Effect of oral health education in the form of Braille and oral health talk on oral hygiene knowledge, practices, and status of 12–17 years old visually impaired school girls in Pune city: A comparative study

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Abstract

Aim: To assess the effect of oral health education (OHE) in the form of Braille and combination with Oral health talk (OHT) on oral hygiene knowledge, practices, and status of 12–17 years old visually impaired school girls in Pune city. Materials and Methods: A 6-week comparative study was conducted among 74 residential visually impaired school girls aged 12–17 years, who were trained to read Braille. The participants were divided into two groups, namely, Group A (n = 37) receiving OHE only in the form of Braille and Group B (n = 37) receiving OHE in form of Braille and OHT at baseline, 2, and 4-week interval. Oral health knowledge was assessed using a self-administered, pre-validated, pre-tested questionnaire typed in Marathi Braille. Assessment of oral hygiene practices and status was done using standardized proforma and simplified oral hygiene index (OHI-S), respectively, at baseline and at the end of 6 weeks. Data was analyzed using paired and unpaired Student’s t-test. Results: The results showed a statistically significant increase in oral health knowledge levels in Group B (4.95 ± 1.66) as compared to Group A (2.97 ± 1.28). There was a significant increase in the frequency of mouth-rinsing in Group B (97.3%) as compared to Group A (86.5%) as well as in the tongue cleaning practice in Group B (100%) as compared to Group A (81.1%) at the end of 6 weeks. Conclusion: OHE in the form of Braille and OHT was more effective than OHE using only Braille.

Key words: Braille, oral health education, visually impaired

INTRODUCTION

“The best and the most beautiful things in the world cannot be seen or even touched. They must be felt with the heart.” Hellen Keller.[1]

Oral health is essential to general health and quality of life.[2] Oral and dental anomalies are a frequent problem for patients with special needs, including those who have hearing impairment and/or are blind.[3] In India 320,000 children (<16 years) are blind, and this constitutes 1/5 of the world’s blind children. These children are usually dependent on parents or guardians for carrying out daily activities including oral care.[4] Dental care is the most common unmet need of these disabled children.[5]
Oral health and dental care of the disabled has generally been poorer than that of the general population. Studies have shown that blind children have poor oral hygiene, gingivitis, and periodontal diseases. Dental instruction programs targeting these groups must be developed as they need to gain oral health knowledge and learn oral hygiene practices.

The school system is found to be a conducive environment for teaching preventive oral health practices and promoting oral health for such a disadvantaged population. There are nearly 268 blind schools in India, which can be targeted for providing oral health education (OHE) based on the principles of active involvement and reinforcement.

Blind children depend much more on sound, speech, and touch to orient them to a situation. Modification of OHE using alternative teaching aids such as the use of OHE booklet in Braille and oral health talk (OHT) can be used for teaching these children. A few previously conducted studies have focused only on improving oral hygiene skills and not on improving their oral health knowledge.

Hence, a study was conducted with an aim to assess the effect of OHE in the form of Braille and combination of Braille and OHT on oral health knowledge, oral hygiene practices, and status of 12–17 years old visually impaired school girls in Pune city.

**MATERIALS AND METHODS**

A comparative, intervention study was conducted from July 2014 to September 2014 among 12–17 years old visually impaired school girls studying in a residential school in Pune city, with a total strength of 120 girls. Ethical clearance was obtained from the Institutional Review and Ethics Committee (2014-14/26) before commencing the study. Necessary permission from the school principal and written informed consent from the parents/local guardians and assent from the girls was obtained.

An OHE booklet and questionnaire was standardized in English and then translated in Marathi and retranslated in English (Cronbach alpha: 0.86), was typed in Marathi Braille, and a pilot was tested among 30 girls to check for content validity of the OHE booklet, the questionnaire, and feasibility of the study.

The selected residential blind school runs in two sessions, i.e., morning and afternoon, with 60 girls in each session. All the girls from each session in the age group of 12–17 years who were trained to read Braille, irrespective of the degree of visual impairment, were selected for the study whereas girls whose parents/guardians who did not give informed consent and who had any systemic diseases were excluded from the study.

The sessions were allocated to the two groups by lottery method.

1. Group A: OHE using Braille typed booklet (n = 37)
2. Group B: OHE using Braille typed booklet and OHT (n = 37).

The data was collected using a specially designed proforma and a structured questionnaire. The proforma included sociodemographic details, previous medical and dental history, and questions on oral hygiene practices. The Braille-typed, Marathi-translated, structured questionnaire was self-administered and included 10 questions concerning oral health knowledge.

At baseline before imparting OHE, demographic details and oral hygiene practices were recorded. Assessment of oral health knowledge using the questionnaire and oral hygiene status using Simplified Oral Hygiene Index was performed at the baseline and at the end of the 6th week by a trained and calibrated investigator.

OHE was provided by dialectic method on a group level by the principle investigator in Marathi language. OHE to both the groups in different forms was given at 0, 2, and 4-week intervals. The study participants in Group A read the OHEn booklet typed in Braille for a period of 20 minutes, whereas in Group B, a 20 minutes pre-validated OHT based on the booklet was delivered by the investigator along with simultaneous reading of the OHE booklet in Braille.

