

Effect of Training School Teachers on Oral Hygiene Status of 8-10 Years Old Government School Children of Udaipur City, India

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ABSTRACT

Introduction: Provision of oral health knowledge to the children by their teachers at the school level can prove to be more fruitful because it is the time period during which the children begin to learn the basic oral hygiene practices and are most prone to dental caries.

Aim: This study was carried out to assess the effect of training school teachers on oral hygiene status of 8-10 years old government school children of Udaipur city, India.

Materials and Methods: A total of nine school teachers and 279, 8-10 year old school children from two government schools were included in the study. The questionnaire on oral health knowledge and practice contained 17 questions to evaluate the knowledge and practice of children towards oral hygiene before and after the teachers training program. Baseline and six months

post training data on oral health knowledge and practice was obtained by the questionnaire method. Baseline and six months post training data on oral hygiene status was obtained by OHI-S Index. Statistical analysis was done using software SPSS 22, the test used were McNemar's test, paired t-test.

Results: Pre and post training data were compared and it was found that there was a significant improvement in oral health knowledge and practices of school teachers and children. Also oral hygiene status of school children was significantly improved after the program.

Conclusion: Results of the present study suggest that experiential learning is an effective school based oral health education method for improvement of oral hygiene in primary school children.

Keywords: Calculus, Oral health, Plaque, Questionnaire

INTRODUCTION

Oral wellbeing is primal to general wellbeing and prosperity. A sound mouth empowers a person to talk, eat and associate without encountering dynamic illness, inconvenience or humiliation [1]. Poor oral wellbeing can detrimentally affect kids' execution in school and their achievement in later life. Youngsters who experience the ill effects of poor oral wellbeing are 12 times more inclined to have more confined movement days including missing school than the individuals who do not [2]. More than 50 million hours every year are lost from school because of oral maladies [1,2]. It has been guessed that oral wellbeing can be enhanced through wellbeing education [3], schools give a perfect setting to advancing oral wellbeing it offers a proficient and powerful approach to reach more than 1 billion kids worldwide and through them, families and group individuals [2,3].

The school-going age is the most influential period of a child's life and it is this period during which the children develop skills, beliefs and attitudes which they practice throughout their lives [4,5]. According to WHO's Global School Health Initiative, launched in 1995, schools have constantly strengthening capacity as a healthy setting for living, learning and working [6]. This is because students can be accessed during their formative years, from childhood to adolescence, thus provide a supportive environment for promoting oral health. Thus, schools can provide a platform for provision of oral health care, i.e., preventive and curative services [7,8].

Teachers are considered as role models to transmit values of life. It is thus critical that their own oral wellbeing conduct adjusts to desire of the populace [4-6]. Empowering school staff to give schoolchildren data about wellbeing consideration that would help them to pick up learning, aptitudes also, states of mind to keep up and upgrade their oral wellbeing [8]. Apart from this

connection, teachers are viewed as major operators in school wellbeing projects and absence of preparing and support makes a more prominent boundary for powerful usage of school wellbeing training intercessions. Children perform behaviors as desired when they receive positive feedback from significant others (e.g., peers, parents, and teachers). Significant others can serve as models for children and children will have strong self-efficacy if they observe a successful model similar to themselves [9,10]. Younger children possibly can do logic thoughts, can work together in teams, can realize the cause-result interaction and explore everything [11,12]. Instructors have a persuasive position, thus can make important commitments to wellbeing advancement in the school community [13]. In this way, oral wellbeing powers need to recognize approaches to create the expert abilities of instructors and energize them to utilize their abilities and information to advantage kids' wellbeing.

Hence, this questionnaire based study was conducted to assess the effect of training school teachers on oral hygiene status of 8-10 years old government school children of Udaipur city, India.

