

REVIEW ARTICLE

ASSESSING THE ORAL HEALTH STATUS OF CHILDREN WITH HEARING AND SPEECH DISABILITY ALONG PROMOTING THE ORAL HEALTH EDUCATION AMONG THEM

¹Dr. Sneha Deokar, ²Dr. Rehan Khan, ³Dr. Rajesh Aduri, ⁴Dr. Ashish Trivedi, ⁵Dr. Sushma Maku and ⁶Dr. Shital Kharat

¹RMO- Dental, DEIC Hospital Buldhana; ²HOD, Saraswati Dhanwantari Dental College Parbhani; ³Private Practitioner and Owner of Rajesh Dental Clinic, Hyderabad; ⁴Private Practitioner and Owner of Ekdant Kids and Family Dental Care Shrirampur; ⁵Private Practitioner at Apple Dental Clinic, Machnerial; ⁶Assistant Professor at GDC Jalgaon

ARTICLE INFO

Article History:

Received 19th April, 2026
Received in revised form
25th May, 2026
Accepted 29th June, 2026
Published online 31st August, 2026

Keywords:

Hearing and Speech Disability, Oral Health Status, Oral Health Education Program, Brushing Technique.

*Corresponding author:
Dr. Sneha Deokar

ABSTRACT

Hellen Keller famously said, “Blindness cuts us off from the things, deafness cut us off from the people”. Hearing and speech loss limits one from interacting with one’s peers, and so impacts the ability to participate in social activities. In children, it interferes learning.¹Children with sensory deficits are most commonly encountered with poor oral hygiene, which is attributed to their physical inability and also due to reduced access to proper dental care². **Aim-** To evaluate the oral health status of children with hearing and speech disability and promoting the oral health education. **Material and methodology-** This study included sixty children within age range of 6-14 years. The plaque, gingival and DMFS index were recorded and analysed. The Oral Health education Program was conducted along with demonstration of brushing techniques. The follow up examination was assessed after one month for evaluating the effect of dental educational program. **Result-** Significant decrease in the values of plaque and gingival index after the oral health education program was observed and there was no significant difference in the DMFS score post the program. **Conclusion-** Significant improvement in oral hygiene status, participants brushing skills and oral health status after educational program was observed.

Copyright©2026, Sneha Deokar et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Dr. Sneha Deokar, Dr. Rehan Khan, Dr. Rajesh Aduri, Dr. Ashish Trivedi, Dr. Sushma Maku and Dr. Shital Kharat, 2026. “Assessing the Oral Health Status of Children With Hearing and Speech Disability Along Promoting the Oral Health Education Among them”, *International Journal of Recent Advances in Multidisciplinary Research*, 13,(08), 12778-12782.

INTRODUCTION

Oral health is an important component of overall health that contributes to a person's well-being and quality of life. A healthy mouth allows people to speak, eat and socialise without discomfort or embarrassment. Oral health is an important aspect of health for all children, but it is especially important for children with special health needs. As they are unable to properly employ the techniques required to control plaque, maintaining the oral health of these children is a difficult challenge¹. In many cases, a disabled child's oral hygiene is taken care of by someone else, usually a parent or guardian, who is frequently unable of handling the emotional or mental health issues of their less fortunate family members. Children with special health care needs have or are at increased risk of having a chronic physical, developmental, behavioural, or emotional condition, as well as requiring health and related services of a type or quantity greater than that required by children in general³. Oral hygiene is essential for preventing the development of periodontal disease and

dental caries. Primary prevention, before disease develops, should be the single most important dental goal for children with developmental disabilities. In the vast majority of cases, persons with impairments just need aggressive preventive measures and routine dental check ups⁴. This is the principle of Oral Health Education (OHE)⁴. These children need to learn about their teeth, what they are composed of, why and how they decay, the advantages of routine dental care, and the significance of a healthy diet. Patients with special needs and those who are medically compromised constitute a distinct population⁵. One of the largest population groupings of children with disabilities is children with hearing and speech impairment. Communication is the main aspect of hearing loss that it affects, and it can have a disastrous impact. Psychological, emotional and social difficulties typically worsen as the severity of loss rises. The age of onset, training and acceptance of disability all have an impact on the severity of the problem⁶. Every human development requires communication, which is a necessary component. Knowing a

