[Downloaded free from http://www.srmjrds.in on Monday, December 20, 2021, IP: 178.176.215.248]

Original Article

# Oral health status of hearing and speech-impaired schoolchildren in Erode district, Tamil Nadu – A cross-sectional study

*S. Kalaivani, Girish R. Shavi[1], Shankar Shanmugam[1], Ranganath Sanga[2], Lalithambigai Gunasekaran[1], C. Rahila[1]*

Department of Public Health Dentistry, Adhiparasakthi Dental College and Hospital, Melmaruvathur, [1]Department of Public Health Dentistry, Vivekanandha Dental College for Women, Tiruchengode, Tamil Nadu, [2]Department of Public Health Dentistry, Care Dental College, Guntur, Andhra Pradesh, India

## ABSTRACT

**Background:** Children with hearing and speech impairment are one of the important groups deprived of good oral health due to communication barriers. The chance of acquiring minimal information can significantly affect their personal as well as oral health. **Aim:** The present study was conducted to assess the oral health status among hearing and speech-impaired children in Erode. **Materials and Methods:** This cross-sectional descriptive study was conducted among hearing and speech-impaired children aged 7–14 years attending special schools at Erode, Tamil Nadu. A structured questionnaire written in vernacular language (Tamil) was used to obtain information on demographic details and oral hygiene practices. Then, oral examination was carried out and findings were recorded in the WHO Oral Health Assessment Form for Children, 2013. Descriptive statistics and Chi-square test were used for statistical analysis. **Results:** A total of 75 children were examined including 46 males (61%) and 29 females (39%). The common dental diseases found in the children were dental caries (65%) and gingival bleeding (47%). Most of the children (76%) required prompt treatment. Intervention urgency is higher among those children who have not visited a dentist before. **Conclusion:** The present study population has extensive dental treatment needs owing to communication difficulties and underutilization of dental care. The dental professionals along with the school authorities and voluntary agencies should reorganize the preventive as well as curative dental services so as to benefit the hearing and speech-impaired children.

**Key words:** Dental care for disabled, dental health surveys, oral hygiene

**Address for correspondence:**
Dr. S. Kalaivani,
Department of Public Health Dentistry, Adhiparasakthi Dental College and Hospital, Melmaruvathur - 603 319, Tamil Nadu, India.
E-mail: skalai2508@gmail.com

**Received:** 02-06-2021, **Revised:** 22-11-2021,
**Accepted:** 23-11-2021, **Published:** 20-12-2021

| Access this article online | |
|---|---|
| Quick Response Code: | Website: www.srmjrds.in |
| | DOI: 10.4103/srmjrds.srmjrds_48_21 |

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** WKHLRPMedknow_reprints@wolterskluwer.com

**How to cite this article:** Kalaivani S, Shavi GR, Shanmugam S, Sanga R, Gunasekaran L, Rahila C. Oral health status of hearing and speech-impaired schoolchildren in Erode district, Tamil Nadu – A cross-sectional study. SRM J Res Dent Sci 2021;12:198-203.



© 2021 SRM Journal of Research in Dental Sciences | Published by Wolters Kluwer - Medknow

[Downloaded free from http://www.srmjrds.in on Monday, December 20, 2021, IP: 178.176.215.248]



## INTRODUCTION

Hearing impairment is a disability that has been defined as loss of 60 dB or more in the ear in the conventional range of frequencies.[1] Around 80% of people with disabilities live in developing countries, and hearing and speech impairment among children is one of the major public health problems, which can hinder further development.[2] In India, one child in every 1000 live births suffers from hearing impairment. As per the National Sample Survey Organization, India 76th round data from July to December 2018, the incidence of disability was 86 per 100,000 persons. The prevalence of disability was 2.2% which included 0.5% suffering hearing and speech impairment.[3]

Hearing and speech impairment is a disability that can limit the chance of acquiring information and significantly affect personal health. A negative correlation exists between hearing loss and reported quality of life.[4] Those with hearing and speech impairment experience communication barriers, often leading to mental distress, emotional or physical abuse, practical problems, and poor social relationships, thereby leading to limited activity. As a result, they become recipients of inappropriate oral health.[5-9] Sometimes, underutilization of oral healthcare prevails among disabled people due to many reasons such as poor accessibility, inadequate training of oral healthcare providers in handling disabled, attitude of dental practitioners, and dependence on caregivers.[6]

