

## Oral health status and treatment needs of hearing impaired children attending a special school”

**Dr. Neha Deol<sup>1</sup>, Dr. Aashima Gupta<sup>2</sup>, Dr. Nitin Kudyar<sup>3</sup>, Dr. Ashwini Pratap Gupta<sup>4</sup>,  
Dr. Sankey Kumar Baidya<sup>5</sup>, Dr. Kapil Paiwal<sup>6</sup>**

<sup>1</sup>MS ENT Specialist, GMC, Udhampur, Jammu and Kashmir, India

<sup>2</sup>Reader, Department of Oral Medicine and Radiology, Himachal Dental College, Sundernagar, HP, India

<sup>3</sup>Consultant Dental, GMC, Udhampur, Jammu and Kashmir, India(Corresponding author)

<sup>4</sup>PG, Department of Oral Pathology and Microbiology, Triveni Institute of Dental Sciences, Hospital & Research Centre, Bilaspur, Chhattisgarh, India

<sup>5</sup>Reader, Department of Prosthodontics and Crown & Bridge, Hazaribag College of Dental Sciences & Hospital, Hazaribag, Jharkhand, India

<sup>6</sup>Professor, Department of Oral & Maxillofacial Pathology, Daswani Dental College & Research Center, Kota, India

### **Abstract:**

**Background:** Children who are hard of hearing (CHI) face special barriers while trying to get the medical care they need. They have serious dental problems and need considerable treatment. **Aim:** This study was out to determine the state of dental health among special education students who were also CHI and the extent of their treatment needs. **Study Design:** The study design was a descriptive cross-sectional study. **Materials and Methods:** This study was conducted in India during the month of November 2022 at the Special School for the Deaf. There were a total of 200 CHI participants, both sexes included; they ranged in age from 6 to 16 and were divided into three groups: Group-I (children ages 6-8), Group-II (children ages 9 to 12), and Group-III (children ages 13 to 16). Researchers used World Health Organization (WHO) recommendations from 1997 to record patients' dental health and the treatments they required. “Prevalence of dental caries was measured (calculated as decayed, missing, and filled teeth [DMFT/dmft]), as was the severity of gingivitis (Le, Silness Gingival Index) and plaque (Silness, Le Plaque Index) and the need for treatment. **Statistical Analysis:** The data was analyzed using the Z-test for percentage, one-way analysis of variance, and the Chi-square test. **Results:** A total of 65% of the sample showed evidence of dental caries, with means of 1.5DMFT in Group-I, 2.0 DMFT in Group-II, and 2.1 DMFT in Group-III, respectively. Approximately 90% of all children screened need medical attention.” Sample mean scores for plaque were 1.5 and gingivitis scores were 1.3. **Conclusion:** These results suggest a catastrophic oral health status because to CHI. Therefore, it is imperative that preventative educational and motivating initiatives aimed at this key demographic be implemented.

**“Keywords:** Gingival index, hearing impairment, oral health education, plaque index, visual instruction”

### **Introduction:**

A kid with special needs is one who, for whatever reason, is unable to develop to his or her full potential in terms of cognitive, motor, and social skills. It is estimated that there are 150 million disabled children worldwide, the vast majority of whom do not have access to adequate health care. Their dental health is

severely compromised [1]. Health care neglect (by caregivers or parents), language problems, socioeconomic status, etc. are cited as reasons for the underserved nature of their dental requirements [2, 3]. [3],There are significant communication hurdles that prevent children with hearing impairment (CHI) from receiving adequate oral health care, as stated in [4]. [5],[6]

Loss of hearing in one or both ears is what we mean when we talk about deafness. Children with hearing impairment (CHI) may range from a slight loss of hearing (15-30 dB) to a substantial impairment of hearing (>95 dB). Many youngsters throughout the globe suffer from hearing impairment (HI). Between 23,000 and 25,000 British children (0 to 15 years old) are born with a hearing loss that will not improve [7] (statistics, 1997). In India, HI affects every one in a thousand newborns, or around 0.4% of the country's 1065.40 million kids. [4],[8] (NSSO 2002). Only 5.4% of the overall deaf and mute population in Turkey attend special education institutions, where only 6268 CHI were enrolled in 2007 and 2008. [9] Child development is negatively impacted by HI because of the delays in speech and language result, decreased cognitive abilities, and slower academic achievement. [8],[10]

