*International Journal of Research and Review*
*DOI: https://doi.org/10.52403/ijrr.20210627*
*Vol.8; Issue: 6; June 2021*
*Website: www.ijrrjournal.com*
*Original Research Article* *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

# Oral Health Status of Special Children in Tribal Population of Southern India

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## ABSTRACT

**Introduction:** The oral health needs of intellectually disabled are complex and may be related to underlying congenital or developmental anomalies as well as the inability to receive adequate personal and professional care to maintain. This research suggests that people with Intellectually Disability such as Mental retardation, are more likely to have poor oral hygiene, periodontal diseases and high incidence of trauma and possibly more likely to have caries than people without Intellectual disability.

**Aim:** The study aims to assess the oral hygiene status and prevalence of malocclusion among special children in tribal population of Southern India.

**Materials and Methods:** Mouth mirror, periodontal probe, straight explorer were used to examine the children.

**Results:** The obtained data are subjected to chi-square test to compare between demographical variables. Statistical significance was fixed at p-value <0.001.

**Conclusion:** We hereby conclude that the maintenance of oral hygiene is difficult among mentally disabled children due to their improper level of understanding. Therefore it is also essential to enlighten or to bring awareness and knowledge among the parents, caregivers, about maintaining the proper oral hygiene status and preventive measures.

***Keywords:*** Mental Retardation, Malocclusion, Dental Caries, Periodontal Diseases, Treatment Intervention.

## INTRODUCTION

The oral cavity is the intersection of medicine and dentistry and acts as a window into the general health of an individual. The oral cavity is a host for millions of microorganisms; improper maintenance of oral hygiene acts as a triggering factor and affects the general health of an individual.

According to the World Health Organization (WHO) estimates, individuals with disabilities comprise 10% of the population in developed countries and 12% in developing countries [1].

In India, as per the national sample survey organization (NSSO), there are 18.49 million individuals with disabilities, which constitutes 1.8%of the total population [2]. The American Academy of Pediatric Dentistry (AAPD) recognizes both primary and comprehensive preventive and therapeutic oral health care to individuals with special health care needs (SHCN), also referred to as the special child is an integral part of the specialty of pediatric dentistry.

The oral health needs of intellectually disabled are complex. They may be related to underlying congenital or developmental anomalies, as well as the

inability to receive adequate personal and professional care to maintain. Inadequate dental care or poor oral hygiene measures may have negative influences on the oral health status of special children. There are no recent data on the dental health status of children with disabilities in southern India, and most of the epidemiological data gathered on the subjects in the area are sparse and need updating.

The study aims to assess the oral hygiene status and prevalence of malocclusion among special children in the tribal population of Southern India (Andhra Pradesh).

## MATERIALS AND METHODS

### Study design and sample size

A descriptive cross-sectional study was conducted among 6-18-year-old specially challenged children with disabilities attending special schools in the tribal population of Southern India (Andhra Pradesh).

The sample size was calculated using the formula

**$n = Z^2pq / e^2 = 360$ (minimum number of participants)**

Where "n" is the number of participants required

Z= confidence level at 95%

p and q are the population proportions, e is the desired level of precision.

Before the start of the study, ethical clearance was obtained from the institutional ethics committee. Prior informed consent of parent or guardians and school authorities were obtained.

A total of 372 instituted developmentally disabled children (special children) out of 420 were recruited for the study, 48 of them did not give informed consent were excluded from the study. A group of 372 non-medically compromised children who attended regular schools were selected randomly and matched for age, gender, and type of dentition served as a control group.

### Inclusion and Exclusion criteria

Inclusion criteria for determining the study group were children with disabilities that have demonstrated sufficient cooperation levels to be examined in a dental chair.

Exclusion criteria for determining the study group were patients whose primary medical condition also includes blood dyscrasia, congenital heart diseases, diabetes, autoimmune diseases, kidney diseases, and patients undergoing chemo and radiation therapy. Patients that previously had undergone dental treatment under general anesthesia and those who did not give consent were excluded from the study.