MATERIALS AND METHODS

The present study was carried out in Udaipur city. The study protocol was reviewed by the Ethical Committee of Pacific Dental College and Hospital and was granted ethical clearance. The list of all the schools present in Udaipur district was obtained from the office of the District education officer, Udaipur. Two government schools with 8-10 years students in Hindi medium, with no previous history of school based dental health education programs were required for the present study. Hence, out of total 121 schools in Udaipur two schools were randomly selected with the help of lottery method. All the classes from each of these two schools

were selected which were having students of age 8-10 years and the respective class teachers were included into the study, which comprised of a total of 279 students and nine teachers. Those with presence of systemic disease/conditions, taking medications affecting oral health [antibiotics, mouthwashes] in the previous two weeks, and children undergoing orthodontic treatment were excluded from the study. The proforma for study included demographic details depicting information regarding name of the school, student/teacher, age, sex, class, section and roll number of the students. It was written in English consisting of 17 questions on the oral health knowledge and practices and then translated to local language (Hindi). The next section in questionnaire comprised of the clinical data sheet used to record OHI-S. The oral health education module for government school teachers and students was prepared in the computer program MS-Office Power Point. The content was standardized and included: importance of teeth, functions of teeth, sets of teeth, causes and significance of gum diseases, malocclusion. The content was later translated into Hindi [14].

A pilot study was done on a group of 20 subjects in which varying levels of plaque and calculus was examined on two successive days and the results were compared to know the diagnostic variability and to accredit the validity of the questionnaire. The results were analyzed for intra-examiner reliability of the examiner and it was found to be 90%.

This study was conducted over a period of seven months from March 2015 to September 2015. The first month was devoted to the preparation of various study materials, which included computer based education (www.colgate.com). Baseline data on oral health knowledge and practices of children and teachers was obtained by the questionnaire method and baseline data on oral hygiene of children was obtained by OHI-S Index. In second visit, one week after the first visit, all nine schools teachers selected were educated with the help of MS-Office PowerPoint presentation by the principle investigator, regarding importance of teeth, functions of teeth, number of permanent and milk teeth, significance of bleeding gums and malocclusion. The teachers were then asked to impart the knowledge to the students utilizing two half hour periods weekly. Six months after the second visit, third visit was made to the respective schools for follow-up examination of the students regarding oral hygiene which was recorded with the help of OHI-S Index. Also students and their teacher's oral health knowledge and practices were assessed with the help of the questionnaires. Pre and post training knowledge scores were compared to assess the effectiveness of oral health education program through assessment of pre and post training OHI-S scores using McNemar's test, Paired t-test, using SPSS version 22.

RESULTS

Total of nine government school teachers were included in the study. Of these, seven (77.8%) were males with mean age of 42.29 ± 10.45 years and two (22.2%) were females with mean age of 35 ± 7.07 years, the mean age of the participants being 40.67 ± 9.93 years. Total of 279 students, 8-10 years of age were included, out of which 163 (58.4%), with mean age of 9.02 ± 0.844 years, were males and 116 (41.6%), with mean age of 8.91 ± 0.89 years, were females. The comparative assessment of the pre and post training oral health knowledge of government school teachers teaching 8-10 years old school children in [Table/Fig-1] shows that only 11.1% were vigilant about the correct number of primary teeth, post training evaluation suggested that it increased up to 88.9%, this difference was found to be statistically significant ($p=0.016$). Before training only 11.1% teachers were aware of fluoride toothpastes, while oral health education made 77.8% of the teachers aware of fluoride toothpastes, this difference was found

| S.n | Questions | Pre-Training Correct Responses (n = 9) n (%) | Post-Training Correct Responses (n = 9) n (%) | p-value* |
|-----|---|--|---|----------|
| 1. | Why do we need teeth? | 8 (88.9) | 9 (100) | 1.000 |
| 2. | How many permanent teeth are present in your mouth? | 8 (88.9) | 9 (100) | 1.000 |
| 3. | How many milk teeth are present in your mouth? | 1 (11.1) | 8 (88.9) | 0.016* |
| 4. | The best way to clean your teeth is | 9 (100) | 9 (100) | 1.000 |
| 5. | How many times in a day should we brush our teeth? | 9 (100) | 9 (100) | 0.500 |
| 6. | Do sweets and sticky foods cause tooth decay? | 8 (88.9) | 9 (100) | 1.000 |
| 7. | Should we wash our mouth after food? | 9 (100) | 9 (100) | 0.500 |
| 8. | Bleeding gums indicate | 8 (88.9) | 9 (100) | 1.000 |
| 9. | Irregular teeth can be caused by sucking your finger | 5 (55.6) | 7 (77.8) | 0.625 |
| 10. | Eating ghutka is good for your teeth | 9 (100) | 8 (88.9) | 1.000 |
| 11. | Do you know about fluoride tooth paste? | 1 (11.1) | 7 (77.8) | 0.031* |
| 12. | Good food for my teeth are | 9 (100) | 9 (100) | 0.250 |
| 13. | How often should we change our tooth brush? | 1 (11.1) | 8 (88.9) | 0.016* |
| 14. | Smoking beedis and cigarettes is bad for our health | 9 (100) | 9 (100) | 0.250 |
| 15. | Cleaning our teeth properly will help preserve our teeth longer | 9 (100) | 8 (88.9) | 1.000 |

