

Assessment of Oral Hygiene of Children with Speech and Hearing Impairment Using Tailor-Made Oral Health Education Tools

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Abstract

Background: The oral health status of children with hearing and speech impairment reported poor oral hygiene and low utilization of dental services. Hence, it is important to understand their specific oral health needs and to plan interventions accordingly.

Objectives: To develop oral health education tools for these children and to assess their effectiveness in improving oral health. **Methods and Methodology:** School for Deaf and Dumb in Bengaluru city was considered for the study. The duration of the study was 30 days. Golden Rules for Oral Health was taken as the basis for preparing health education material. The team members were trained for educating the study group in sign language and also calibrated to measure oral hygiene using Oral Hygiene Index Simplified (OHI-S). Flipcharts were handcrafted for visual acceptance, Models for a 3-Dimensional view of the oral cavity were prepared. Video in sign language about brushing technique was shown and leaflets were designed as hand-outs and peer leaders were trained to reinforce the learning. Pre-intervention and post-intervention data were collected using WHO basic oral health survey for children, 2013 questionnaire and the OHI-S. Data was analysed using SPSS (version 20.0). **Results:** Thirty four school children were included in the study. Improved awareness, practice and knowledge about oral health was observed in study group (n=34). The improvement was also seen in oral hygiene. Healthy gingiva (compared to red gingiva before the programme intervention) and bleeding on probing were absent post intervention. **Conclusion:** From the results of the study we can conclude that visually appealing educational aids help children with hearing and speech impairment to understand and comprehend better, as it reflected in their oral hygiene scores.

Keywords: *Prevention, Oral Cancer Risk Factors, Health Care Workers, Health Education*

1. INTRODUCTION

Indian population is nearly 1.3 billion of which children represent 39% of total population.¹ According to Suneela Garg *et al.*, 9.6% suffer from speech disorder and 6.3% from significant auditory loss.² Children are at high-risk for dental problems as childhood is a sensitive growth period that may pose challenges to manage oral health.³ It becomes more challenging if the child has some impairment.⁴

Most of today's health education material is in audio-visual format for normal children; hence information does not reach this group of children. Special children also have the right to "complete" information. Hence, it is important to understand their specific need and plan interventions accordingly to make an impact on their health. Oral care is not a priority to families of the differently-abled children. Earlier studies on oral

health status of children with impaired hearing and speech reported poor oral hygiene and low utilization of dental services which may be attributed to health care neglect (by care takers or parents) which may be because of ignorance, fear, stigma, misconception and negative attitude, inability to hear and comprehend speech, socioeconomic status etc.⁵ More awareness about oral healthcare needs for these children is necessary. A study in Bhimavaram showed that there is increased need for oral healthcare among this group. Children with hearing impairment have accessibility issues to meet their oral health care needs.⁶

Since Oral health is a window to general health, Oral health professionals need to go that extra mile to provide innovative, creative and sustainable benefits to this vulnerable group.



Hence, there is a significant need for development of creative and visually appealing methods to deliver oral health knowledge and change in behavior in a unique way to this special group so as to empower them.⁷ The study was carried out with the objectives to develop oral health education tools and to assess their effectiveness in improving oral health among children with impaired hearing and speech.

2. METHODS AND METHODOLOGY

Permissions were obtained from the head of the Institution of a school for deaf and dumb for conducting the study. Ethics Committee approval was taken from Faculty of Dental Sciences; M.S. Ramaiah University of Applied Sciences. Informed Consent was obtained from the parents.

The team members were trained for educating the study group in sign language and also calibrated to measure oral hygiene using Oral Hygiene Index Simplified (OHI-S). The WHO basic oral health survey for children, 2013 questionnaire was used to assess the knowledge, attitude and practice of the children.

A literature search was conducted on various tools that could be used to educate children with impaired hearing and speech, and topics relevant to maintain good oral health were identified. According to Hoferková, R., the teaching of children with impaired hearing and speech must be done in a customized way according to their learning needs.⁸ The health education material prepared consisted of handcrafted flipcharts based on the 5 golden rules (fig.2), models to show tongue cleaning and for the demonstration of brushing technique (fig.3), leaflets designed for reinforcement and videos pertaining to oral hygiene were selected. A pilot study was conducted in a school for the deaf and dumb to assess the feasibility of carrying out the study with the prepared material. Students were taught the five golden rules using the prepared educational material.

One of the schools for the deaf and dumb was selected from Bengaluru city and children with impaired hearing and speech was included in this

study. Potentially uncooperative children and those who have undergone oral prophylaxis in previous week were excluded. The sample size of 34 children was considered and the method used was cluster sampling.