Evaluation was done at the end of the 6th week to assess the changes in knowledge scores, practices, and in simplified oral hygiene index (OHI-S) scores in Group A as compared to Group B from the baseline. Right answer for oral hygiene knowledge was given as a score of 1, and wrong answer was scored 0. The mean knowledge score for each group was calculated by summing up the scores of all 10 knowledge questions.

**Statistical analysis**

The data was analysed using the Statistical Package for Social Sciences (Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). Descriptive statistical
analysis was carried out. The $P$ value was considered to be significant when less than 0.05 (confidence interval of 95%).

Comparisons were made within groups and between groups from the baseline to 6th week for mean knowledge scores and mean OHI-S score using paired $t$-test and unpaired Student’s $t$-test, respectively. For comparison between proportions of correct responses for knowledge questions, $Z$ test was used.

RESULTS

Out of 74 school girls, Group A (OHE using booklet typed in Braille) comprising 37 school girls had a mean age of 13.6 ± 1.5 years; Group B (OHE using OHT and booklet typed in Braille) comprising 37 school girls had a mean age of 13.8 ± 1.6 years.

All the study participants from both Group A and Group B used toothpaste for cleaning their teeth. A significant increase in the number of study participants of Group B ($P < 0.05$) using toothbrush was seen from the baseline to the 6-week interval [Table 1].

The intragroup evaluation revealed a significant increase in the number of study participants brushing twice daily in both the groups at the end of 6 weeks ($P < 0.05$). The study participants of Group B showed a significant difference ($P < 0.05$) in brushing teeth twice daily at end of 6 weeks as compared to Group A [Table 1].

The intragroup and the intergroup evaluation did not show a significant change in the adoption of correct method of brushing their teeth ($P > 0.05$).

With regards to the mouth rinsing practice after every meal, at baseline, 19% and 11% of the study participants of Group A and Group B, respectively, rinsed their mouth after every meal, whereas at the end of 6 weeks, 87% and 97% of the study participants of Group A and Group B, respectively, practiced mouth rinsing after every meal. Baseline to 6-week evaluation showed a significant increase in the number of study participants of both Group A and Group B in mouth rinsing practice after every meal ($P < 0.05$) [Table 1].

At baseline, 30% and 38% of the study participants of Group A and Group B, respectively, practiced tongue cleaning, whereas at end of 6 weeks, 81% and 100% of the study participants of Group A and Group B, respectively, practiced tongue cleaning. Baseline to 6-week evaluation showed a significant increase in the number of study participants of both Group A and Group B who were practicing tongue cleaning, however, Group B as compared to Group A showed a significant difference in tongue cleaning practice ($P < 0.05$) [Table 1].

The knowledge-based questions on oral health focused on the importance of oral health for general health, functions of teeth, number of deciduous and permanent teeth, dental plaque, reasons and symptoms of tooth decay, ingredient of tooth paste that prevents caries, cause of malaligned teeth, and method of saving an avulsed tooth [Table 2].

The intragroup evaluation of the questionnaires from baseline to 6 weeks for the abovementioned parameters showed a significant increase in the mean score of correct responses in both the groups ($P < 0.05$), whereas the intergroup evaluation revealed a significant difference in the mean knowledge score of Group B as compared to Group A ($P < 0.05$) [Table 3].

The intragroup and intergroup evaluation of mean score of OHI-S were not statistically significant ($P > 0.05$) at the 6th week follow up, however, a significant difference in the mean scores of Simplified Debris Index (DI-S) component was seen in Group B as compared to Group A [Table 4].

DISCUSSION

Visually impaired children are challenged every day in their daily activities. The effects of blindness are many,
Table 2: Intragroup and intergroup comparison of oral health knowledge among Group A and Group B

| Oral health knowledge                        | Groups       | Baseline n (%) | 6th week n (%) | P value |
|---------------------------------------------|--------------|----------------|----------------|---------|
| Good oral health for good general health    | Group A      | 11 (29.7)      | 28 (75.7)      | <0.05*  |
| Functions of teeth                          | Group B      | 13 (35.1)      | 28 (75.7)      | <0.05*  |
| Number of deciduous and permanent teeth     | Group A      | 1 (2.7)        | 10 (27.0)      | <0.05*  |
| Dental plaque                               | Group B      | 3 (8.1)        | 21 (56.8)      | <0.05*  |
| Reason for tooth decay                      | Group A      | 3 (8.1)        | 14 (37.8)      | <0.05*  |
| Symptoms of dental caries                   | Group B      | 3 (8.1)        | 36 (97.3)      | <0.05*  |
| Ingredient of toothpaste that prevents caries | Group A | 1 (2.7)        | 5 (13.5)       | NS      |
| Cause of malaligned teeth                   | Group B      | 1 (2.7)        | 12 (32.4)      | <0.05*  |
| Saving an avulsed tooth                     | Group A      | 0 (0)          | 4 (10.8)       | NS      |
| Keeping mouth healthy                       | Group B      | 0 (0)          | 6 (16.2)       | <0.05*  |
| P value                                      | Group A      | NS             | <0.05*         |
| P value                                      | Group B      | NS             | NS             |
| P value                                      | Group A      | 3 (8.1)        | 16 (43.2)      | <0.05*  |
| P value                                      | Group B      | 1 (2.7)        | 22 (59.5)      | <0.05*  |