[Table/Fig-1]: Comparative assessment of the pre and post training oral health knowledge of government school teachers teaching 8-10 years old school children of Udaipur city, India.

Test applied - McNemar's test, * - Statistically Significant

to be statistically significant ($p=0.031$). Only 11.1% of teachers gave correct response to the question enquiring the frequency of changing tooth brush, post training results showed a statistically significant ($p=0.016$) rise in response by teachers upto 88.9% that to change their tooth brushes every three months.

[Table/Fig-2] represents the evaluation of knowledge towards oral health of 8-10 year old children through same questions as in [Table/Fig-3], a statistically significant ($p < 0.05$) improvement before and after training was seen in almost every question. But in response to the question whether gutkha is good for teeth; only 58.8% gave correct response, while after training the correct response increased to 64.2% which was statistically not significant ($p=0.192$). On the question of whether sucking of finger results in irregular teeth 40.5% of children responded correctly, but surprisingly post training this number reduced to 39.4%, but that was also statistically not significant ($p=0.845$).

[Table/Fig-3,4] revealed assessment of the pre and post training oral health practices of government school teachers and 8-10 years old school children. Pre training responses to the questions evaluating frequency and methods of cleaning teeth showed that before training only 88.8% teachers and 54.5% children used tooth brush + tooth paste/powder for teeth cleaning. After training all the teachers started using tooth brush + tooth paste/powder for cleaning their teeth ($p=1.0$), while in children this response increased to 93.2% ($p=0.001$). Pre training evaluation in teachers revealed that all teachers used to brush once daily, while post training evaluation showed that after education 77.8% teachers started brushing more than times ($p=0.016$). Pre training assessment in children showed that 12.9% did not brush even once a day, 69.9% children brush once daily, post training assessment revealed that 49.5% started brushing twice daily ($p=0.001$).

| S.n | Questions | Pre-Training Correct Responses (n = 279) n (%) | Post-Training Correct Responses (n = 279) n (%) | p-value* |
|-----|---|--|---|----------|
| 1. | Why do we need teeth? | 0 (0) | 278 (99.6) | 0.001* |
| 2. | How many permanent teeth are present in your mouth? | 17 (6.1) | 153 (54.8) | 0.001* |
| 3. | How many milk teeth are present in your mouth? | 12 (4.3) | 73 (26.2) | 0.001* |
| 4. | The best way to clean your teeth is | 140 (50.2) | 244 (87.5) | 0.001* |
| 5. | How many times in a day should we brush our teeth? | 68 (24.4) | 186 (66.7) | 0.001* |
| 6. | Do sweets and sticky foods cause tooth decay? | 129 (46.2) | 227 (81.4) | 0.001* |
| 7. | Should we wash our mouth after food? | 160 (57.3) | 195 (69.9) | 0.001* |
| 8. | Bleeding gums indicate | 191 (68.5) | 167 (59.9) | 0.030* |
| 9. | Irregular teeth can be caused by sucking your finger | 113 (40.5) | 110 (39.4) | 0.845 |
| 10. | Eating ghotka is good for your teeth | 164 (58.8) | 179 (64.2) | 0.192 |
| 11. | Do you know about fluoride tooth paste? | 61 (21.9) | 84 (30.1) | 0.020* |
| 12. | Good food for my teeth are | 132 (47.3) | 202 (72.4) | 0.001* |
| 13. | How often should we change our tooth brush? | 12 (4.3) | 63 (22.7) | 0.001* |
| 14. | Smoking beedis and cigarettes is bad for our health | 129 (46.2) | 192 (68.8) | 0.001* |
| 15. | Cleaning our teeth properly will help preserve our teeth longer | 149 (53.4) | 172 (61.6) | 0.027* |