language makes it possible for us to express our needs, emotions, and ideas to others. The success of teaching preventive oral health care to a child with hearing loss depends on the dental professional's ability to communicate with them. Since communication is the biggest obstacle to providing OHE to hearing-impaired children, new or specially designed programmes for these children are essential. There is a need to improve the dental health of children with hearing impairments, and in particular to develop creative methods that address the unique oral health programmes for these children in our nation⁷. So, the goal of the study was to evaluate the effect of sign language-based visual instruction in educational programmes as a motivational tool on the oral hygiene status of children with disabilities.

MATERIALS AND METHODS

The present study was designed as an observational study for evaluating the oral health status of children with hearing and speech loss. Oral health of such children was evaluated, after obtaining prior consent from the respective schools authorities and from the parents/guardians. Ethical clearance was obtained from Institutional Ethical Committee.

Sample: The study was carried out on Children with hearing and speech impairment, aged 6-14 years of both genders attending special school for deaf and mute in Parbhani, Maharashtra, India. Out of 75 children, 5 were absent on the day of examination and 10 were excluded based on the inclusion criteria, yielding a total sample of 60. Inclusion criteria was children with complete hearing and speech loss and within good general health. While, exclusion criteria included children with other systemic diseases and uncooperative children unable to cope up with the examination procedure.

All children were examined during school hours by a single examiner. The children were examined seated on an ordinary chair, under good illumination, either natural light or hand torch, using a sterile mouth mirror, probe and explorer, while taking protective cross infection control measures using disposable gloves and masks. The plaque index, gingival index and DMFS index were recorded on a oral health assessment form.

Assessment of plaque and gingivitis scores: Gingival index scores using Loe and Silness Gingival Index and Plaque score using Silness and Loe Plaque index were obtained from all the surfaces of the teeth and average score was calculated. All the teeth were examined and the score of the pre and post oral health education program was recorded. The score for Gingival index was also recorded.

Assessment of dental caries (decayed, missing and filled teeth): A tooth was considered to be decayed when there was lesion in the pit /fissure/smooth surface, undermined enamel, temporary filling with caries and softened floor. A tooth was classified as missing if it was extracted due to caries. A filled tooth was considered. DMFS index was obtained from all the surfaces of the teeth and average score was calculated. All the teeth were examined and the score of the pre and post oral health education program was recorded.

OHE talk (Oral Health Education): An OHE talk was delivered with the help of the teachers and care providers, who used sign language to communicate. The health talk emphasized on the importance of teeth, what they are made of, why and how they decay, the benefits of good oral hygiene procedures and the importance of a proper diet.

Assessment of brushing skills: Tooth brushing technique was demonstrated using a tooth brushing model and toothbrush. A combination of Modified Bass and Horizontal Scrub techniques were demonstrated since they are easy to learn and adequately effective among young children. The teachers and care takers were trained to supervise tooth brushing so they could effectively guide the children during and after the program. After a month of reinforced tooth brushing, all the children were subjected to a re-evaluation of their oral health status by assessing their plaque, gingival and carious teeth status and oral hygiene status.

STATISTICAL ANALYSIS

All data collected were subjected to statistical analysis using Chi-Square test. The measures of central tendency (mean) and standard deviation were calculated for variables. A paired t-test was performed to determine whether there was difference between the pre- and post measurements. The pre-OHE and post-OHE values were compared using the Wilcoxon signed rank test. A statistical package SPSS ver 17.0 was used to do the analysis; $p < 0.05$ was considered as statistically significant.