Several cross-sectional studies of CHI have shown that the population has a dismal oral health state and requires substantial therapy. All of these investigations were done on a somewhat small sample, and the ages of the participants ranged widely. They were also examined alongside research involving other children with exceptional needs [2, 11, 12, 13]. Only a small number of recent studies have described assessing dental requirements in isolation. [4],[14],[15],[16] Any incentive to better oral health must be both effective and relevant to the intended populations. [17],[18] Only by pinpointing the requirements of the intended audiences can this be achieved. This research set out to do just that, providing a quick snapshot of CHI caries experience and treatment requirements by gauging prevalence of dental caries, plaque scores, gingivitis scores, and the like.

## **Materials and methods:**

### **Ethical approval:**

The Institutional Review Board cleared the research procedures included in this descriptive cross-sectional study. The parents and school administration gave their prior written approval. During their regular monthly school visits, all

the parents were briefed on the research procedure and agreement was gained.

### **Sample:**

In XXXX India, researchers conducted a large-scale descriptive study of CHI between the ages of 6 and 16. Because of this, the study's findings should not be generalized to all children with hearing loss throughout the city, county, or country. There were 240 students enrolled in the school, but only 200 were included in the sample since five were missing on the day of the test and seven did not meet the inclusion requirements. Children must meet the general health standards set by the American Society of Anesthesiology (ASA I-II) to be eligible for inclusion. youngsters with various systemic disorders and youngsters who are uncooperative or otherwise unable to handle the examination process are ineligible.

### **Examination:**

"All of the kids were tested using a mouth mirror, a CPI probe, and some supplemental illumination from a head lamp during school hours, as suggested by the WHO survey. [19] Dental caries, gingivitis, plaque, and treatment needs were recorded using a simplified World Health Organization oral health assessment form."Two examiners performed the tests, and their results were found to be consistent and reliable ( $\kappa = -0.71$ ). Data was recorded by a dental assistant with the appropriate training.

### **Assessment of dental caries (decayed, missing, and filled teeth):**

Dental illness included a lesion in a pit, fissure, or smooth surface; weakening of the enamel; temporary filling with caries; and a weaker floor. Tooth loss was determined by the need for caries treatment. The tooth was deemed filled if a restoration was placed to address a carious lesion. Exfoliated baby teeth, permanent teeth that have yet to erupt, and teeth extracted for causes other than caries were left out of the count. In order to rule out the possibility of bias caused by noncarious extraction and filling, the institution's records of the children's previous

treatment were collected. The checkup did not include any radiographic testing.

### **Assessment of plaque and gingivitis scores:**

"The gingival third of the buccal and lingual surfaces were measured at mesial and distal positions (four measurements) to calculate an average score for gingivitis using the Löe, Silness Gingival Index [20] and the Silness, Linge Gingival Plaque Index [21]. A mean was calculated after each tooth was scored separately.

Statistical analysis was performed using SPSS (Statistical Package for the Social Sciences; SPSS Inc.; version 14.0; Chicago, Illinois, USA)." The incidence of caries and the need for care were compared using Z- and Chi-square tests, respectively. Caries rates (the ratio of teeth with decay, missing teeth, and restorations [DMFT/dmft]) were compared across the groups using analysis of variance (ANOVA). All tests were considered significant if P 0.05, and highly significant if P 0.001.

### **Results:**

Prevalence of caries in relation to age	Number of children	Caries present %	Groups	P value
Group 1	60	35	I-II	0.2
Group 2	80	55	II-III	0.01
Group 3	60	10	I-III	0.01
Total	200			
Prevalence of caries in relation to gender				
Male	110	55	M vs F	0.3
Females	90	45		

"The mean level of caries prevalence (DMFT) for different age groups was found to be  $1.5 \pm 0.9$  in Group-I,  $1.7 \pm 1.1$  in Group-II, and  $2 \pm 1.1$  in Group-III. There was a statistically

Differences between age groups were discovered by statistical analysis. So, most of the findings were related to certain age ranges.