*Significant (P<0.05); NS=Not significant

but one of the most common is the inability of the individual to maintain oral health.[3] OHE regarding maintenance of oral hygiene is more important to establish good oral routines and knowledge early in life in these children.[14] Improving knowledge and teaching oral hygiene practices to these children require special approaches such as the introduction of OHE booklets typed in Braille and a continuous reinforcement in the form of OHT and patience. The effectiveness of the use of OHE booklet in Braille and OHT on improving the oral health knowledge and oral hygiene practices and status was assessed in this study.

Adolescents are in particular need of preventive programs as they are prone to have high levels of plaque.[7] Their oral hygiene practices are based on short-term rewards so as to improve appearance and social attractiveness; therefore, 12–17 years old visually impaired school girls were selected for the present study.

Most of the oral hygiene practices such as the use of toothbrush for cleaning of teeth, mouth rinsing after every meal, and tongue cleaning showed a significant improvement in both the groups at the end of the study. A significant increase in knowledge score was seen in Group B as compared to Group A. It was observed that the knowledge gained was translated into better oral hygiene status and practices.

A significant improvement was seen among the study participants of Group B as compared to Group A in the use of toothbrush for cleaning of teeth (P < 0.05). All the study participants from both the group used toothpaste throughout the study for cleaning their teeth. This was in contrast to the study conducted by Yalcinkaya et al.[14] and Hebbal et al.[17] where no statistically significant difference was found between the use of toothbrush for cleaning of teeth before and after health education. This might be because of continuous reinforcement in the form of OHT and reading in Braille where the importance of using a toothbrush was emphasized.
The difference between the methods used for cleaning teeth was not statistically significant \( (P > 0.05) \) between the two groups at the end of 6 weeks. This may be because the method of brushing was explained orally to the study participants and no personal training was given to them regarding the method of brushing their teeth by holding their hand and using dentoform models.

The frequency of tooth brushing increased from once to twice daily in both the groups. This study was similar to the study conducted by Hebbal et al.\(^{[17]}\) where there was a statistically significant difference in frequency of brushing teeth twice daily before and after OHE. This might be due to continuous reinforcement in the form of OHT that emphasized the importance of brushing twice daily.

A significant difference \( (P < 0.05) \) was seen within both the groups at the end of 6 weeks in mouth rinsing after every meal as well as the tongue cleaning practice. The significant increase in the mouth rinsing and tongue cleaning practice may be because of the personal attention given to the children and explaining the importance of mouth rinsing and tongue cleaning practice in maintaining good oral hygiene through continuous reinforcement for 6 weeks given at biweekly interval.

The intragroup difference for the mean knowledge scores was statistically significant \( (P < 0.05) \) at 6\(^{th} \) week follow-up for both the groups, whereas in the intergroup comparison, the mean knowledge score of Group B was statistically significant \( (P < 0.05) \) as compared to Group A at the 6\(^{th} \) week follow up. This increase in knowledge scores in Group B as compared to Group A may be because biweekly reinforcement in the form Braille and OHT was provided as well as the language used for explaining the subject was very simple. Moreover, there was a personal human touch of a dentist teaching.

The intragroup and intergroup evaluation of the OHI-S scores did not show any significant difference in both the groups at the end of the study. This was in contrast to the study conducted by Kumar et al.\(^{[15]}\) where a decrease in OHI-S in both groups at all time intervals was seen at the end of 12 months. This difference in our study may be because the CI-S was not statistically significant in both the groups as oral prophylaxis was not done at the start of the study and the act of tooth brushing was not supervised. The role of other factors such as technique of tooth brushing, reduced motor skills, and reduced concern about their appearance can also be considered. Furthermore, obtaining help from guardians was not considered, which might have an impact on oral hygiene status of both groups.

The strengths of the study were that for the first time an OHE booklet typed in braille was used to deliver OHE to the blind girls. In addition, the questionnaire used was typed in braille so that the study participants can read the questions themselves and answer them to avoid any kind of information bias.

The limitation of the study was that the two groups selected were from the same school due to which carry-over effect could have occurred. This study was conducted in a residential girl’s school for a short duration. Further studies involving both the genders, wide age range, and long duration, wherein school personnel and teachers can be involved, are suggested.

CONCLUSION

To conclude, the awareness of oral health among school children was found to be low at the start of the study. OHE in both forms; Braille and combination of Braille and OHT, were instrumental in improving the oral health knowledge, oral hygiene status, and practices of 12–17 years old school children. The increase in knowledge regarding oral health was also translated as better oral hygiene status and practices.

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Conflicts of interest

There are no conflicts of interest.

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