RESULTS

The mean range of plaque index score was decreased in 1 month follow-up from 0.811 to 0.369, the mean range of gingival index score decreased 0.478 to 0.203 with statistically significant difference between the Pre and Post OHE values ($p < 0.001$) respectively. The mean range of DMFS index score was unchanged in 1 month follow up 5.61 with no statistically significant difference between Pre and post OHE (Oral Health Education) program values ($p = 1.000$) respectively. Table 1 shows the age distribution with a mean value of 11.21, which suggests that the majority of the children were of 11 years.

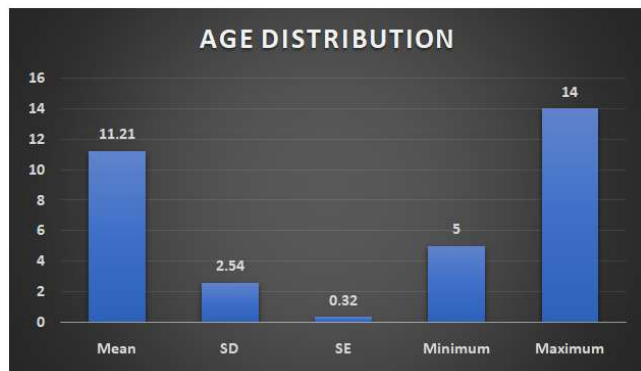
Table 1: Age distribution of study population

	Mean	SD	SE	Minimum	Maximum
Age (in years)	11.21	2.54	0.32	5.0	14.0

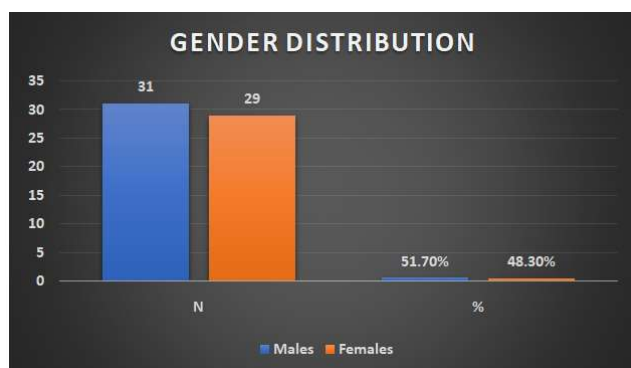
Table 2 shows the gender distribution with 51.7% accounting for males and 48.3% accounting for females in the study. Table 3 shows the mean plaque index scores of the total sample before and after receiving the oral health education talk. The mean value score at the end of pre-OHE was 0.811 which decreased to 0.369 after the oral health education talk after one month follow up.

Table 2: Gender Distribution of study population

	N	%	Chi square test value	P value, Significance
Males	31	51.7%	Chi =0.067	P =0.796 (Not significant difference)
Females	29	48.3%		



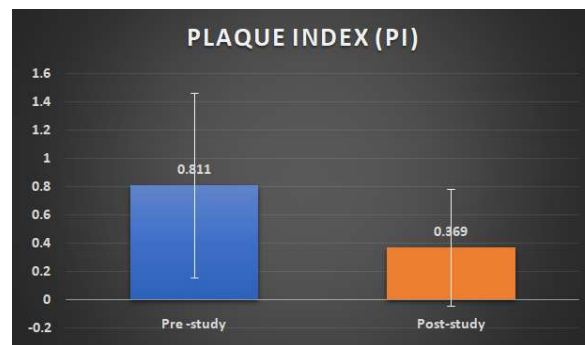
Graph 1- Age distribution of study population



Graph 2- Gender distribution of the study population

Table 3: Comparison of effectiveness of programme in respect to mean plaque index score