The intelligent quotient (IQ) level record, which was provided in the institution, was taken during the conduct of the study. The American Association Of Mental Deficiency (AAMD) classified retardation into four categories according to intelligence quotient (IQ) [3].

**Table 1: AAMD classification based on IQ[3].**

| TYPE OF RETARDATION | IQ Level |
|---|---|
| MILD | (50-55) to about 70 |
| MODERATE | (35-50) to about 50 |
| SEVERE | (20-25) to 35 |
| PROFOUND | Below(20-25) |

As per the AAMD classification [3], the subjects of the present study comes under MODERATE (IQ 35-50) and PROFOUND (BELOW 20-25). Of these majority are of moderate retardation.

### Training and Calibration of the examiner

Before the intraoral clinical examination, the researcher followed the norms of WHO, examining 15% of the sample (ten students) twice in consecutive days, so that the in calibration could be verified through kappa test, whose measure of agreement was 0.87. A single investigator did all the clinical examination procedures.

### Dental caries

Using the decayed, missing and filled teeth (dmft) index for primary and early mixed dentition (6–10 years) and Decayed, Missing and Filled Teeth (DMFT)

index for late mixed (11–15 year') permanent dentition's (16-20 years) and (21 yrs and above). A tooth was considered decayed when there was frank carious cavitation on any surface of the tooth. A tooth was classified as missing if it was extracted due to caries or which were so severely decayed that they are indicated for extraction. A tooth was classified as filled if it had a restoration for a carious lesion without any recurrent decay present. Primary teeth, which were concluded to be exfoliated, and permanent teeth, unerupted, and those extracted for other reasons apart from caries, were not included in the indices. To avoid the ambiguity among the two indices, scores were graded (0= Good, <3= Fair, >3= Poor).

**Chronologic enamel hypoplasia**

Enamel hypoplasia was recorded when there were consistent discolored malformations on teeth of the same series in at least two quadrants.

**Missing teeth**

A tooth, if not erupted after six months of its expected eruption date, was classified as missing.

**Data collection**

The data was collected through a clinical examination in 62 students of both the sexes, using a structured pretested modified oral health assessment form based on the WHO Basic Oral Health Survey for children 2013 (Annex 2). A single examiner examined children using a mouth mirror and Community Periodontal Index (CPI) probe following the WHO criteria and methods.

**Oral examination**

Type III clinical examination, as recommended by American dental association specifications, was followed for the oral exam. A sufficient number of required instruments were used for the study. All aseptic precautions were taken. Clinical assessment includes the recording of the dentition status of the child for caries and its effect like missing or filled. Gingival status was assessed by recording gingival bleeding using the CPI probe. The presence and severity of dental erosion, dental fluorosis, and dental trauma were also assessed. Intervention urgency/ treatment needs were also mentioned according to the type of treatment required for an individual. After the examination, children in need of dental treatment were reported to the parents/ guardians, appropriate oral health education given, and written referrals given to the dental hospitals.

**STATISTICAL ANALYSIS**

The obtained data are given for statistical analysis, and the results are subjected to the chi-square test to compare between demographical variables. Statistical significance was fixed at p-value <0.001.

## RESULTS

Three hundred and seventy two developmentally disabled children (special children), aged 6-18 years (mean $12.61 \pm 5.52$ years) of the 222 (59.7%) males and 150 (40.3%) females who were examined as a study group. In order to avoid the bias 372 non- medically compromised children of same age group and gender were selected randomly and examined as a control group.

The descriptive statistical results of Dental Aesthetic Index (DAI), Dentition status, Periodontal status, Enamel fluorosis, Dental erosion, Treatment urgency of the study and the control groups were tabulated (Table 2).

