Oral health status and treatment needs among deaf, mute and visually impaired children of Gulbarga district – A population based cross sectional study

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Abstract

Background: Oral diseases can particularly have a harmful impact on the general health of individuals with certain systemic health problems or conditions. The aim of the study was to assess the oral health status and treatment needs among deaf, mute, and visually impaired children of the Gulbarga district. Methodology: A cross-sectional study was conducted among 284 deaf, mute, and visually impaired children of the Gulbarga district. A specially prepared structured questionnaire was used to record the demographic variables and oral hygiene practices. Type III clinical examination was carried out. Oral health status was assessed using the World Health Organization (WHO) assessment form (1997). Oral hygiene index-simplified (1964) was used to assess the oral hygiene status. Results: A total of 284 children were examined, aged 6–24 years, with a mean age of 12.95 years (±3.13). The prevalence of dental caries was 49.3%, and 87.4% of the children suffered from periodontal disease. Oral hygiene status was poor in 24.7% of the children. Conclusion: The findings in the present study highlight the lack of dental treatment. There is a considerable need for the prevention and treatment of oral diseases among deaf, mute, and visually impaired children.

Keywords: Deaf and Mute, dental caries, oral health, oral hygiene status, visually impaired

Introduction

Oral health being a part of general health affects the total well-being of any individual.[9] Dental and oral diseases affect various aspects of quality of life, and oral diseases can particularly have a harmful impact on the general health of individuals with certain systematic health problems or conditions.[5] The Director-general of the World Health Organization in the year 2000 rightly stated that in matters of health, every individual should be treated equally but still, people with disabilities have been discriminated against throughout history. Their participation in the life and social activities has been restricted which needs to be changed.[9]

A handicapped child may be defined as an individual who has been prevented, because of his handicap from full participation in usual activities of his age.[6] According to the WHO estimates of

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Oral diseases can have a direct and devastating impact on the health of those with certain systemic health problems or conditions. Dental care is the most common unmet health care need of disabled children. It has been reported that dental treatment is the greatest unattended health need of the disabled as their families are so emotionally, physically, and financially involved with the patient’s medical condition that they find it difficult to keep dentistry at the forefront of their minds. Thus, treatment cost, accessibility of facilities, fear of pain, acceptability of dentistry, and perception of dental need by children and parents are the barriers to seeking dental care.

The deaf, mute, and visually impaired special children are at a greater risk for developing oral health problems and pose unique difficulties in their dental management. Therefore, an effective pre-planned primary preventive care approach is needed to be designed with a basic objective of alleviating and preventing diseases in our society by primary care physicians. It is observed that these children relatively have poorer oral hygiene and increased prevalence of gingival diseases and dental caries. Effective assessment of their oral health care needs can extend primary care to them which is considered to be the foundation of an effective health care system along with affordable and accessible oral health outcomes. Thus, the present study is conducted to assess the oral health status, treatment needs, knowledge, attitude, and oral hygiene practices of deaf, mute, and visually impaired children in the Gulbarga district.

Material and Methods

A cross-sectional study was conducted to assess the oral health status and treatment needs among deaf, mute, and visually impaired children of Gulbarga district, Karnataka. This district is situated in northern Karnataka which comprises seven talukas which are Gulbarga, Aland, Afzalpur, Jevargi, Sedam, Chitapur, and Chincholi.

The present study was conducted in the Gulbarga district which comprised two schools for the visually impaired and three schools for deaf and mute children. All the children registered in these five schools were examined, and the sample size was constituted to be 284 children, out of which 158 were boys and 126 were girls. A pilot study was also carried out on 30 children to determine the feasibility and applicability of the questionnaire and clinical examination.

The permission to conduct the study on these children was obtained from the District Physically Challenged and Senior Citizen Empowerment officer, Gulbarga. The study protocol was approved by the Institutional Ethical Committee and Review Board, Navodaya Dental College and Hospital, Raichur. Informed consent was taken either in English or Kannada language from their respective school principals before the conduct of clinical examination of the study subjects.