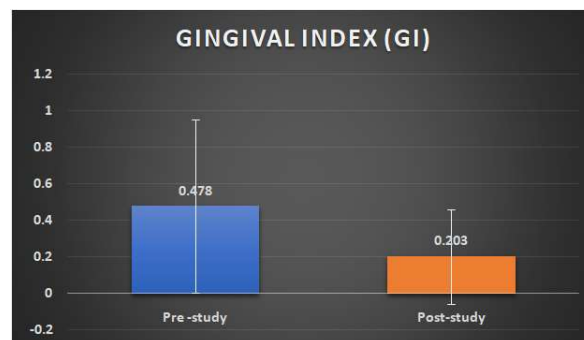
PI	Mean	SD	Mean Difference $\pm$ SE	Wilcoxon Sign Rank test	P value, Significance
Pre -study	0.811	0.655	0.442 $\pm$ 0.038	Z = -6.75	P< 0.001**
Post-study	0.369	0.411			



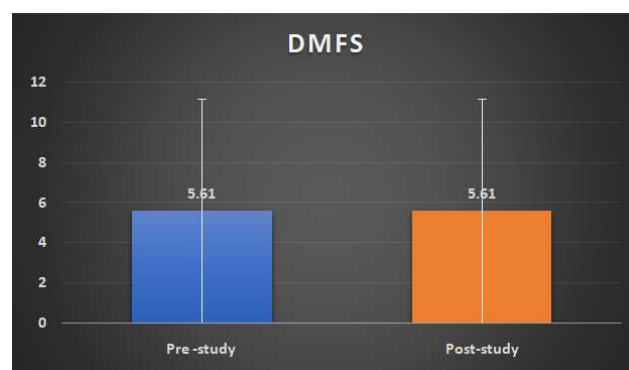
Graph 3. Comparison of effectiveness of pre and post study program with respect to Plaque Index

Table 4: Comparison of effectiveness of programme in respect to mean gingival index score

GI	Mean	SD	Mean Difference $\pm$ SE	Wilcoxon Sign Rank test	P value, Significance
Pre -study	0.478	0.476	0.275 $\pm$ 0.034	Z = -6.108	P< 0.001**
Post-study	0.203	0.259			



Graph 4. Comparison of effectiveness of pre and post study program with respect to Gingival Index



Graph 5- Comparison of effectiveness of programme in respect to mean DMFS score (caries experience)

Table 5: Comparison of effectiveness of programme in respect to mean DMFS score (caries experience)

DMFS	Mean	SD	Mean Difference $\pm$ SE	Wilcoxon Sign Rank test	P value, Significance
Pre-study	5.61	5.59	0.0 $\pm$ 0.0	Z = 0.0	p =1.000 (NS)
Post-study	5.61	5.59			

Table 4 shows the mean gingival index scores of the total sample before and after receiving the oral health education talk. The mean value score at the end of pre-OHE was 0.478 which decreased to 0.203 after the oral health education talk on one month follow up. Table 5 shows the mean DMFS index scores of the total sample before and after receiving the oral health education talk.

The mean value score at the end of pre-OHE and post- OHE was 0.561 which doesn't show any decrease in the mean values and no significant difference was found.

DISCUSSION

The American Health Association defines a child with disability as a child who for various reasons cannot fully make use of all his or her physical, mental and social abilities. Any impediment that restricts or limits daily activity in any way is referred to as having a disability⁸. Early detection of developmental disorders is important because they typically last a person their entire lives. According to WHO estimates of 2018, 466 million people have disabling hearing loss across the globe (6.12% of the world's population), out of which 34 million are children. In 1997, the WHO reported a 6.3% prevalence of Disabling Hearing Loss in India. Looking at the numbers from India alone, according to the 2011 census, more than 3 million people have disabling hearing loss and more than 1.2 million people have speech disability⁹. The number of Disabling hearing loss patients worldwide is predicted to be 630 million by 2030 and 900 million by 2050⁹. The onus is on the dental health care professional to come up with new and inventive ways to impart dental health education to these children because children with hearing impairment represent a very vulnerable group that is heavily dependent on their parents and care providers for general and oral health care needs¹⁰.