Individuals with special needs may have great limitations in oral hygiene performance due to their potential motor, sensory, and intellectual disabilities and so are prone to poor oral health.[6] Children with hearing and speech impairment are one important group deprived of good oral health due to communication barriers as it is a two-way process. Patients with hearing loss need to be helped to understand and also need to know how to communicate in the best way.[7] Oral health promotion can be effectively achieved if the needs of these special children are fulfilled.

Previous studies have emphasized that oral diseases are affecting disabled individuals with greater severity and at a younger age.[7-12] There is sparse literature about the oral health status of disabled in Western zone of Tamil Nadu. Erode is a prominent district in Western Tamil Nadu, with a hearing disability rate of 246 per 100,000 population.[13] Hence, the present study has been conducted among hearing and speech-impaired children attending the special school for disabled in Erode to evaluate their oral hygiene practices, oral health status, and treatment needs.

## MATERIALS AND METHODS

- Study design: Cross-sectional descriptive study
- Study setting: Special schools at Erode taluk and Perundurai taluk in Erode district, Tamil Nadu
- Participants: Hearing and speech-impaired children aged 7–14 years
- Study period: January to March 2019
- Sample size: 75.

The study was approved by the Institutional Ethics Committee of Vivekanandha Dental College for Women, dated March 1, 2018, VDCW/IEC/90/2018. All procedures performed in the study were conducted in accordance with the ethical standards given in 1964 Declaration of Helsinki, as revised in 2013. Prior permission was obtained from the headmaster of the two special schools to conduct the study. The parents were informed about the study through the respective headmasters, and their consent was obtained. The primary investigator was calibrated before the start of the study. The pilot study was conducted among a sample of 15 hearing and speech-impaired schoolchildren to determine the feasibility, reliability, and validity of the questionnaire and practical difficulties in examination of each subject and applicability of WHO Oral Health Assessment Form for children, 2013.[14]

The students were made to answer the pretested, structured, and validated questionnaire written in vernacular language (Tamil). There were 18 closed-ended questions regarding the reasons for hearing loss, level of hearing loss, communication methods used, attitude toward oral health, oral hygiene practices, and dental visits. The study subjects were selected using total enumeration sampling technique, and all the children who are available and willing to participate in the study were given the questionnaire in their classrooms. The children who are unable to cope up with the examination procedure and the children with other systemic diseases were excluded. The level of hearing loss of the children was obtained from the class teachers. The questionnaire was self-administered, and in case of any difficulty in understanding, the examiner explained the questions to the subjects with the help of their class teachers. Confidentiality and anonymity of the respondents were assured. The questionnaire generally took an average of 10 min to complete.

After answering the questions, the children were examined under artificial light seated comfortably on an ordinary chair. The oral health status, including oral mucosal conditions, periodontal status, dentition status, and intervention urgency, were recorded in the WHO Oral Health Assessment Form for Children, 2013,[14] which took about 10 min for each child. The total time taken to complete the questionnaire and oral examination was around 20–30 min for each child.

### Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences version 20 software (IBM SPSS Statistics for Windows, version 20.0 (SPSS Inc., Armonk, NY, USA)). Descriptive statistics were used to summarize the sample

[Downloaded free from http://www.srmjrds.in on Monday, December 20, 2021, IP: 178.176.215.248]



and responses of the questionnaire. Chi-square test was used to find the association between the gender, age group, and oral health parameters. Level of significance was set at $P \leq 0.05$ (with confidence interval of 95%).

## RESULTS

A total of 80 hearing and speech-impaired schoolchildren (total strength is 95) were given the questionnaire (excluded children who are uncooperative [7], parents did not give consent [8], did not complete questionnaire [5]) and only 75 children were examined after they completely filled the questionnaire. The present study included 19 children (25%) in the 7–10 years age group and 56 children (75%) in the 11–14 years age group. Their mean age was 11.83 ± 1.8 years. Based on gender, there were 46 male (61%) and 29 female children (39%). All the children had congenital hearing loss along with speech impairment. Out of the 75 children, 7 children (9%) had moderate hearing loss, 28 (37%) had severe hearing loss, and 40 (54%) had profound hearing loss [Table 1].