Questionnaire

A specially prepared structured questionnaire was administered to the children to know the demographic variables, dietary habits, sugar exposure, knowledge, attitudes, and oral hygiene practices. All the questions were explained in their local language, and the answers were recorded by the examiner itself.

Clinical examination

The oral health status and treatment needs of all the children were assessed according to the WHO Oral Health Assessment Form (1997). Children were seated upright on a chair and were examined in adequate natural daylight using Type III examination. The examination was performed using a mouth mirror and Community Periodontal Index (CPI) probe, and the instruments were sterilized using autoclave before the examination of the children.

Statistical Analysis

The data were analyzed using SPSS v16.0 software package. Cohen’s kappa statistics were used to assess the examiner’s reliability. Descriptive statistics such as mean, standard deviation, and percentage were used. The association was evaluated using the Chi-square test. Any P value less than 0.05 was considered significant.

Results

Demographic characteristics

Table 1 depicts the sociodemographic characteristics of the study participants. The present study was conducted among 284 school children, 6–24-year-old deaf, mute, and visually impaired children with a mean age of 12.95 years. Among 284 children, the majority, 126 (44.4%) belonged to 12–14 years of age group. A majority of 55.6% of the children were male in the present study. Out of the total subjects, 207 (72.9%) were deaf and mute, and 77 (27.1%) were visually impaired. Among deaf and mute children, 121 (58.4%) were male and 86 (41.6%) were female, and a total of 37 (48.0%) males and 40 (52.0%) females were visually impaired. A total of 36.8% of the study subjects had a deleterious habit history of tongue thrusting, whereas 31.8% of the study subjects reported mouth breathing and thumb sucking. Of the
mean simplified oral health index (OHI-S) in the visually impaired children was 2.43, and in the deaf and mute children, it was 1.95. The mean debris and calculus score in the visually impaired children was 1.35 and 1.18, respectively. The mean debris and calculus score in the deaf and mute children was 1.12 and 0.83, respectively. [Table 3]

**Periodontal condition**

Community Periodontal Index was used to assess the periodontal status of the study subjects. A total of 198 study subjects had at least two permanent teeth in a sextant. Among 198 children, 25 (12.6%) had healthy periodontium and 161 (81.3%) of them had calculus. The mean number of sextants per person with healthy periodontium was 1.75, with calculus was 3.59, none of them had a pocket of ≥6 mm [Table 2]. Deaf and mute children had a significantly higher percentage of healthy periodontium when compared to visually impaired children ($P < 0.05$) [Table 4].

**Dentition status and treatment needs**

The prevalence of dental caries among 284 children was 49.3%. The mean value of permanent sound teeth was 22.1, and the mean value of permanent decayed teeth was 1.03. The mean Decayed, Missing, and Filled Teeth (DMFT) per person in the present study was 1.05, mean DT per person was 1.03, mean MT per person was 0.01, and mean FT per person was 0.0. The mean dmft scores per person in the present study was 0.46, mean dt was 0.46, mean mt and ft was found to be zero. The mean value of primary sound teeth was 2.86, and the mean value of primary decayed teeth was 0.46. The mean value of filled with decay and filled no decay was found to be zero among the study subjects. [Table 5]

**Discussion**

Oral health is an integral part of general health and well-being. People with special needs have equal rights for good oral health as any other citizen of the country. However unfortunately, due to their condition and lack of awareness towards oral health, dental diseases get undiagnosed in these children leading to the accumulation of high unmet demand for dental care later in. Keeping this in mind, the present study was conducted to assess the oral health status and treatment needs among deaf, mute, and visually impaired children in the Gulbarga district of Karnataka.

The key to good oral health is through proper maintenance of good oral hygiene behaviors and that should be practiced from childhood itself. In the present study, majority 85.7% of the visually impaired children used a toothbrush, whereas 14.3% child used a finger for the same purpose. Contrasting findings were found in another study conducted in Bangalore where 97.37% used a toothbrush to clean their teeth, and 14.67% of another study done on visually impaired children in Bangalore used a finger to clean their teeth which is similar to the findings of the present study. However unfortunately, due to their condition and lack of awareness towards oral health, dental diseases get undiagnosed in these children leading to the accumulation of high unmet demand for dental care later in. Keeping this in mind, the present study was conducted to assess the oral health status and treatment needs among deaf, mute, and visually impaired children in the Gulbarga district of Karnataka.