The WHO basic oral health survey for children, 2013 questionnaire was used to assess the knowledge, attitude and practice of the children and oral hygiene of the study group was assessed before the intervention and was recorded using the Oral Hygiene Index Simplified (OHI-S), for which the team members were trained and calibrated. This was followed by the intervention and its reinforcement following the study protocol given in Fig. 1. The prepared flipcharts and models were demonstrated and video was played. Then student peer leaders were selected and trained to help reinforce over the period of study. After one month, the same criteria of oral hygiene were assessed using OHI-S and the pre-intervention and post-intervention data were analyzed using SPSS (version 20.0)

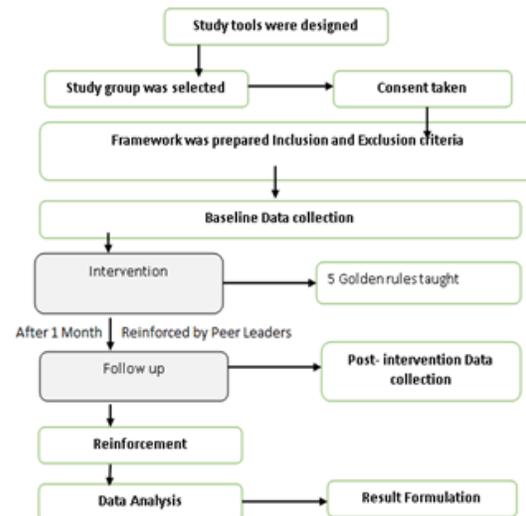


Figure 1: Study protocol





Figure 2: Flipcharts

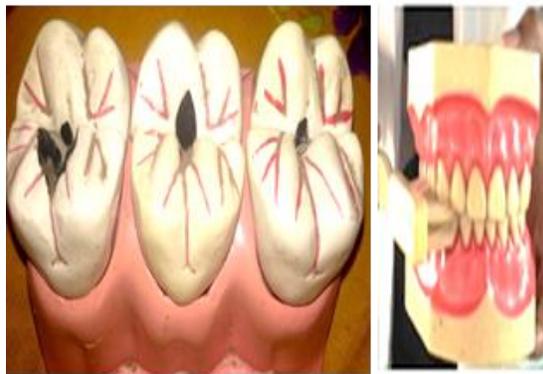


Figure 3: Models used for Health Education

3. RESULTS

A total of 34 students were included in the study. The data collected pre and post-intervention were analysed separately and combined for comparison to evaluate the acceptance of the education tools.

In a mixed age population with maximum age as 17 years and minimum of 5 years, it was found that the highest number of students belonged to the age group of 11-15 years of age and this proved advantageous since this is a significant age group to teach and train with the children new habits.

The following table depicts the age distribution of the children:

Table 1. Age Distribution of the study group

AGE GROUP (in years)	FREQUENCY
≤ 5	2
6 - 10	10
11 – 15	18
16	4

Table 2. Post-intervention Qualitative Analysis about the health education materials

Sl. No.	Modes of Education	Response	Comment
1	Flipcharts	Most Accepted	The handmade colourful charts with examples of the do's and don'ts and content in their native language gave them a good insight about the topics.
2	Models	Better Acceptance	Children got to see the design of the oral cavity, areas of most frequent plaque deposition, process of tooth decay, tongue cleaning and a clear view of brushing technique.
3	Videos	Good Acceptance	Children could relate to the videos since it was in the sign language and tried repeating the actions as given in video.
4	Pamphlet	Comparatively less Accepted	Pamphlets were given in the idea of easy review for the children. But this did not show any immediate positive response.



The following figures [Fig 4 – Fig 5] show the average score for knowledge and self - perception of the study group assessed using WHO 2013 questionnaire.

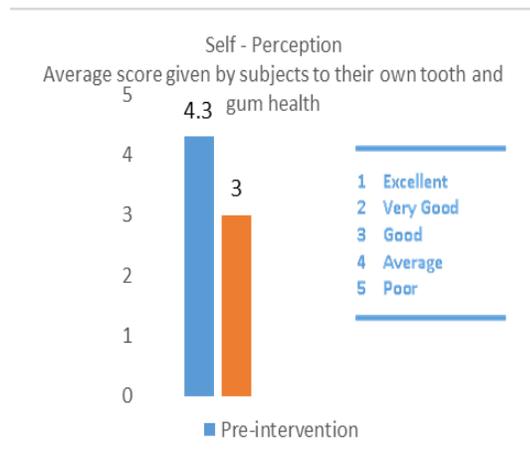


Figure 4: Correlation of pre and post intervention data regarding Self-perception about health of teeth and gums

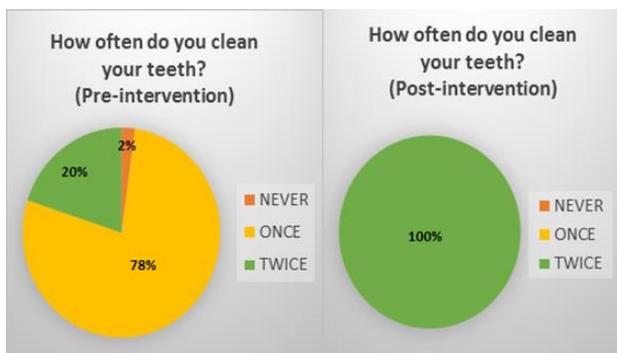


Figure 5: Pie chart depicting the knowledge gained about the number of times to brush teeth

Table 3. Oral Hygiene Status of the Children before and after the intervention

Oral Hygiene Status	Before	After
Fair	23.52%	0
Good	76.47%	100%

The oral hygiene was also improved (not statistically significant)

Table 4. Shows the mean scores of Oral Hygiene Index – Simplified before and after intervention among subjects with OHI-S score >1

OHI Score (n=24)	Intervention	Mean	Standard Deviation	p value (significant)
Pre-intervention		1.87	0.7436	0.000
Post-intervention		0.35	0.2238	

The oral hygiene was also improved as the mean difference was 1.5 (p= 0.000 which was statistically significant).