The most commonly used method of communication by the students was sign language (60%), followed by lip-reading (26%) and hearing aids (14%). The major source of getting oral health-related information among these children was school, irrespective of the communication methods used [Figure 1].

Regarding the oral hygiene practices, all the children used toothbrush and toothpaste to clean their teeth. Majority (91%) of the participants brush once daily and around 9% brush twice daily. Many children in the 7–10 years age group (73.7%) and 11–14 years age group (64.3%) have never visited a dentist. Among those children who had previous dental visit, 15.8% of children in 7–10 years age group and 26.8% of children in 11–14 years age group have visited only when there is any pain or discomfort. There is a significant association ($P < 0.037$) found between age and previous dental visits [Table 2].

The reasons for delaying dental visit was that they felt that there was nothing wrong with their teeth (45%), fear of pain (25%), afraid of dentist (18%), communication difficulties (4%), dental clinic was far away (4%), and cost financial difficulty (4%). At the dental clinic, 49.6% of children with moderate hearing loss and 74.1% of children with profound hearing loss had difficulty in communicating with the dentist. Around 27% and 18% of the children with severe and profound hearing loss had difficulty in understanding what takes place during treatment, respectively. All the children with moderate hearing loss did not have any communication difficulty in the dental clinic, while 23.1% of the children with severe hearing loss and 7.7% of the children with profound hearing loss did not have any communication difficulty.

**Table 1: Distribution of study population based on age, gender, and level of hearing loss**

| | *n* (%) |
|---|---|
| Age group (years) | |
| 7-10 | 19 (25) |
| 11-14 | 56 (75) |
| Gender | |
| Male | 46 (61) |
| Female | 29 (39) |
| Level of hearing loss (dB) | |
| Moderate (41-60) | 7 (9) |
| Severe (61-80) | 28 (37) |
| Profound (>81) | 40 (54) |

dB: decibel

On oral examination, dental diseases found in the children were dental caries (65%), gingival bleeding (47%), dental fluorosis (19%), dental trauma (8%), and dental erosion (5%). Most of the children (76%) required prompt treatment; 10 children required preventive or routine treatment; only 8 children did not require any treatment [Figure 2].

Based on intervention urgency, majority of the boys (52%) required prompt treatment, while very few (10.6%) did not require any treatment. A significant association is found between intervention urgency and gender. Intervention urgency is higher among those children who have not visited a dentist before [Table 3].

## DISCUSSION

The greatest challenge faced by the sensory impaired people who are institutionalized is the society's misperception that they are a "breed apart" because historically they have been pitied, ignored, and hidden away in homes and institutions. Providing healthcare services for these special children is a challenge in the 21st century, and it still continues to be a greater. Oral health and quality oral healthcare contribute to holistic health. The number of male children in the study was significantly higher than that of the females, which could be due to the fact that the rural population of India still perceives that female child education does

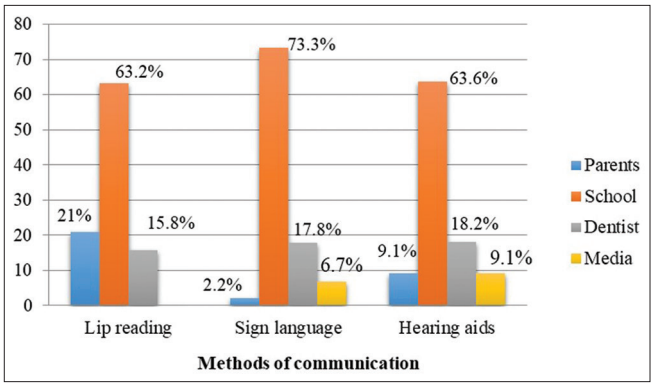


**Figure 1: Distribution of study population based on the communication methods used to receive oral health-related information**

[Downloaded free from http://www.srmjrds.in on Monday, December 20, 2021, IP: 178.176.215.248]