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percentage could be due to more awareness towards oral health in the developed sections of the society.\cite{19}

Dental fluorosis was seen in 5% of the study subjects, and this finding is consistent with a study conducted in Kuwait, on disabled children and young adults, where 10% of the study subjects had fluorosis.\cite{18}

In the present study, calculus was seen more in the visually impaired children (86.8%) than in the deaf and mute children (78.5%). These findings were in accordance with another study conducted among the teenagers with special needs in Nalgonda, India, where 96% of the visually impaired children had calculus, and it was seen in 91.7% of the deaf and mute children.\cite{20} Another similar study conducted in Delhi and Gurgaon showed a high prevalence of poor gingival health among blind study subjects that is 71.5% and among deaf study subjects it was 49.6%.\cite{21} The mean number of healthy sextants in our study was 1.75, this finding is consistent with a study conducted in Udaipur, where the mean number of sextants with healthy periodontium was 3.02 (±2.39). The mean number of sextants with calculus in the present study was 3.59, which is in contrast to the study conducted in Udaipur, where the mean number sextants with calculus was 0.51 (±0.98).\cite{22} Thus, the present study showed a higher prevalence of periodontal disease that is 87.4% which is in contrast to a study done in Udaipur where the prevalence of periodontitis is 67%.\cite{23} Thus, the present study finding of poor periodontal health was more prevalent among the visually impaired children (96%) in comparison to the deaf and mute children (83%) because the maintenance of oral hygiene remains the most outstanding challenge for these children that may have eventually aggravated the influence of hormones on the periodontium.

On the other hand, in agreement with previous reports, the present findings suggest that children and adolescents with visual or auditory impairments can be taught and guided to perform oral hygiene practices as well as any child, as long as the care provider is knowledgeable about the possible limitations that may exist.\cite{23} The practitioner must get to know his or her patient and adapt his or her behavior and techniques to the patient’s unique needs. The observed prevalence of dental caries in the current study was low (49%) when compared to other studies done in Bhopal (59%),\cite{24} Bhimavaram (65%),\cite{25} Mysore (69%).\cite{26} This could be due to as all the children were studying in residential schools and had a restricted diet at regular intervals. All the children in the school were provided a toothbrush to clean their teeth.

The mean DMFT value of the visually impaired children in the present study was 1.24 (±1.94), which is comparable to the other studies conducted on the visually impaired in Chennai (1.1) and\cite{27} Mysore (1.2),\cite{28} and the mean value is lower than the studies conducted in Bhopal city (2.1),\cite{29} Bangalore (2.1).\cite{30} The mean DMFT value for the deaf and mute children in the present study was 0.97 (±1.70) which is comparable to another study conducted on deaf and mute in Davangere (1.64),\cite{31} and the mean was lower in our study when compared to the study conducted in Udaipur (2.61).\cite{32}

In the present study, the mean DMFT of the visually impaired children was comparatively higher than that of the deaf and mute children. Similar reports were seen in a study in South

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### Table 2: Oral health knowledge, and attitude of deaf, mute and visually impaired children

| Knowledge regarding the effect of good oral health on general health | Number | Percentage |
|---------------------------------------------------------------|--------|------------|
| Yes                                                          | 152    | 53.5       |
| No                                                           | 132    | 46.5       |
| Knowledge regarding the cause of dental caries                |        |            |
| Don’t know                                                    | 90     | 31.7       |
| Sweets/Sugar                                                  | 184    | 64.8       |
| Chocolates/Cakes                                              | 10     | 3.5        |
| Knowledge regarding the means of treating dental caries       |        |            |
| Don’t Know                                                    | 281    | 99.0       |
| Filling                                                       | 281    | 1.0        |
| Knowledge regarding the cause of gum diseases                 |        |            |
| Don’t know                                                    | 281    | 99.0       |
| Poor oral hygiene                                             | 3      | 1.0        |