4. DISCUSSION

Children with hearing and speech impairment have lesser access to information regarding oral hygiene compared to the general population due to which they lack awareness about the maintenance of good oral hygiene. The studies about oral health status among hearing and speech impaired children in various countries suggested that there was oral health care need in this group^{5,6,9-12}.

The present study was conducted among 34 children with hearing and speech impairment of the age group between 5-21 years (table 1). Health education intervention was conducted using the prepared flipcharts, models and videos selected. Most of the children preferred flip charts followed by hands on demonstration on models (table 2). Maintenance of oral hygiene among the children is necessary for their normal growth and development. Hearing and speech impaired children are an essential part of this society; therefore, it is necessary to evaluate their awareness levels and provide intervention to improve their oral health status^{6,9-12}.



One of the key features of the present study was the reinforcement done at regular intervals with the help of teachers and peer leaders due to which the children were able to improve upon their oral health. Also, through hands-on demonstration, children were taught the correct method of brushing and its frequency which improved their awareness about brushing.

The knowledge and perception about the oral health improved after intervention. This was evident as most of them felt that their appearance had improved (fig.3). A similar study by V Sandeep et al. in 2014 concluded that the gingival scores had significantly reduced after visual instructions.⁶ A study by Arunakul M et al., stated that there was significant improvement in plaque scores upon teaching oral hygiene methods which included brushing as a main component.¹¹ Such an increase in awareness is evident in the present study where most of the subjects learnt that they should brush twice daily (fig.4).

In the present study, it was found that a shift of 23% of students from fair to good was observed after intervention as shown in Table 3. Oral hygiene index reduced to a significant value (Wilcoxon signed rank test with $p = 0.000$), as shown in Table 4. In a study by Jain M et al., the oral health treatment need for the deaf and dumb was high compared to the general population, due to their lack of awareness.¹³ To bridge the gap between the availability of oral hygiene information to the normal children and the hearing and speech impaired children, this study was conducted and various methods were developed, tested and assessed. In a similar study by Liliya Doichinova et al. they created training program in oral hygiene for 100 children with hearing disabilities⁹. Their training used a specially designed methodology (demonstration materials like models, audio-visual materials like cartoons and slide films) and showed significant improvement in oral hygiene after 6 months of training ($p < 0.01$). Yet another study conducted by Sandeep V et al. institutionalised children with hearing impairment using visual instructions as their mode of motivation. They used Loe and Silness Gingival index and Silness and Loe

Plaque index to measure oral hygiene where they found that there was a significant mean reduction of plaque (0.37) and gingival scores (0.39) in the study group, but only a marginal reduction of plaque (0.08) and gingival scores (0.1) in the control group⁶. In the present study, visually appealing educational aids helped the children with hearing and speech impairment to understand and comprehend better. Similarly, in a study by Pareek et al., improved oral health status in hearing and speech impaired children was recorded through supervised oral hygiene measures¹⁴. In Madhuri et al, visually appealing methods of teaching deaf and dumb children showed best results¹⁵. This study revealed that a school-based intervention approach is effective in improving the oral health of hearing impaired and mute children. Lev Vygotsky et al. had mentioned that the attitude of hearing and speech impaired children alters greatly when properly taught and trained in a method that visually pleases them¹⁶. This was reflected in the present study as well. The children with impairment can be instructed about simple oral hygiene procedures and then can carry out correct tooth brushing when given encouragement and motivation.

The purpose of the present study was to understand the importance of using custom made tools to teach the differently abled children and help them build a healthier future. The drawback found in the conventional oral health education method depends predominantly on audio-visual aids has created a gap between the normal children who regularly get oral and general health education in their schools than the children with special needs. This gap was tried to bridge through the present study where various customised methods were used for hearing and speech impaired children who grasped most of the aspects of our oral health education. It was found that the children had got a better knowledge about oral health care, their self-perception about their oral condition had improved and also their overall attitude about the oral health care had improved after the intervention, compared to before intervention.



Further research is required in various fields of oral health education to bring out more creative and efficient tools for educating and engaging such children. They may include assessing the inclination of children of different age groups towards different educational tools which can be of help for future scheming of oral health education programs in schools.

5. CONCLUSIONS

From the results of the study we can conclude that visually appealing educational aids help children with hearing and speech impairment to understand and comprehend better. Flipcharts was the most accepted tool; the children had a greater appeal towards it, owing to its attractive format. In addition to this, reinforcement by teachers and peer leaders, the children were able to improve upon their oral health using these educational aids.

The overall OHI-S score had improved and hence their oral health condition had enhanced, substantiating the success of the teaching methods employed.

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