

Dental Examination of Deaf and Mute Children: Experience and Study Results in the Bukhara Region

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Abstract Introduction: The article analyzes the findings of a cross-sectional study conducted at the Department of Dentistry of the Bukhara State Medical Institute. The study aimed to assess oral health and treatment needs among children with hearing and speech impairments. The sample included 124 students from specialized boarding schools in the Bukhara region, comprising 78 boys and 46 girls aged 6 to 18 years, with an average age of 12.95 years. A cross-sectional study was conducted to evaluate the oral health status and treatment needs of children with hearing and speech impairments at the Department of Dentistry, Bukhara State Medical Institute. **Results:** Table 1 presents the sociodemographic characteristics of the study participants. The study involved 124 schoolchildren with hearing and speech impairments aged 6 to 18 years, with a mean age of 12.95 years. **Conclusion:** Children with hearing and speech impairments show higher caries prevalence, poorer periodontal health, and greater unmet dental care needs compared to healthy children.

Keywords Children, Hearing impairment, Speech impairment, Oral health, Dental examination, Treatment needs, Specialized schools, Bukhara region, Disabilities, Clinical diagnostics, Questionnaires, Demographics

1. Introduction

Oral health, as an integral part of overall health, significantly impacts a person's general well-being [1]. Oral and dental diseases affect various aspects of quality of life, with their influence being particularly pronounced among individuals with systemic disorders or specific conditions [2]. In 2000, the Director-General of the World Health Organization (WHO) emphasized the need for equity in health access. However, persons with disabilities have historically faced discrimination, limiting their participation in societal and social activities [3].

A child with a disability is defined as an individual who, due to their physical limitations, is unable to fully participate in age-appropriate activities [4]. According to WHO estimates from 2018, over 466 million people worldwide experience hearing loss, including 34 million children [5]. In India, based on the 2011 census, more than 3 million individuals suffer from hearing impairments, while over 1.2 million face speech disabilities [6]. Hearing loss impacts the ability to interpret speech sounds, leading to delays in language development, communication barriers, and economic, educational, and social inequities [7]. Visual impairments range from low

vision to total blindness, defined as a visual acuity of less than 3/60 or a visual field reduction to less than 10 degrees in the better eye with best correction [8]. Among the 38 million blind individuals globally, approximately 6 million reside in India [9].

Oral diseases can have a destructive impact on individuals with systemic conditions [10]. Dental care remains the most unmet healthcare need for children with disabilities, as their families are often emotionally, physically, and financially focused on managing the child's primary medical condition, leaving oral health issues neglected [11]. Barriers to receiving dental care include treatment costs, accessibility, fear of procedures, and insufficient awareness of dental needs among children and their parents [12].

Children with hearing, speech, or visual impairments face a higher risk of oral health issues, posing unique challenges in their dental management. This underscores the necessity of well-planned preventive strategies with a focus on primary prevention by primary healthcare providers [13]. These children often exhibit poorer oral hygiene and higher prevalence of gum diseases and dental caries. Effective evaluation of their oral health needs can enhance the accessibility of primary healthcare, which is considered the foundation of an efficient healthcare system, leading to improved oral health outcomes. Therefore, the present study aims to assess the oral health status, treatment needs, knowledge, attitudes, and oral hygiene practices among hearing-impaired children in the Bukhara region.

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2. Methodology

A cross-sectional study was conducted to evaluate the oral health status and treatment needs of children with hearing and speech impairments at the Department of Dentistry, Bukhara State Medical Institute.

The study included children from two specialized boarding schools for deaf and mute children located in the Bukhara region. All registered students from these schools were examined, resulting in a total sample size of 124 children, including 78 boys and 46 girls. To assess the feasibility and applicability of the questionnaire and clinical examination methods, a pilot study was conducted on 30 children. Permission to conduct the study was obtained from the parents of the children involved. The research protocol was approved by the Ethics Committee of the Republic of Uzbekistan and the Supervisory Board of the Bukhara State Medical Institute. Informed consent was obtained from the principals of the respective schools in either the national or Russian language prior to the clinical examinations.

