

Comparison of Effectiveness of Audio-Aids and Tactile-based Health Education on the Plaque Index among Visually Impaired Children

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Abstract

Background: The aim of the study is to compare and evaluate the effectiveness of audio aids and tactile-based health education on the plaque index among visually impaired children. **Materials and Methods:** A total sample size of 50 schoolchildren in the age group of 5–15 years were selected and randomly divided into 2 groups: Group A: audio aids and Group B: the tactile Method. A verbal questionnaire was developed to record their oral health knowledge, frequency of dental check-ups and brushing, and awareness about sugar intake. They were given individual training on oral care three times with a 30-day interval within 3 months, and oral plaque assessment was done using the Silliness and Loe plaque index (1964). **Results:** The present study showed a decrease in the mean plaque index score at all-time intervals in individual groups as compared to that of the baseline, which was statistically significant. **Conclusion:** This dental health education module comprising of tactile dental models, a specially designed music-based brushing technique, and health education talk, definitely improved knowledge and attitudes toward oral health.

Keywords: Oral health, Plaque, Toothbrushing, Visual impairment.

INTRODUCTION

One of vision's most significant functions is to mold a child's brain and aid in their understanding of their environment.^[1] Approximately 3,20,000 children in India are blind, which makes up one-fifth of all blind children worldwide.^[2] The most frequent causes of childhood blindness include cataracts, trachoma, glaucoma, and corneal scarring (from measles, vitamin A insufficiency, and trauma).^[3]

Children who are visually impaired face several challenges, such as poor oral health and an inability to maintain good oral hygiene due to a lack of knowledge that exacerbates oral infections. Their food and eating habits, medications, physical restrictions, incapacity to clean, and the attitudes of their parents and health-care providers all contribute to their tendency to have considerable dental plaque and an increased risk of dental illnesses.^[4] Because of their aberrant tongue position and abnormal muscular action, they have a higher incidence of malocclusion. Research indicates that those with mental or physical disabilities have a higher incidence of periodontal disease than those without such conditions.^[5]

A growing number of studies have been conducted recently regarding the general population's oral health. However, the

group of visually impaired people needs to have their dental health given more consideration.^[6] For visually challenged people, chemical approaches are advised for efficient plaque control. The greatest need is for individualized instruction in oral hygiene and plaque management to lower the incidence of dental caries in children with visual impairments.^[7]

Therefore, the study's objective was to evaluate the efficacy of novel oral health education techniques in Indore City among visually impaired children using a plaque index.

MATERIALS AND METHODS

The 3-month dental health teaching program was held at the Helen Keller Blind School in Indore. Before conducting the

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study, ethical clearance, informed consent, and permissions were obtained from the institutional review board (Sri Aurobindo College of Dentistry) (IEC No.-SAIMS/IEC/21/23). This study included 50 children without systemic disorders and probiotics or supplements for dental hygiene, and informed consent was taken from the parents or guardians. The study excluded children who were receiving dental therapy, had a medical history including systemic antibiotics or topical fluoride treatments, or were getting any kind of oral care. The Silness and Loe Plaque Index (1964) was used to evaluate oral hygiene.

An oral questionnaire^[9] was designed to document their awareness of sugar intake, frequency of dental examinations and brushing, and understanding of oral health. Within 3 months, each one of them received the same personalized oral hygiene instructions, respectively, at an interval of 30 days. In the oral examination, one examiner assessed the plaque index and recorded the values both at baseline and 3 months later.

The students were split into two groups of twenty-five each at random using a chit system. Children in Group A received instruction using auditory aids. A song was used to illustrate toothbrushing, and the audio lasted for 2 min and 15 s. While in Group B, tactile methods were used to make them feel the cast models with a hand-over-hand technique, as shown in Figure 1. Both groups demonstrated toothbrushing using the Fones method.

The impact of foul breath and dental caries was elaborated, and children were made aware of the issues related to their teeth due to early gum disease and periodontal difficulties. Numerous preventive dental treatment approaches were explained, along with some health facts. Finally, an explanation of the seven golden rules for a healthy oral cavity^[6] was given.

- a. Brush your teeth twice daily
- b. Floss once a day
- c. Clean your tongue daily
- d. Rinse your mouth after every meal
- e. Eat nutritious food
- f. Avoid snacking between meals
- g. Visit the dentist every 6 months.

RESULTS

A study was run among 50 visually impaired children attending special blind schools. All the children were provided with toothbrushes and fluoridated toothpaste (40 g) by the examiner. They all reported using toothbrushes and toothpaste as cleaning tools, and they were not using any other oral hygiene aid.