**Table 2: Distribution of the study population according to previous dental visits**

| Age group (years) | Previous dental visit | | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|---|
| | More than twice a year, *n* (%) | Once a year, *n* (%) | During pain/discomfort, *n* (%) | Never, *n* (%) | | |
| 7-10 | 2 (10.5) | 0 | 3 (15.8) | 14 (73.7) | 8.491 | 0.037* |
| 11-14 | 0 | 5 (8.9) | 15 (26.8) | 36 (64.3) | | |

*Significance at *P*<0.05

**Table 3: Distribution of intervention urgency among the study population based on gender and level of hearing loss**

| | Intervention urgency | | | $\chi^2$ | *P* |
|---|---|---|---|---|---|
| | No curative treatment needed, *n* (%) | Preventive or routine treatment, *n* (%) | Prompt treatment, *n* (%) | | |
| Gender | | | | | |
| Male | 1 (1.3) | 6 (8) | 39 (52) | 9.259 | 0.010* |
| Female | 7 (9.3) | 4 (5.3) | 18 (24) | | |
| Level of hearing loss | | | | | |
| Moderate | 0 | 1 (1.3) | 6 (8) | 6.317 | 0.177 |
| Severe | 1 (1.3) | 6 (8) | 21 (28) | | |
| Profound | 7 (9.3) | 3 (4) | 30 (40) | | |

*Significance at *P*<0.05

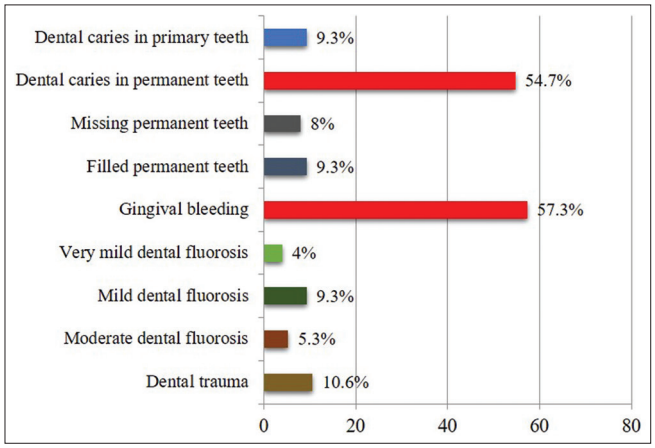


**Figure 2: Distribution of the study population according to their oral health status**

not contribute to the economic development of a family. Around 55% of the children in the present study felt that tooth brushing prevents dental caries which was similar to the previous study by Tugeman *et al.*[15] All the children in the present study used toothbrush and toothpaste to clean their teeth, and this finding is similar to the studies by Suma *et al.*[9] and Vaishanavi *et al.*[10] but higher than the study by Aruna *et al.*[11] Almost 91% of the children in the present study brushes once daily, which is similar to the study by Aruna *et al.*[11] and Vaishnavi *et al.*[10] but lower than the studies by Oredugba *et al.*[12] Other oral hygiene aids, such as dental floss, interdental cleaning aids, and mouthwashes, were not used by the present study population. Lack of knowledge about good oral hygiene practices among the concerned authorities, lack of motivation, the low priority given to oral healthcare in the society, and the generally poor socioeconomic status of parents or guardians could have resulted in poor oral hygiene among the disabled children.

In the present study, dental caries was the most common disease experienced by 61.3% of the children, and this result is similar to the studies by Wei *et al.*[16] and Sandeep *et al.*[8] This result was lower than reported by Aruna *et al.*[11] but higher than the studies by Jnaneswar *et al.*[17] Gingival bleeding was found in around 57% of the children, similar to the study by Mehta *et al.*[18] This could be attributed to negligence on the part of parents and school authorities in obtaining preventive dental treatment for these hearing and speech-impaired children. Efforts must be made to encourage the parents and school teachers of these children to promote and improve their oral health since they are the main source of oral health-related information. Parents should be educated about dental development of their children, dental disease processes, and oral hygiene measures that are appropriate for children.