2.1. Questionnaire

Data on demographics, dietary habits, sugar exposure, oral hygiene knowledge, attitudes, and practices were collected using a specially designed structured questionnaire. All questions were explained to the children in their native language, and responses were recorded directly by the examiner.

2.2. Clinical Examination

Oral health status and treatment needs were assessed according to the WHO Oral Health Assessment Form (1997) [14]. The children were examined while seated upright in sufficient natural daylight using Type III examination. The examination was conducted with the help of a dental mirror and a Community Periodontal Index (CPI) probe. Instruments were sterilized in an autoclave before examining each child.

2.3. Statistical Analysis

Data analysis was performed using SPSS v16.0 software. Cohen's kappa coefficient was used to assess examiner reliability. Descriptive statistics, including mean, standard deviation, and percentages, were calculated. Associations were evaluated using the chi-square test, with P-values < 0.05 considered statistically significant.

3. Results

Table 1 presents the sociodemographic characteristics of the study participants. The study involved 124 schoolchildren with hearing and speech impairments aged 6 to 18 years, with a mean age of 12.95 years. The majority of participants, 55 (44.4%), belonged to the 12–14-year age group.

Table 1. Presents the sociodemographic characteristics of the study participants

No	Parameter	Value
1	Total number of children examined	124
2	Average age of participants	12.95 years
3	Number of children in the 12–14 age group	55 (44.4%)
4	Number of boys	78
5	Number of girls	46
6	Percentage of children with tongue-thrusting habit	36.8%
7	Percentage of children with mouth breathing and thumb-sucking habits	31.8%
8	Percentage of children without dental fluorosis	117 (94.4%)
9	Percentage of children with very mild fluorosis	1 (0.9%)
10	Percentage of children with mild fluorosis	3 (2.4%)
11	Percentage of children with moderate fluorosis	3 (2.4%)

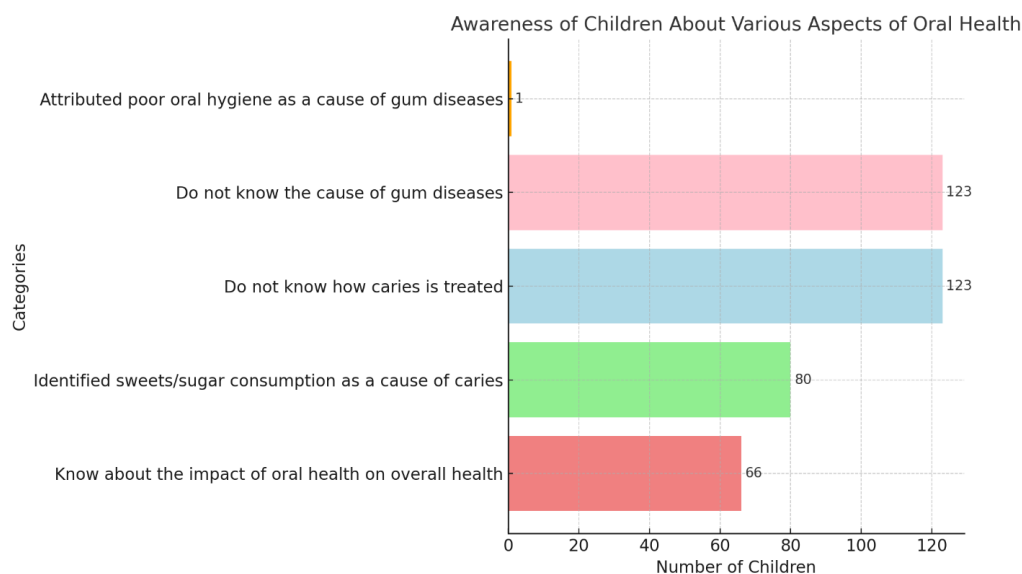


Figure 1. Knowledge and attitudes toward oral health among deaf and mute children