### **Plaque and gingivitis scores:**

Mean plaque and gingivitis scores were 1.70 and 1.59, respectively, for the whole cohort, with no significant variations across genders or ages. Not only that, but moderate to severe gingival inflammation was present in 78% of the sample, and moderate to abundant plaque deposits were present in 81% of the sample.

### **Prevalence of dental caries:**

Dental caries was shown to be prevalent throughout all age groups in this study, with rates of 66.0% in Group-I, 79.2% in Group-II, and 46.6% in Group-III. Comparing Group III to Groups I and II, there were statistically significant differences ( $P = 0.04$  and  $P < 0.001$ , respectively). Caries was found to be prevalent in 61.3% of men and 69.0% of females, with no statistically significant difference between the sexes ( $P = 0.28$ ). [Table 1].

significant split between the groups, according to a one-way ANOVA ( $P = 0.04$ ). The largest component was found to be decayed (D) with a mean total prevalence of  $1.6 \pm 1.1$ . When dmft was compared, mean dmft was  $2.5 \pm 2.1$  in

Group-I,  $2 \pm 1.3$  in Group-II, and  $1.0 \pm 1.1$  in Group-III with "d" being the largest component.

### **Treatment needs:**

Children constituted 91.7% of those in need of treatment, with boys making up 86% and girls making up 79.0% of those in need.

### **Discussion:**

The disabled kid population has the highest unmet demand for dental care. [3] Nowak's claim was supported by many international studies of children with disabilities. [11],[12],[13] The prevalence of dental caries was also high in the current research, at 65%, with 91.7% of participants requiring some kind of treatment. The inability to effectively express themselves is likely to blame for these children's painful condition in many areas of the globe.

Wei et al. found a 55.9% caries prevalence rate in their research of 229 deaf kids in high school, which they compared to 196 hearing adolescents. [14] Independent studies on CHI have found widely varying caries prevalence rates. Suma found that the decaying component of the index was the most common, with a prevalence incidence of 42%. Al-Qahtani and Wyne [16] reported a prevalence of 91% in CHI children aged 6-7 years old and a prevalence of 95% in CHI children aged 11-12 years old. [12] Shyama et al. identified a prevalence of 84.6% and an untreated prevalence of 86.0% in their research of caries lesions. [22] The prevalence rate discovered by Rao et al. to be 65.1%. [13] Despite the fact that comparing caries prevalence rates among research is meaningless because of substantial heterogeneity in sample age, all of these studies point to the dire state of dental health in CHI.

In a comparable research, Jain et al. in India found that the mean DMFT was 0.50 in CHI aged 5-8, 1.76 in CHI aged 9-12, and 2.95 in CHI aged 13-17. [4] According to our data, these numbers are 1.6%, 1.9%, and 2.2%. Age was shown to have a positive effect on DMFT scores in both investigations. In both cases, the decaying part was the most abundant. Possible explanation for this similarity is because both

locations (India) have similar health care delivery systems.

Present findings show that 81% of the sample as a whole had moderate to abundant plaque deposition. Similarly, 78% of the whole group had gingivitis ranging from mild to severe. This suggests that the children's ability to practice good oral hygiene is impaired.

Treatment needs evaluated by Jain et al. [4] on CHI found similar things to what we found. He found that 75.9% of the kids needed at least one surface filler, whereas our research found just 71.7% did. In our research, 16.5% of the kids needed extractions, but Jain et al. only found 5.5%. The lower rates may be linked to better access to medical care for children in urban centers like Udaipur, as opposed to more rural areas like ours.

The absence of a control group in the current research may be a weakness. The school in this study was funded and supervised by the Tirumala Tirupati Devasthanam (Andhra Pradesh, India), a government organization with its own disciplines regarding diet (strict vegetarian), commodities, etc. There was no other nearby school that could provide data on dietary patterns or other confounding variables. Therefore, only descriptive information about these kids is included in this research.