[Table/Fig-2]: Comparative assessment of the pre and post training oral health knowledge of 8-10 years old government school children of Udaipur city, India. Test applied - McNemar's test, * - statistically significant.

| Questions | Responses | Pre-training (n = 279) n (%) | Post- training (n = 279) n (%) | p-value |
|---|-----------------------------------|------------------------------|--------------------------------|---------|
| 16. What method do you use for cleaning your teeth? | Tooth brush + Tooth paste/ powder | 152 (54.5) | 260 (93.2) | 0.001* |
| | Finger + Tooth paste/ powder | 70 (25.1) | 4 (1.4) | |
| | Neem twigs | 34 (12.2) | 8 (2.9) | |
| | Any other oral hygiene aid | 23 (8.2) | 7 (2.9) | |
| 17. How many times you clean your teeth? | 0 times | 36 (12.9) | 4 (1.4) | 0.001* |
| | 1 time | 195 (69.9) | 137(49.1) | |
| | 2 times | 42 (15.1) | 138 (49.5) | |
| | More than 2 times | 6 (2.2) | 0 | |

[Table/Fig-3]: Comparative assessment of the pre and post training oral health practices of government school teachers teaching 8-10 years old school children of Udaipur city, India. Test applied - McNemar's test * statistically significant

[Table/Fig-5] unveil the comparative assessment of the pre and post training mean - oral health knowledge score of government school teachers and it was found that the increase in knowledge of teachers was highly significant ($p=0.001$).

[Table/Fig-6] unveil comparative assessment of the pre and post training mean-oral health knowledge score of 8-10 years old government school children. A significant up gradation of knowledge was observed in both males ($p=0.001$) and females ($p=0.001$).

[Table/Fig-7] shows baseline mean OHI-S score of students was 3.09 ± 0.695 which after six months of training it significantly decreased to 2.39 ± 0.606 ($p = 0.001$).

| Questions | Responses | Pre-training (n = 9) n (%) | Post- training (n = 9) n (%) | p-value |
|---|-----------------------------------|----------------------------|------------------------------|---------|
| 16. What method do you use for cleaning your teeth? | Tooth brush + Tooth paste/ powder | 8 (88.8) | 9 (100) | 1.000 |
| | Finger + Tooth paste/ powder | 1 (11.1) | 0 | |
| | Neem twigs | 0 | 0 | |
| | Any other oral hygiene aid | 0 | 0 | |
| 17. How many times you clean your teeth? | Never | 0 | 0 | 0.016 |
| | 1 time | 9 (100) | 2 (22.2) | |
| | 2 times | 0 | 0 | |
| | More than 2 times | 0 | 7 (77.8) | |

[Table/Fig-4]: Comparative assessment of the pre and post training oral health practices of 8-10 years old government school children of Udaipur city, India. Test applied - McNemar's test, * - statistically significant

| Gender | Baseline Knowledge Score (Mean \pm SD) | 6 Months Post - Training Knowledge (Mean \pm SD) | p-value |
|--------|--|--|---------|
| Male | 11.57 \pm 2.225 | 14.57 \pm 1.414 | 0.001* |
| Female | 11.5 \pm 2.121 | 15 \pm 0 | 0.258 |
| Total | 11.56 \pm 0.689 | 14.22 \pm 1.302 | 0.001* |

[Table/Fig-5]: Comparative assessment of the pre and post training mean - oral health knowledge score of government school teachers teaching 8-10 years old school children of Udaipur city, India. SD = Standard Deviation, Test applied - paired t-test, * - statistically significant

| Gender | Baseline Knowledge Score (Mean \pm SD) | 6 Months Post - Training Knowledge (Mean \pm SD) | p-value |
|--------|--|--|---------|
| Male | 6.75 \pm 3.712 | 10.69 \pm 3.336 | 0.001* |
| Female | 7.83 \pm 3.698 | 11.18 \pm 3.264 | 0.001* |
| Total | 7.20 \pm 3.730 | 10.89 \pm 3.304 | 0.001* |

