

ORIGINAL PAPER

## Dental problems among hearing-impaired children: Our experiences at a tertiary care teaching hospital in eastern India

Santosh Kumar Swain<sup>1</sup>, Basanta Kumar Choudhury<sup>2</sup>, Mahesh Chandra Sahu<sup>3</sup>

<sup>1</sup>Department of Otorhinolaryngology, IMS and SUM Hospital, Siksha “O” Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India

<sup>2</sup>Department of Oral Medicine & Radiology, IMS and SUM Hospital, Siksha “O” Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India

<sup>3</sup>Directorate of Medical Research, IMS and SUM Hospital, Siksha “O” Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India

### ABSTRACT

**Aim of the study:** To evaluate the prevalence of dental problems in hearing-impaired children at a tertiary care teaching hospital in eastern India.

**Material and methods:** This is a cross-sectional descriptive study carried out on 152 children of dental caries status in the age range 5 to 16 years. The children in this study were divided into group I (5-9 years), group II (10-12 years) and group III (13-16 years). Oral health and treatment were documented using methods and standards following WHO oral health surveys 1997. Dental caries prevalence, gingivitis level, plaque levels, and treatment requirement were recorded and analysed.

**Results:** Out of 152 hearing impaired children, 69 (45.39%) were suffering with dental caries, 36 (23.68%) with plaque, and 24 (15.78%) with gingivitis. The oro-dental hygiene of hearing-impaired children, classified according to the Oral Hygiene Index – Simplified (OHI-S), revealed 31% had fair oral hygiene, 26% good hygiene, and 42% poor oral hygiene. The mean number of decayed teeth was  $3.2 \pm 2.1$ , the mean number of missing teeth was  $0.9 \pm 1.2$ , and mean number of filled teeth was  $0.4 \pm 1.2$ , in which about 89.4% had decayed teeth, 39% had missing teeth, and only 19% had filled teeth.

**Conclusions:** The children suffering with hearing loss showed unsatisfactory dental health in relation to the status of dental caries.

### KEY WORDS:

hearing impairment, dental problem, children, caries, oral health.

### INTRODUCTION

Oro-dental health is a vital part of overall health in a human being. Oro-dental healthcare is important in both children and adults; however, it is more important for children with deafness because they have limited ability to execute oral health practices. Hearing-impaired chil-

dren deserve the same opportunity as healthy children for oral health care. But oro-dental healthcare is most often unattended among hearing impaired children [1]. Oro-dental health has a great impact on the overall health of human beings and decides the well-being of an individual. Maintenance of good oro-dental hygiene, particularly in hearing-impaired children, is always challenging [2, 3].

### ADDRESS FOR CORRESPONDENCE:

Santosh Kumar Swain, Department of Otorhinolaryngology, IMS and SUM Hospital, Siksha “O” Anusandhan University, K8, Kalinganagar, Bhubaneswar, Odisha, India, e-mail: [santoshvoltaire@yahoo.co.in](mailto:santoshvoltaire@yahoo.co.in)

Hearing impairment children often face challenges in maintaining proper oral hygiene. Difficulty in removing plaque from teeth is an important factor differentiating between normal and hearing-impaired children. Hearing impairment usually affect communication, this may lead to devastating effect. When hearing loss is more severe, psychological, social, and emotional disturbances become more pronounced. The degree of disturbance depends on age of onset, acceptance of disability, and training. The primary aim of a nation should be to improve the health and social functioning of disabled children. Hearing impairment affects general behaviour and impairs social functioning. Hearing-impaired children are often neglected because of stigma, ignorance, fear, misconception, and negative attitudes. Although there are some studies that have explored the oro-dental health among the hearing-impaired population, there is still little information available for hearing-impaired children. The objective of this present study was to determine the prevalence of dental caries, their severity, and oral hygiene status in hearing-impaired children attending a tertiary care teaching hospital in eastern India.

## MATERIAL AND METHODS

This study was conducted at a tertiary care teaching hospital in eastern India between July 2014 and August 2017. This study involved 152 children of both genders aged 5-16 years. The children in this study were divided into three groups: group I (5-9 years), group II (10-12 years), and group III (13-16 years). It was a cross sectional and descriptive study where all hearing-impaired children were selected from dental and otorhinolaryngology outpatient departments. Children with mental retardation, orthopaedic defects, visually impaired, mentally handicapped, and medically compromised were excluded from this study. The study was approved by the Institutional Ethical Committee (IEC) of our institute. Informed consent was obtained from caretakers or from parents.