### **Conclusion:**

The present study's findings show that CHI have poor dental health and need extensive treatment. Caries was found to be present in 65% of the sample, with therapy being necessary for 91% or more of the population. The requirements of this sizable group should be taken into account when designing oral health education initiatives.

### **References:**

1. UNICEF. The State of the World's Children 2006: Excluded and Invisible. Available from: <http://www.unicef.org/sowc06/profiles/disabilities.php>. [Last accessed on 2013 Apr 05].
2. Brown JP, Schodel DR. A review of controlled surveys of dental disease in

- handicapped persons. *ASDC J Dent Child* 1976;43:313-20.
3. Nowak AJ, editor. Dental care for the handicapped patient - Past, present, future. In: *Dentistry for the Handicapped Patient*. 1 st ed. St. Louis, MO: CV Mosby; 1976. p. 3-20.
  4. 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
  5. Stiefel DJ. Dental care considerations for disabled adults. *Spec Care Dentist* 2002;22 3 Suppl:26S-39S.
  6. Alsmark SS, García J, Martínez MR, López NE. How to improve communication with deaf children in the dental clinic. *Med Oral Patol Oral Cir Bucal* 2007;12:E576-81.
  7. Champion J, Holt R. Dental care for children and young people who have a hearing impairment. *Br Dent J* 2000;189:155-9.
  8. Joint Committee on Infant Hearing; American Academy of Audiology; American Academy of Pediatrics; American Speech-Language-Hearing Association; Directors of Speech and Hearing Programs in State Health and Welfare Agencies. Year 2000 position statement: Principles and guidelines for early hearing detection and intervention programs. Joint Committee on Infant Hearing, American Academy of Audiology, American Academy of Pediatrics, American Speech-Language-Hearing Association, and Directors of Speech and Hearing Programs in State Health and Welfare Agencies. *Pediatrics* 2000;106:798-817.
  9. Ciger S, Akan S. Occlusal characteristics of deaf-mute individuals in the Turkish population. *Eur J Dent* 2010;4:128-36.
  10. Davis A, Hind S. The impact of hearing impairment: A global health problem. *Int J Pediatr Otorhinolaryngol* 1999;49 Suppl 1:51-4.
  11. Simon EN, Matee MI, Scheutz F. Oral health status of handicapped primary school pupils in Dares Salaam, Tanzania. *East Afr Med J* 2008;85:113-7.
  12. Al-Qahtani Z, Wyne AH. Caries experience and oral hygiene status of blind, deaf and mentally retarded female children in Riyadh, Saudi Arabia. *Odontostomatol Trop* 2004;27:37-40.
  13. 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.
  14. 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.
  15. Kumar S, Dagli RJ, Mathur A, Jain M, Duraiswamy P, Kulkarni S. Oral hygiene status in relation to sociodemographic factors of children and adults who are hearing impaired, attending a special school. *Spec Care Dentist* 2008;28:258-64.
  16. Suma G, Das UM, Akshatha BS. 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
  17. Ramseier CA, Leiggner I, Lang NP, Bagramian RA, Inglehart MR. Short-term effects of hygiene education for preschool (Kindergarten) children: A clinical study. *Oral Health Prev Dent* 2007;5:19-24.
  18. Axelsson P. Mechanical plaque control. In: Lang N, Karring T, editors. *Proceedings of the 1 st European Workshop on Periodontics*, 1993. London: Quintessence; 1994. p. 219-43.
  19. WHO. *Oral Health Surveys, Basic Methods*. 4 th ed. Geneva: WHO; 1997.
  20. Loe H, Silness J. Periodontal disease in pregnancy. I. prevalence and severity. *Acta Odontol Scand* 1963;21:533-51.
  21. Silness J, Loe H. Periodontal disease in pregnancy. II. Correlation between oral hygiene and periodontal condition. *Acta Odontol Scand* 1964;22:121-35.
  22. Shyama M, Al-Mutawa SA, Morris RE, Sugathan T, Honkala E. Dental caries experience of disabled children and young

adults in Kuwait. Community Dent Health 2001;18:181-6