### Table 3: Mean DMFT, DMFT and OHI-S index scores of the study subjects

| Deformity          | DT (±SD) | MT (±SD) | FT (±SD) | DMFT (±SD) | dt (±SD) | mt (±SD) | ft (±SD) | dmft (±SD) | dt (±SD) | mt (±SD) | ft (±SD) | dmft (±SD) |
|--------------------|----------|----------|----------|------------|----------|----------|----------|------------|----------|----------|----------|------------|
| Deaf & Mute        | 1.24     | 0        | 0        | 1.24       | 0.36     | 0        | 0        | 0.36       | 0.50     | 0        | 0        | 0.52       |
| Visually Impaired  | 0.97     | 0.01     | 0.01     | 0.98       | 0.36     | 0        | 0        | 0.36       | 0.50     | 0        | 0        | 0.52       |

### Table 4: Comparison of periodontal condition among deaf & mute and visually impaired children

| Deformity          | Healthy (%) | Bleeding (%) | Calculus (%) | Pocket 4-5 mm (%) | Pocket ≥6 mm (%) | Total (%) |
|--------------------|-------------|--------------|--------------|-------------------|------------------|-----------|
| Deaf & Mute        | 22 (16.9)   | 4 (3.1)      | 102 (78.5)   | 2 (1.5)           | 0                | 130 (100) |
| Visually Impaired  | 3 (4.4)     | 6 (8.8)      | 59 (86.8)    | 0 (0)             | 0                | 68 (100)  |
| Total              | 25 (12.6)   | 10 (5.1)     | 161 (81.3)   | 2 (1.0)           | 0                | 198 (100) |
Canara, Karnataka where the mean DMFT reported was 2.6 for the deaf and mute children, and it was 0 for those who were visually impaired. This could be correlated to poor oral health among these children. Thus, poor oral health coupled with poor oral hygiene practices predisposes to an increase in dental caries. In another study conducted in Birmingham, the U.K, the mean DMFT reported was 1.82 for the visually impaired group of children and 1.76 for the deaf and mute children. This is higher compared to the results of the present study.

It was observed in the present study that 36.3% of the children required surface fillings, 4.2% of the children required crown for any reason, 2% of the children required pulp care and restoration, whereas only 1% of the children required extraction. This finding of the study was in contrast with the other study conducted on the hearing impairment and visually impaired children in Udaipur, however similar to a study done in the Satara district of Maharashtra. Lack of understanding of good oral hygiene practices among the subjects involved, lack of motivation, low dental priority in society, lack of preliminary and regular oral health control and timely therapy, the parents or guardians’ bad socioeconomic status, and therapy price may be the factors behind accumulated therapy requirements.

A dental instruction program should likewise be set up by associations, especially for instructors with the goal that they can teach hard of hearing and quiet youngsters and influence them to comprehend the significance of oral wellbeing and at last help them in accomplishing the objective of dental well-being. In the present study, the oral health of the visually impaired children was found to be poor in comparison to the deaf and mute children. The reason might be due to the fact that visually impaired children are not able to visualize deposits on their tooth surface thus preventing the appreciation of oral hygiene measures and practices even if employed. Thus, this implies that better oral health found among deaf and mute children could be due to their ability to appreciate their oral hygiene, esthetics, and oral hygiene measures and practices in a better way. As not many studies were conducted on the oral characteristics of children and adolescents with visual or auditory impairments, suggested additional studies similar to the present one will help to get an overview on the oral characteristics of children and adolescents with visual or auditory impairments.

### Conclusion

- An increased caries prevalence, poor oral hygiene, increased risk of poor periodontal health, and extensive unmet needs for dental treatment among visually impaired children were found compared to deaf and mute children.
- Special need children are neglected and less treatment priority is offered to them, emerging a need to improve special access to oral health care services.
- Further efforts should focus on improving oral health education for disabled children, educating the parents of disabled children about oral health care, and increasing the rate of topical fluoridation and other appropriate caries-preventing methods.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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