Dental trauma was found in 10.6% of the children which is higher than the study by Suma *et al.*[9] yet contrary to the study by Nayak *et al.*[19] Dental trauma in the present study could be due to hearing disability, venturing into more risks, or participating more in sports activities. There is a higher frequency of dental trauma in institutionalized children or rural children when compared to that of urban children, which may be due to higher parental knowledge and more protective environment for urban children.

The present study population revealed the prevalence of dental fluorosis to be 18.6%, which is contrary to the study by Shyama *et al.*[20] According to Kumar *et al.*,[21] the prevalence of enamel mottling in Erode district was 30%. The proportion of water sources having 1.0 ppm of fluoride in the villages of Erode was 17%. In addition, the consumption of fluoride-containing foods could also be a reason for fluorosis.

Preventive treatment was required by around 13% of the children in the present study which is higher than that of the study by Rao *et al.*[22] Around 76% in the present study required prompt treatment, which is higher than the study by Mehta *et al.*[18] The lack of treatment was reflected with

[Downloaded free from http://www.srmjrds.in on Monday, December 20, 2021, IP: 178.176.215.248]



the results from the current study. These findings propose the need to emphasize preventive care in these disabled children. In the present study, 67% of the children have not visited a dentist which is similar to the previous studies by Suma *et al*.[9] and Reddy *et al*.[23] On the other hand, the number of children with previous dental visit in the present study was lower than other studies by Champion and Holt[24] and Tugeman *et al*.[15] Difference in results as compared with the study conducted abroad may be because of low awareness regarding the provision of comprehensive orodental care. The most common reason for visiting a dentist was pain or discomfort as reported by 72% of the children. This was similar to the study by Vaishnavi *et al*.[10] and is contrary to the studies by Suma *et al*.[9] and Tugeman *et al*.[15]

Around 88% of the present study population faced communication difficulties at the dental clinic which is similar to the previous study by Champion *et al*.[24] in which nearly three-fourth of patients were reported to have communication difficulties at the dental clinic. The previous study by Champion *et al*.[24] reported that communication difficulties could be due to many reasons such as lack of awareness, lack of specific calling systems, need to learn and to use basic sign language, using explanatory videos/books, dentist not pulling the mask down to speak to, not facing child to communicate, and lack of positive attitude of dentist in handling hearing-impaired children. Management of hearing-impaired patients includes simple measures such as not calling the patient from the waiting room using solely verbal means, sign posters, brochures, and pictures to help explain procedures. Dentists need to be sensitive to nonverbal communication such as facial expressions, postures, and movements as a means of conveying feelings. Dentists should routinely enquire about a child's preferred means of communication. Removing masks while talking, reducing background noise, and learning to use simple signs may improve communication with hearing-impaired patients.

## CONCLUSION

In the present study, sign language was the commonly used communication method by the institutionalized hearing and speech-impaired children, and school was their major source of getting oral health information. Dental caries was the most common oral disease. An extensive treatment need prevails among the study population owing to difficulties in communication and underutilization of dental care. Hence, the dental professionals along with the help of the school authorities as well as voluntary agencies should organize regular dental services in the schools or at dental clinics to provide periodic dental care to these special children.