Four types of hearing loss were seen among study populations. These were mild (26-40 dB), moderate (41-70 dB), severe (71-90 dB), and profound hearing

loss (> 90 dB). The school teachers were advised to assist during communication. All the children were examined during school time by a mouth mirror and a head lamp as per WHO survey recommendation. Oral cavity findings like dental caries, gingivitis scores, and plaque scores were documented.

Assessment of dental caries was done by studying the decayed, missing, and filled teeth (DMFT). A tooth is considered to be decayed when there is a lesion like a pit/fissure/smooth surface, undermined enamel, temporary filling with caries and softened floor. A tooth is considered as missing if it is extracted due to caries. A tooth is called filled if it is restored for a carious lesion. Exfoliated teeth in the primary and mixed dentition unerupted and teeth extracted due to reasons other than caries were not included in this study.

## RESULTS

A total of 152 hearing-impaired children were examined, out of which 82 (53.94%) were males and 70 (46.05%) were females. The mean age of the study population was 10.23 years. Seventy-eight children were aged 5-9 years, 48 were aged 9-12 years old, and 24 were aged 13-16 years (Table 1). The children who participated in the study had both congenital and acquired hearing loss, and all of them attended school. Out of 152 children, 51 (33.55%) were from special schools (Table 2). Out of 152 hearing-impaired children, 69 (45.39%) were suffering with dental caries, 36 (23.68%) with plaque, 24 (15.788%) with gingivitis, and 23 were without any oral pathology (Table 3). Among hearing-impaired children, 88 (57.89%) were cleaning their teeth by using toothpaste, and the rest were not using any medicated dental cleaning material (Table 4). Out of all hearing-loss children, 7 (4.60%) were affected with intellectual impairment. Different barriers for dental care among children in

TABLE 1. Patient profile in the study group

Patient details	Number (n)	Percentage
Age		
5-9 years	78	51.31
10-12 years	48	31.57
13-16 years	24	15.78
Gender		
Male	82	53.94
Female	70	46.05

TABLE 2. Details of hearing loss among children

Patient details	Number (n)	Percentage
School		
Special school	51	33.55
Integrated school	101	66.44
Severity of hearing loss		
Mild	24	15.78
Moderate	26	17.10
Severe	53	34.86
Profound	49	32.23
Type of hearing loss		
Congenital	113	74.34
Acquired	39	25.65

TABLE 3. Dental problems among children

Dental problem	Number (n)	Percentage
Plaque	36	23.68
Gingivitis	24	15.78
Caries	69	45.39
Total	129/152	

our study were lack of awareness for oral health among parents or teachers or care takers (21.05%), cost of dental treatment (15.13%), dental treatment facilities not available nearby (12.5%), and children being afraid of the dentist (3.28%) (Table 5).

The oro-dental hygiene of hearing-impaired children classified according to the Oral Hygiene Index Simplified (OHI-S) revealed that 31% had fair oral hygiene, 26% had good hygiene, and 42% had poor oral hygiene. The mean number of decayed teeth was  $3.2 \pm 2.1$ , the mean number of missing teeth was  $0.9 \pm 1.2$ , and the mean number of filled teeth was  $0.4 \pm 1.2$ , in which about 89.4% had decayed teeth, 39% had missing teeth, and only 19% had filled teeth. The mean gingivitis and plaque scores among children were found to be  $1.70 \pm 0.61$  and  $1.59 \pm 0.58$ , respectively, without any gender and age variations. Thirty-six (23.68%) of the study children had moderate to abundant deposits of plaque and 24 (15.78%) of the sample showed moderate to severe gingival inflammation (Table 3).

## DISCUSSION

A hearing-impaired child does not develop or grow in the same way as a normal hearing child. The hearing impairment or deafness is of two types: congenital and acquired or adventitiously deaf. Congenital deafness means the child was born deaf, and it can be again classified into three types: hereditary, due to genetic influences; parental, due to influences upon the developing embryo; and peri-natal of a number of trauma at the time of birth itself, or within the earliest time after birth [4]. The acquired type of deafness includes those born with normal hearing but in a later part of life the sense of hearing becomes non-functional. Acquired hearing loss may be due to viral infection, injury, or ototoxicity. Viral infections causing hearing loss are mumps, measles, influenza, chicken pox, common cold virus, and poliomyelitis.