Hearing loss may be misinterpreted and associated with a learning disability¹¹. An effort should always be made, using various communication strategies, to provide quality health education to these children¹². Communication is essential in providing dental health education to children with hearing impairments¹³. The present study was planned in the Department of Paediatric and Preventive Dentistry and was carried out at Kanchan Trimbakrao Karnabadhir Mahavidyalaya, Parbhani, Maharashtra. Sixty children were included in the study, their age ranged from 6-14 years old. An Oral health education program was conducted and brushing technique was demonstrated with the help of their teachers who used signed language for the same. The follow up examination was assessed after one month, for evaluating the effect of the dental educational program on the oral health status of deaf children. Kropfl reported that modified bass method to be significantly more efficacious than horizontal scrub method¹⁴. Kremers et al.¹⁵ and Zhang et al., showed that Bass technique effectively removed interdental plaque when compared with other techniques¹⁶. Horizontal scrub technique has been reported as a method of choice in young children in various studies because of the inability to apply other tooth brushing techniques.¹⁷

A combination of modified bass and horizontal scrub techniques were used since they are easy to learn and adequately effective among young children. This school-based oral health programme was shown to be successful in enhancing the hearing and speech impaired children's oral hygiene¹⁷. In this study there was significant reduction in Plaque and gingival index scores after receiving an educational program which enhance improvement in oral health status. The results of this study came with agreement with results of study conducted by Sandeep et al., 2014 in India who found that there was a significance reduction in

plaque score in the intervention group, but only marginal reduction in plaque score in the control group. Also these observations came in accordance with the findings of similar study carried out by Shetty et al., 2014 in Mangalore, India who reported significance reduction in plaque score in the intervention group that received the oral health educational program¹⁸. In addition similar findings were observed in a study conducted by Pareek et al., 2015 in Jaipur, Rajasthan who found a significant reduction in plaque score for the intervention group that received oral educational program¹⁹. Children with hearing impairment received individualised attention in the form of an educational programme, which increased their motivation in practising excellent oral hygiene and contributed to the improvement in oral hygiene status. This study found that the designed educational programme is effective in improving the oral health status of hearing impaired and mute children who had poor oral health at the start. The current intervention demonstrated that children with disabilities can be taught simple oral hygiene procedures and can brush their teeth correctly when encouraged and motivated¹⁹. For the purpose of achieving the highest possible levels of oral health, this programme can be very beneficial in removing the communication barrier created by hearing and speech impairment. Modifications and enhancement to the oral health programme can be made for these children as well as children with other special care needs¹⁹. The results of this study demonstrated the importance of oral health education in preventing oral diseases. School-aged children should always receive this education because classrooms are the ideal setting for imparting preventive dental health habits, and through them, the message can spread to the community at large. Our study emphasise the importance of conducting research into preventive strategies for children with hearing and speech impairments. Furthermore, there is a need to investigate the long-term effectiveness of such programmes in a large sample population of children with longer regular periods of reinforcement.

CONCLUSION

The gingival health of all the children from the pre-OHE and post-OHE programmes showed a highly significant improvement. With the help of their teacher or care taker, the demonstration of tooth-brushing method on a model was successful in reaching out to those children. The dental health education programme was a successful way to raise the level of oral hygiene among deaf and mute children. At the conclusion of the study, all the children's brushing abilities had significantly improved. The findings of our study indicate that the OHE programme, which was created especially for kids with hearing and speech loss, was successful in considerably enhancing their oral health status. Hence, prevention based educational and motivational programs should be targeted to this vital group to achieve adequate oral hygiene.

REFERENCES

1. Vishnu Prasad S, Kumar M, Ramakrishnan M, Ravikumar D. Report on oral health status and treatment needs of 5–15 years old children with sensory deficits in Chennai, India. *Special Care in Dentistry*. 2018 Jan;38(1):58-9.
2. Verma RR, Konkimalla A, Thakar A, Sikka K, Singh AC, Khanna T. Prevalence of hearing loss in India. *National Medical Journal of India*. 2021 Jul 1;34(4).