### Acknowledgment

We would like to thank the hearing and speech-impaired school headmasters, children, and their parents for their valuable contribution for this study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. WHO-PDH. Report of the Informal Working Group on Prevention of Deafness and Hearing Impairment, Programme Planning. Geneva: World Health Organization; 1991. Available from: https://apps.who.int/iris/handle/10665/58839. [Last accessed on 2021 May 05].
2. Purohit BM, Singh A. Oral health status of 12-year-old children with disabilities and controls in southern India. WHO South East Asia J Public Health 2012;1:330-8.
3. Government of India. Persons with Disabilities in India. Report No. 583(76/26/1). New Delhi: National Sample Survey Organisation; 2019.
4. Roland L, Fischer C, Tran K, Rachakonda T, Kallogjeri D, Lieu JE. Quality of life in children with hearing impairment: Systematic review and meta-analysis. Otolaryngol Head Neck Surg 2016;155:208-19.
5. Kvam MH, Loeb M, Tambs K. Mental health in deaf adults: Symptoms of anxiety and depression among hearing and deaf individuals. J Deaf Stud Deaf Educ 2007;12:1-7.
6. Jain M, Mathur A, Kumar S, Dagli RJ, Duraiswamy P, Kulkarni S. Dentition status and treatment needs among children with impaired hearing attending a special school for the deaf and mute in Udaipur, India. J Oral Sci 2008;50:161-5.
7. Sanjay V, Shetty SM, Shetty RG, Managoli NA, Gugawad SC, Hitesh D. Dental health status among sensory impaired and blind institutionalized children aged 6 to 20 years. J Int Oral Health 2014;6:55-8.
8. Sandeep V, Kumar M, Vinay C, Chandrasekhar R, Jyostna P. Oral health status and treatment needs of hearing impaired children attending a special school in Bhimavaram, India. Indian J Dent Res 2016;27:73-7.
9. Suma G, Das UM, Bs A. Dentition status and oral health practice among hearing and speech-impaired children: A cross-sectional study. Int J Clin Pediatr Dent 2011;4:105-8.
10. Vaishnavi S, Chaly PE, Nijesh SP, Priyadarshni VI. Oral health care awareness among differently abled children attending special schools in Chennai. TJPRC: IJCPHD 2015;5:1-10.
11. Aruna CN, Chandu GN, Shafiulla MD. Dental caries experience among deaf and dumb children in Davengere, Karnataka. J Indian Assoc Public Health Dent 2005;5:1-4.
12. Oredugba FA, Akindayomi Y. Oral health status and treatment needs of children and young adults attending a day centre for individuals with special health care needs. BMC Oral Health 2008;8:30.
13. Velayutham B, Kangusamy B, Mehendale S. Prevalence of disability in Tamil Nadu, India. Natl Med J India 2017;30:125-30.
14. Petersen PE, Ramon JB. Oral Health Surveys: Basic Methods. 5th ed. Geneva: World Health Organization; 2013. Available from: https://apps.who.int/iris/handle/10665/97035. [Last accessed on 2021 May 12].
15. Tugeman H, Rahman NA, Yusoff A, Daud MK. Oral health knowledge, practice and dental plaque maturity status of hearing-impaired children. Sains Malaysiana 2016;45:761-8.
16. Wei H, Wang YL, Cong XN, Tang WQ, Wei PM. Survey and analysis of dental caries in students at a deaf-mute high school. Res Dev Disabil 2012;33:1279-86.
17. Jnaneswar A, Subramaniya GB, Pathi J, Jha K, Suresan V, Kumar G. Assessment of dental caries and periodontal status in institutionalized hearing impaired children in Khordha District of Odisha. J Indian Soc Pedod Prev Dent 2017;35:203-8.
18. Mehta A, Gupta R, Mansoob S, Mansoori S. Assessment of oral health status of children with special needs in Delhi, India. RSBO 2015;12:244-51.

[Downloaded free from http://www.srmjrds.in on Monday, December 20, 2021, IP: 178.176.215.248]



19. Nayak PP, Kakarla PV, Shetty PJ, Bhat MY. Dental trauma prevalence and disability types: A comparative study among children and adolescents in Dharwad, India. J Indian Assoc Public Health Dent 2015;13:19-23.
20. Shyama M, Al-Mutawa SA, Honkala S, Honkala E. Supervised toothbrushing and oral health education program in Kuwait for children and young adults with Down syndrome. Spec Care Dent 2003;23:94-9.
21. Kumar RH, Khandare AL, Brahmam GN, Venkiah K, Reddyand CG, Sivakumar B. Assessment of current status of fluorosis in North-Western districts of Tamil Nadu using community index for dental fluorosis. J Hum Ecol 2007;21:27-32.
22. Rao DB, Hegde AM, Munshi AK. Caries prevalence amongst handicapped children of South Canara district, Karnataka. J Indian Soc Pedod Prev Dent 2001;19:67-73.
23. Reddy VK, Chaurasia K, Bhambal A, Moon N, Reddy EK. A comparison of oral hygiene status and dental caries experience among institutionalized visually impaired and hearing impaired children of age between 7 and 17 years in central India. J Indian Soc Pedod Prev Dent 2013;31:141-5.
24. Champion J, Holt R. Dental care for children and young people who have a hearing impairment. Br Dent J 2000;189:155-9.