[Table/Fig-6]: Comparative assessment of the pre and post training mean - oral health knowledge of 8-10 years old government school children of Udaipur city, India. SD = Standard Deviation, Test applied - paired t-test, * - statistically significant

| Gender | Baseline OHI-S Score (Mean \pm SD) | 6 Months Post - Training OHI-S (Mean \pm SD) | p-value |
|--------|--------------------------------------|--|---------|
| Male | 3.11 \pm 0.667 | 2.46 \pm 0.543 | 0.001* |
| Female | 3.07 \pm 0.734 | 2.30 \pm 0.678 | 0.001* |
| Total | 3.09 \pm 0.695 | 2.39 \pm 0.606 | 0.001* |

[Table/Fig-7]: Comparative assessment of the pre and post training OHI-S score of 8-10 years old government school children of Udaipur city, India. SD = Standard Deviation, Test applied - paired t-test, * - statistically significant

DISCUSSION

Wellbeing instruction is any mix of learning encounters intended to encourage intentional activities helpful for wellbeing and which incorporate instructive mediations for youngsters, folks, educators, approach producers or medicinal services suppliers. The objective of oral healthcare training is to progress learning, which might prompt reception of positive oral wellbeing practices that add to better oral health.

The study included nine government school teachers teaching 8-10 year old school children of Udaipur city; of which 77.8% were male and 22.2% were female teachers. The study included 285, 8-10 years old government school children, of which 6 were lost in follow-up because of absenteeism. So we assessed the data of 279 school children, out of which 58.4% were males and 41.6% were females. This demographic distribution was nearly

similar to those with various authors who carried out similar study [9,12,16,17]. Yekaninejad MS et al., in 2012 and Shenoy RP & Sequeira PS in 2010 conducted similar type of studies in which they took 392 and 415 school children respectively [9,17].

A statistically significant improvement in their knowledge regarding correct frequency and proper method and materials for cleaning teeth was also observed. Awareness of fluoride toothpastes was added to their knowledge and also of the foods healthy for teeth and gums and the correct time to replace tooth brush after educational intervention. This was in accordance with Pertesen PE, Nyandindi U and Sekhar V, who also suggested a significant increase in frequency of tooth brushing post training [5, 16, 18]. After health education all the teachers believed that proper brushing preserves teeth longer, which are in close association with findings of Sekhar et al., and Nyandini U where in around 97% and 50% of subjects respectively, believed that regular brushing could reduce the incidence of gum diseases and hence can preserve tooth longer [5,18].

Before training only 11.1% teachers knew about fluoride tooth pastes and their importance, while after intervention 77.8% teachers showed awareness of fluoride dentifrices. This finding was in accordance with Dedeke AA et al., who also suggested that pre-test, 37.5% of respondents knew fluoride was used in preventing caries as compared to 75.0% post-test [19]. All the teachers before training used to brush their teeth once daily; while after training 77.8% started to brush more than two times a day while only 22.2% were still brushing once daily. Gauba et al., in conducted a similar type of study where at the baseline only 43% of the study subjects brushes once daily, six months post training there was significant increase upto 93.4% ($p=0.0001$), participants who brush twice or more daily [20]. Another study by Shenoy PR where baseline to 36-week evaluation revealed highly significant increases in the number of participants brushing twice daily ($p=0.000$) [17]. Tangade PS et al., also suggested that most of their subjects (69.3) used tooth brushing for cleaning of the teeth [14]. Total 99.6% children after educational intervention understood the importance and need of teeth. Around 55% and 26% children after training came to know the correct number of permanent and primary teeth post training. Before training only 50.2% and 24.4% could give correct responses to the questions pertaining to best way of cleaning teeth and the frequency of brushing, respectively; while after education it increased to 87.5% and 66.7%. This proportion was higher than that of Petersen PE et al., [16].