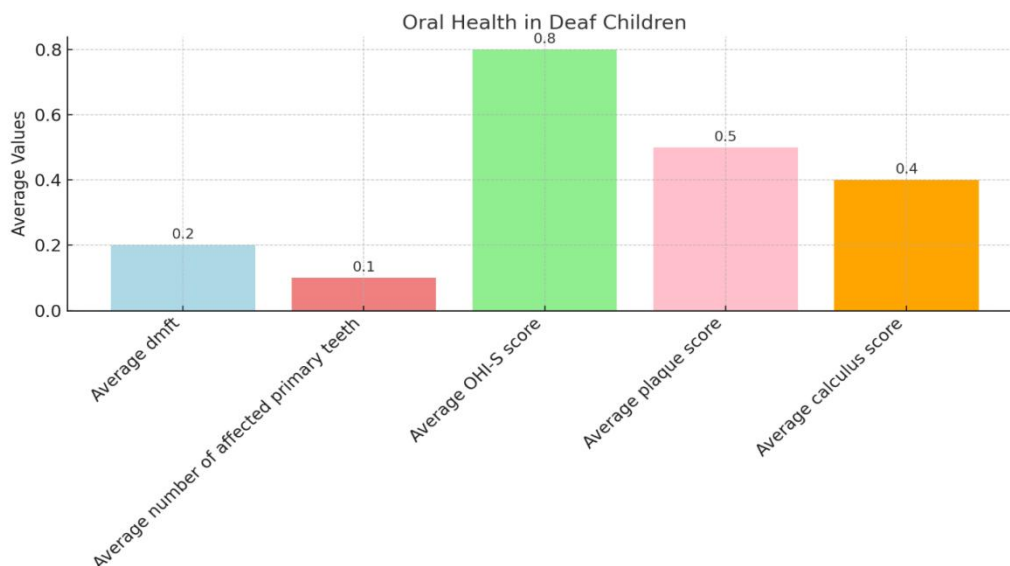


Figure 2. Interpretation of Dental Caries and Oral Hygiene Status

Among children with speech impairments in the study group, there were 78 boys and 46 girls. Tongue-thrusting habit was observed in 36.8% of participants, while mouth breathing and thumb-sucking were noted in 31.8%. Out of the total 124 participants, 117 (94.4%) showed no signs of dental fluorosis, 1 (0.9%) child had a very mild form, 3 (2.4%) had a mild form, and another 3 (2.4%) presented with a moderate form of fluorosis. Of the 124 participants, the majority, 66 (53.2%), were aware of the connection between good oral health and overall health. Furthermore, 80 (64.5%) children identified sweets and sugar consumption as the primary cause of dental caries. However, a significant majority, 123 children (99.2%), were unaware of how dental caries are treated or the causes of gum diseases. Only one child (0.8%) attributed gum disease to poor oral hygiene. **[Figure 1]**

Interpretation of Dental Caries and Oral Hygiene Status

In this study, the average Decayed, Missing, and Filled Teeth (dmft) index among deaf and mute children was 0.21. The average number of decayed primary teeth in this group was 0.21, with no missing or filled teeth recorded. The Simplified Oral Hygiene Index (OHI-S) for this group was 0.82. The average plaque and calculus scores among deaf and mute children were 0.47 and 0.35, respectively.

Figure 2 demonstrates the analysis of fluoride ion concentration in various toothpaste formulations revealed substantial differences in fluoride content among the tested products. The fluoride concentrations (mean \pm standard deviation) for the different brands are as follows: Colgate Total 12 clean mint exhibited the highest fluoride concentration at 0.446 ± 0.02 ppm. This was followed by Colgate Calcium Remin, which had a fluoride concentration of 0.353 ± 0.01 ppm, and Galaxy Triple protection, with a concentration of 0.268 ± 0.02 ppm. On the other hand, Rocs and Splat displayed significantly lower fluoride concentrations of 0.084 ± 0.01 ppm and 0.036 ± 0.01 ppm, respectively.

Statistical analysis using one-way analysis of variance (ANOVA) confirmed that the differences in fluoride concentrations among the toothpaste groups were statistically significant ($p < 0.05$). To further delineate the differences, a Tukey post-hoc test was conducted. The results of this test categorized the toothpaste brands into three distinct groups based on their fluoride content Colgate Total 12 clean mint demonstrated a significantly higher fluoride concentration than all the other tested products. Colgate Calcium Remin and Galaxy Triple Protection **Periodontal Status**. The Community Periodontal Index was used to evaluate the periodontal condition of the participants. A total of 83 children with at least two permanent teeth in one sextant were included in the assessment. Among into statistically distinct categories suggests that these differences are unlikely to impact their clinical utility within their respective fluoride concentration ranges.