3. Alse, A. S., Anandkrishna, L., Chandra, P., Ramya, M., Kamath, P. S. & Shetty, A. K. Educational intervention on the plaque score among hearing impaired children. *Journal of Advanced Clinical & Research Insights*. 2015; 1(4): 1-5.
4. Ciorba, A., Bianchini, C., Pelucchi, S. & Pastore, A. The impact of hearing loss on the quality of life of elderly adults. *Clinical interventions in aging*. 2012; 7: 159-163.
5. Davis, A. M., Brown, R. F., Taylor, J. L., Epstein, R. A. & McPheeters, M. L. Transition care for children with special health care needs. *Pediatrics*. 2014; 134(5): 900-908.
6. Kwan, S. Y., Petersen, P. E., Pine, C. M. & Borutta, A. Health-promoting schools: an opportunity for oral health promotion. *Bulletin of the World Health organization*. 2005; 83(9): 677-685.
7. Petersen, P. E & Kwan, S. Evaluation of community-based oral health promotion and oral disease prevention-WHO recommendations for improved evidence in public health practice. *Community dental health*. 2004; 21(4): 319-329.
8. Watt, Richard G. Strategies and approaches in oral disease prevention and health promotion. *Bulletin of the World Health Organization*. 2005; 83(9): 711-718.
8. Sacristan, J. A. Patient-centered medicine and patient-oriented research: improving health outcomes for individual patients. *BioMed Central, medical informatics and decision making*. 2013; 13(1): 6-8.
9. Baliga SM, Deshpande MA, Thosar N, Rathi N, Bane S, Deulkar P. Comparison of impact of oral hygiene instructions given via sign language and validated customized oral health education skit video on oral hygiene status of children with hearing impairment. *Journal of Indian Society of Pedodontics and Preventive Dentistry*. 2020 Jan 1;38(1):20-5.
10. Tesini DA, Fenton SJ. Oral health needs of persons with physical or mental disabilities. *Dental Clinics North Am* 1994;38(3):483-3. Murray JJ, McLeod JP. The dental condition of severely subnormal children in three London boroughs. *Br Dent J* 1973;134: 380-5.
11. Nunn JH. The dental health of mentally and physically handicapped children: a review of literature. *Community Dent Health* 1987;4:157-68.
12. Shaw L, MacLaurin ET, Foster TD. Dental study of handicapped children attending special schools in Birmingham, UK. *Community Dent Oral Epidemiol* 1986;14: 24-7.
13. Cutress TW. Dental caries in trisomy 21. *Arch Oral Biol* 1971;16:1329-44.
9. Nunn JH, Murray JJ. The dental health of handicapped children in Newcastle and Northumberland. *Br Dent J* 1987;162:9-14.
14. Kropf JL. Clinical Evaluation of Magnifying Lighted Mirror and Unwaxed Dental Floss as Oral Hygiene Adjuncts. Master's Thesis. Ann Arbor: University of Michigan, School Dentistry; 1971. p. 124. 22.
15. Kremers L, Lampert F, Etzold C. Comparative clinical studies on 2 toothbrushing methods – Roll and Bass technic. *DtschZahnarztl Z* 1978;33:58-60.
16. Zhang JH, Sha YQ, Cao CF. Comparative study of the effects of removing plaque by two toothbrushing methods. *Beijing Da Xue Xue Bao* 2005;37:542-4.
17. Kimmelman BB, Tassman GL. Research in design of children's toothbrushes. *J Dent Child* 1960;27:60.
18. Shetty, V., Kumar, J. & Hegde, A. Breaking the sound barrier: oral health education for children with hearing impairment. *Special Care in Dentistry*. 2014; 34(3): 131-137.
19. Pareek, S., Nagaraj, A., Yousuf, A., Ganta, S., Atri, M. & Singh, K. Effectiveness of supervised oral health maintenance in hearing impaired and mute children-A parallel randomized controlled trial. *Journal of International Society of Preventive & Community Dentistry*. 2015; 5(3): 176-182.