Only 25% students before training used to brush with finger and tooth paste or powder and others used other traditional methods of tooth cleaning. This was in near similarity with Nyandindi et al., who suggested that about 80% of all children in their study said they used a factory-made toothbrush, and 90% or more preferred a factorymade brush over the traditional 'mswaki' [18]. Similar findings were observed in study conducted by Conrado CA et al., who also deduced that there was an increment in the extent of those youngsters and teenagers guaranteeing to brush their teeth three or more times each day, utilizing dentifrice, flossing and an expert fluoride application [11].

Angelopoulou MV et al., also suggested that oral health behavior improved in their study groups at six months [12]. Thus, a statistically significant melioration in knowledge and practices which may be attributed to Hawthorne effect (Hawthorne effect is a form of reactivity whereby subjects improve an aspect of their behavior being experimentally measured simply in response to the fact that they are being studied, and not in response to any particular experimental manipulation) [18]. Statistically significant improvement in oral hygiene was observed when pre and post training OHI-S scores were compared. These findings were in partial accordance with Conrado CA et al., and Maheshwari UN

et al., who also used OHI-S and DI-S respectively to compare pre and post training effects of oral health education. Mean pre and post training OHI-S scores as derived by Conrado CA et al., were 2.55 ± 0.36 and 0.87 ± 0.13 respectively, indicating a significant improvement in oral hygiene after education [11]. Maheshwari UN et al., also found significant increase in good oral hygiene scores and a significant decrease in debris scores on post oral health education with p -value < 0.0522 [22]. This was also in accordance with Fernando S who also concluded that the oral health knowledge score of teachers improved 30% from the baseline median ($p=0.005$) while only a 9% increase was observed in oral health practice scores ($p=0.03213$) [13]. Chandrashekhar BR et al., also had similar findings with pre-training OHI-S scores as 4.02 with a standard deviation (SD) of 1.46 and post intervention scores were 3.91 ± 1.48 , suggesting the difference in OHI-S scores between different groups was statistically significant ($p < 0.01$) [23]. Sri Wendari AH.etal., and Chandrasekhar BR et. Al.(2012) also carried out similar study found similar findings as the present study suggesting significant difference pre and post intervention OHI-s scores of children after educational training of teachers [24,25].

As in accordance with Petersen PE et al., the present study also indicates a positive effect of OHE program since in this study also most of the children adopted positive regular health behaviors such as tooth brushing twice daily, awareness and use of fluoride tooth pastes and they also came to know about the ill effects of sugary foods and hence have reduced their consumption [16]. This positive effect was moderate and in association with other studies which have reported positive effects of OHE programs, such as mentioned by Gauba A et al., and Sri Wendari AH et al., that key components of educational intervention to seek positive behavior change were immediate gains from good oral hygiene, which is also key finding in the present study [20,24].

Therefore, it seems that support, commitment, and involvement of staff members hold great promise for promoting students' oral health and hence better quality of life.

LIMITATION

1. Limited sample size and specific population inclusion which make results and differences debatable. This could not generalize the effectiveness on all populations.
2. Although all possible efforts were made to standardize the presentations and subjects included in the study, it is possible that other environmental factors such as barriers of communication, efficiency of educators and trainers and grasping power of children, which could have modifying effects the effectiveness of educational intervention.
3. Effectiveness is also governed by the number of children and teachers present in the school on the day of oral educational intervention program.
4. Differences could also arise due to the dynamic interaction between the teachers and specific student group.
5. Another confounding factor might be the alterations between schools during the implementation of the experiential program.

RECOMMENDATION

1. More extensive studies focusing on larger sample size need to be conducted to document the differences and other data reliably.
2. There should be coordinating efforts between school personnel, dental health professionals, and involvement of parents to ensure long-term benefits of dental health education.
3. Intersectoral coordination with education, government sectors and development of public health policy can have a profound effect on oral health of school children.

4. A basic prioritized action plan using proven models and approaches can tangibly accelerate improvements in school dental health.

CONCLUSION

The results of the present study propose that oral health knowledge and practices of government school teachers was average. But they were benefited by the health education given by a professional dental educator. After the training given by the dentist, teachers significantly improved their oral health knowledge and practices. Thus, the health education delivered to children by their own teachers who were trained was effective in improving both the oral health knowledge and practices of the children aging 8-10 years. This indicates that this method of oral health education was well received by the study subjects.

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