The hearing loss in early life has a definite consequence on the personality development of the child, leading to communication problems with others. A hearing-impaired child is unable to speak and cannot ask the questions he/she wants. So the child is dependent on the interpreter in such communication problems. The first interpreters in the life of a hearing-impaired child are the parents. Before visiting the dentist, the parents of the hearing-impaired child should explain exactly what will transpire.

TABLE 4. Tooth cleaning by hearing-impaired children

Tooth cleaning	Number (n)	Percentage
Toothpaste and brush	88	57.89
Not using toothpaste	64	42.10

TABLE 5. Different barriers for dental problems among children

Barriers	Number (n)	Percentage
Lack of awareness	32	21.05
Cost of dental treatment	23	15.13
Facilities not available	19	12.5
Afraid of dentist	5	3.28

Oro-dental infections or dental caries are among the common oral diseases affecting humankind. These diseases lead to destruction of the hardest structure of the body: the tooth. Teeth play an important role inside the oral cavity, and loss of teeth affects mastication, speech, aesthetics, and even self-confidence of the child. There are multiple factors like host (teeth and saliva), micro flora, substrate, and time.

The incidence of hearing impairment in the world is 0.01 to 0.02% in newborns [5]. Dental caries are a complete preventable and reversible problem if diagnosed early at the non-cavitated stage [6]. Dental caries affect different persons to different degrees and at different ages. Dental caries may affect hearing-impaired children without considering sex, creed, caste, or country. Hearing-impaired children delay communicability and learning ability longer than normal children [7]. The recognition of the sound is one of the most delicate interpretations of senses in early life, so its lack may hamper emotional, social, and physical development [8]. Children with hearing impairment appear to have poorer oral health than normal children [9]. Hearing disability children often receive less general care and dental care than normal individuals [10]. Dental caries is one of the common diseases among disabled children worldwide, and dental care is often needed among these children. The reasons behind poor dental care in hearing-impaired children are inadequate call systems, practical difficulties during treatment sessions, socioeconomic status and underestimation of treatment, communicable problems, and poor cooperation [11].

Hearing impairment among children affects their general behaviour and impairs social functioning due to fear, ignorance, stigma, misconception, and negative attitudes and neglect by society [12]. These disabilities affect all classes and ages of society [13]. In developing countries like India, the oro-dental problem of hearing-impaired children is a serious issue. The children with hearing disability constitute a unique population needing special attention [14]. The dental problems among hearing disabilities may be influenced by age,

severity of hearing loss, and living conditions. These children may not understand or assume responsibility to cooperate with preventive dental health guidelines or practices. These types of children usually depend on parents, siblings or care givers for oral hygiene. Most of the care takers are not trained or have no knowledge for oral hygiene in disabled children, as well as a proper diet for these children. They may go for unhealthy eating habits and susceptible to dental caries.

Our study findings demonstrated a high prevalence of dental caries and poor oral hygiene, which need immediate attention from healthcare providers. A preventive-based intervention programme is needed for this special group of hearing-impaired children. Efforts must be taken to encourage the parents and teachers of these children to promote and improve their oro-dental health. A customised awareness oral health programme is required considering the hearing-impaired children in the community.

The limitation of our study is the small sample size of the subjects, even though we tried to cover all the hearing-impaired children at the same time. The present data might have some advantages because as it will help to create a larger and better planned comprehensive study for a deeper understanding of oro-dental health problems among hearing-impaired children. Hearing-impaired children should receive early special attention and guidance for improved oral hygiene.

## CONCLUSIONS

The oral cavity and dental health are a vital part of overall health. Oro-dental healthcare is vital for all adults and children; however, it is important for children with hearing impairment because they have limited ability to perform oral health practices. There is an increased prevalence of dental caries, poor oral hygiene, and periodontal diseases in hearing-impaired children, which is a highly alarming situation that requires immediate attention. Efforts must be taken to improve oral health by encouraging and promoting parents of deaf children. It is imperative because a public health response is needed for effective oral health promotion programs by providing adequate oral education and practical demonstration to help hearing-impaired children to maintain optimum oral hygiene.

## DISCLOSURE

The authors declare no conflict of interest.

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