervention can, on a short-term basis, be effective in improving oral cleanliness of children. Organising oral health education in high schoolchildren of fishermen community could lead to improvement in students' oral hygiene to ultimately enhance their oral health. A similar model probably could be applied in other countries with a developing oral health system. Teacher training and motivation is needed for their role in health education. An intervention involving the oral health providers, the school personnel, and children and their parents needs to be attempted to see what effect it could have on impact of school oral health education in India.



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## APPENDIX

### Proforma

Name: ..... Age: ..... Sex: .....

Name of school: .....

#### Oral Health Knowledge

1. Is oral health a part of general health?
  - a. Yes
  - b. No
2. How many milk teeth do we have?
  - a. 10
  - b. 20
  - c. 28
  - d. 32
3. How many permanent teeth do we have?
  - a. 10
  - b. 20
  - c. 28
  - d. 32
4. What are the most common diseases affecting oral cavity?
  - a. Dental caries and periodontal diseases
  - b. Asthma and common cold
5. Why do we get dental problems?
  - a. If we don't clean teeth regularly and eat frequently
  - b. If we eat healthy diet
  - c. If we drink lot of water
6. What is the reason for tooth decay?
  - a. Caused by bacterial fermentation
  - b. Caused by viruses
  - c. Caused by fungal infection
7. What is the reason for bleeding gums?
  - a. Not cleaning teeth regularly and deposition of debris
  - b. Eating hard food
8. How can we prevent dental problems?
  - a. Maintaining oral hygiene and regular dental visit
  - b. Taking bath regularly
9. What is fluoride?
  - a. A substance that purifies water
  - b. A substance that improves taste of food
  - c. A chemical substance in water that prevent dental caries
10. What is dental floss?
  - a. Type of a toothbrush
  - b. An interdental cleaning aid
11. Regular cleaning of mouth can prevent dental caries
  - a. Yes
  - b. No

#### Oral Health Attitude

1. Do you think maintaining healthy mouth is individual responsibility?
  - a. Yes
  - b. No
2. Do you think that improving and maintaining health of the mouth is in your control?
  - a. Yes
  - b. No
3. Do you think it is required to visit a dentist periodically to maintain health of your mouth?
  - a. Yes
  - b. No

#### Oral Health Practices

1. How do you clean your teeth?
  - a. Toothbrush and tooth paste/toothpowder
  - b. Finger and tooth paste/toothpowder
  - c. Finger only
  - d. Toothbrush only
  - e. Any other
2. How often do you clean your teeth?
  - a. Occasionally
  - b. Twice or more daily
  - c. Once daily
3. What type of toothbrush bristles do you use?
  - a. Soft
  - b. Medium
  - c. Hard
4. Do you rinse your mouth after meals?
  - a. Yes
  - b. No
5. How do you brush your teeth?
  - a. Horizontal method
  - b. Vertical method
  - c. Circular method
6. How often do you change your toothbrush?
  - a. Every month
  - b. Every 2 months
  - c. Every 6 months
  - d. When bristles flare out
7. Do you clean your tongue?
  - a. Yes
  - b. No
8. Do you use oral hygiene aids?
  - a. Yes
  - b. No