Table 1 depicts the age-wise distribution of the population. The mean age of children in the group was 10.06 ± 2.78 , ranging from 5 to 15 years.

Table 2 shows the comparison of plaque scores before and after intervention. There is a statistically significant difference present before and after intervention in both groups, with a high reduction in plaque score after intervention.

Table 3 shows the comparison between groups before and after treatment. No significant differences were found in the plaque

Table 1: Age distribution

Age (years)	No. of children (n) (%)
6	8
7	14
8	14
9	12
10	12
11	6
12	12
13	6
14	8
15	8

Table 2: Plaque score comparison pre and post intervention

GROUPS	n	Mean $\pm$ Standard deviation	t-value	P-value
Group				
Plaque score pre-treatment	50	0.92 $\pm$ 0.65	5.13	0.01*
Plaque scores post-treatment	50	0.68 $\pm$ 0.51		
Group 1				
Plaque score pre-treatment	25	1.20 $\pm$ 0.62	2.42	0.02*
Plaque scores post-treatment	25	0.84 $\pm$ 0.45		
Group 2				
Plaque score pre-treatment	25	1.04 $\pm$ 0.67	3.12	0.01*
Plaque scores post-treatment	25	0.51 $\pm$ 0.52		

Table 3: Intra group comparison of both the methods.

Groups	N- number of students	Mean $\pm$ Standard deviation	t-value	P-value
Pre-treatment				
Group 1	25	1.20 $\pm$ 0.62	0.82	0.41
Group 2	25	1.04 $\pm$ 0.67		
Post-treatment				
Group 1	25	0.84 $\pm$ 0.45	2.36	0.02*
Group 2	25	0.51 $\pm$ 0.52		



Figure 1: Group B (tactile method) demonstration

score before treatment between both groups. When comparison was done after the intervention, there was a significant difference

found between both groups, with group B (tactile method) showing a better reduction in plaque score than group A (audio-aid).

DISCUSSION

Children with visual impairments face daily challenges in learning life skills, such as maintaining good oral hygiene.^[9] According to the Chang and Shih's^[11] research, there is a widespread belief that kids with visual impairments do not know as much about oral health. Upon the other hand, the majority of the kids in our study knew a fair amount about oral health, brushing twice daily, cleaning their tongues, and avoiding sticky foods and sweets.

The most important and easily accessible source of information on oral health care is education.^[10] In a study, Nandini N found that when visually impaired youngsters received one-on-one health education talks, their cognitive level of dental health knowledge and oral health habits significantly increased.^[12]

The development of dexterity abilities in visually impaired children is a prerequisite for improving their capacity to complete adequate oral hygiene procedures.^[13] According to Parkar *et al.*^[14] study, these people had fair plaque scores (80%) during the pre-intervention phase, which is consistent with our findings.

The results of the current investigation showed a statistically significant decline in plaque scores. At baseline, the intergroup comparison of plaque scores was statistically non-significant despite the fact that both Group A and Group B had reduced plaque scores.^[15] The findings indicate that tactile methods were superior than auditory aids in promoting dental care in children, with a 50% drop in the plaque score, whereas Group A showed a 30% plaque reduction following the post-education session.

According to Sharififard *et al.*,^[16] a study was conducted in institutionalized visually impaired children to assess oral hygiene status after providing Braille and audio instructions, as reported by Mahantesha *et al.*,^[17] Deshpande *et al.*,^[18] and others. They came to the conclusion that the decline in plaque scores was positive. In addition, Bhor *et al.*'s study showed that after an oral health education program was implemented, toothbrushing frequency went from once to twice a day, which resulted in a decrease in the plaque score. Gautam *et al.* demonstrated that after a month, there was no variation between the groups in visually impaired children aged 6–16. Children who are visually handicapped can more easily and effectively use the audio-tactile approach, according to a study conducted by Nasrin *et al.*

Limitations

To provide education to all children, there is a varied distribution of children of different age groups in the same grade in schools for visually impaired children. The duration of the study was short. Longer follow-up is required to assess the impact of the program on oral health behaviors. The

educational program was not evaluated in the control group with normal visual acuity in the present study.

CONCLUSION

This dental health education module comprising of tactile dental models, a specially designed music-based brushing technique, and health education talk, definitely improved knowledge and attitudes toward oral health, with the tactile method being a better one among these visually impaired children.

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