These findings highlight the importance of understanding the fluoride content in toothpaste formulations to align with the oral health needs and preferences of different populations. Products with higher fluoride content, such as Colgate Total, may be more appropriate for individuals at higher risk of dental caries, whereas products with low fluoride content, such as Rocs and Splat, may serve a niche market that prioritizes minimal fluoride exposure. The significant differences observed in fluoride concentrations across the tested toothpaste brands emphasize the need for consumers to select toothpaste based on their specific oral health requirements and risk factors.

Dental Status and Treatment Needs. The prevalence of dental caries among the 124 children was 49.3%. The average number of healthy permanent teeth was 9.2, while the average number of decayed permanent teeth was 0.43. The mean DMFT index per child was 0.44, with DT at 0.43, MT at 0.01, and FT at 0.0. The mean dmft index was 0.19, with dt at 0.19, while mt and ft were 0. The average number of healthy primary teeth was 1.19, and the average number of decayed primary teeth was 0.19. The index for filled teeth

with or without caries among participants was zero for both primary and permanent teeth.

Table 2. Dental Status and Treatment Needs

No	Parameter	Value
1	Prevalence of dental caries among children	49.3%
2	Average number of healthy permanent teeth	9.2
3	Average number of decayed permanent teeth	0.43
4	Mean DMFT per person	0.44
5	Mean DT per person	0.43
6	Mean MT per person	0.01
7	Mean FT per person	0.0
8	Mean dmft per person	0.19
9	Mean dt per person	0.19
10	Mean mt per person	0.0
11	Mean ft per person	0.0
12	Average number of healthy primary teeth	1.19
13	Average number of decayed primary teeth	0.19
14	Average number of filled teeth with caries	0.0
15	Average number of filled teeth without caries	0.0

4. Discussion

Oral health is a crucial component of overall health and well-being. Individuals with special needs have the same rights to good oral health as other citizens. Unfortunately, due to their condition and lack of awareness, oral diseases in such children often go undiagnosed, leading to a high unmet need for dental care. This study aimed to assess the oral health status and treatment needs of deaf and mute children in the Bukhara region.

Maintaining good oral hygiene practices from early childhood is key to ensuring oral health. In this study, 85.7% of deaf-mute children used a toothbrush, while 14.3% cleaned their teeth with their fingers. These results align with a study in Russia where 85.3% used a toothbrush, and 14.67% used fingers. In contrast, a study in India found that 97.37% of children used a toothbrush, likely due to greater awareness in developed communities.

Dental fluorosis was observed in 5% of participants, consistent with a study in Kuwait, which reported 10% prevalence. Calculus was found in 78.5% of children, similar to the 91.7% observed in an Indian study.

On average, participants had 1.75 sextants with healthy periodontal status, which was lower than the 3.02 ± 2.39 reported in Udaipur, but the number of sextants with calculus was higher — 3.59 compared to 0.51 ± 0.98 in Udaipur. This highlights a higher prevalence of periodontal disease among children with hearing and speech impairments (87.4%) compared to 67% in Udaipur.

Children with special needs can learn and practice oral hygiene as effectively as other children, provided their caregivers and teachers are educated about their unique needs. The findings emphasize the importance of adapting approaches to

suit the individual needs of these patients.

In this study, 36.3% of children required superficial fillings, 4.2% needed crowns, 2% required pulp therapy, and only 1% needed tooth extraction. These results highlight the need for greater awareness, better access to dental care, and preventive programs.

This study underscores the significant unmet dental needs among children with hearing and speech impairments, necessitating further research and the development of targeted educational and preventive strategies.

5. Conclusions

Children with hearing and speech impairments show higher caries prevalence, poorer periodontal health, and greater unmet dental care needs compared to healthy children.

- Efforts must be made to improve access to dental services and educate parents and caregivers about oral health care.
- Future initiatives should focus on educational programs, preventive interventions, and enhancing the quality of dental care for children with special needs.

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