**Table 2: FREQUENCY DISTRIBUTION**

| | | Special children | | Control | | |
|---|---|---|---|---|---|---|
| **Oral disease variables** | **Categories** | **Frequency** | **Percentage (%)** | **Frequency** | **Percentage (%)** | **P value** |
| **DAI** | 1(<25)-no treatment need/slight need | 114 | 30.6% | 246 | 66.1% | <0.001 |
| | 2(26-30)-treatment elective | 228 | 61.3% | 96 | 25.8% | |
| | 3(31-35)-treatment highly desirable | 30 | 8.1% | 30 | 8.1% | |
| | TOTAL | 372 | 100% | 372 | 100% | |

| *Table 2 Continued...* | | | | | | |
|---|---|---|---|---|---|---|
| **DENTITION STATUS** | 0 | 84 | 22.6% | 168 | 45.2% | <0.001 |
| | ≤3 | 102 | 27.5% | 192 | 51.6% | |
| | >3 | 186 | 50.0% | 12 | 3.2% | |
| | TOTAL | 372 | 100% | 372 | 100% | |
| **PERIODONTAL STATUS** | 0-absence of condition | 30 | 8.1% | 186 | 50% | <0.001 |
| | 1-presence of condition | 324 | 87.1% | 144 | 38.7% | |
| | 2-tooth excluded | 18 | 4.8% | 42 | 11.3% | |
| | TOTAL | 372 | 100% | 372 | 100% | |
| **ENAMEL FLOUROSIS** | 0-normal | 294 | 79% | 294 | 79% | <0.001 |
| | 1-questionable | 0 | 0% | 42 | 11.3% | |
| | 2-very mild | 12 | 3.2% | 36 | 9.7% | |
| | Mild | 42 | 11.3% | 0 | 0% | |
| | 4-moderate | 24 | 6.5% | 0 | 0% | |
| | TOTAL | 372 | 100% | 372 | 100% | |
| **DENTAL EROSION** | 0-no sign of erosion | 192 | 51.6% | 366 | 98.4% | <0.001 |
| | 1-enamel erosion | 108 | 29% | 6 | 1.6% | |
| | Dentinal erosion | 72 | 19.4% | 0 | 0% | |
| | TOTAL | 372 | 100% | 372 | 100% | |
| **DENTAL TRAUMA** | 0-no sign of injury | 180 | 48.4% | 324 | 87.1% | <0.001 |
| | 1-treated injury | 0 | 0% | 24 | 6.5% | |
| | 2-enamel fracture | 132 | 35.5% | 18 | 4.8% | |
| | 3-enamel and dentinal fracture | 60 | 16.1% | 6 | 1.6% | |
| | TOTAL | 372 | 100% | 372 | 100% | |
| **INTERVENTION URGENCY** | 0-no treatment needed. | 0 | 0% | 180 | 48.4% | <0.001 |
| | 1-preventive or routine treatment needed. | 30 | 8.1% | 156 | 41.9% | |
| | 2-prompt treatment (including scaling) needed. | 318 | 85.5% | 36 | 9.7% | |
| | 3-immediate (urgent) treatment needed. | 24 | 6.5% | 0 | 0% | |
| | TOTAL | 372 | 100% | 372 | 100% | |

*P<0.001 statistically significant*

## DAI

The majority of children with disabilities showed a DAI score of 26-30 that the need for elective treatment procedures. In contrast, the control group showed overall score ≤25, which indicates there is no need for treatment/slight treatment needed (Table 2).

## Dentition status

A statistically significant difference was found among the two groups based on the dentition status, and the study (special child) group showed a DMFT score of >3 and in the control group a score of ≤3 in the majority of cases (Table 2).

## Periodontal status

The results of the study showed that 87.1% of children with disabilities (study group) had periodontal problems/conditions, due to their poor oral hygiene maintenance. However, there is a statistically significant difference between the study group and the control group (Table 2).

## Enamel fluorosis

There is a mild to moderate enamel fluorosis seen in 11.3% and 6.5%, respectively, in the study group, whereas 11.3% of the questionable condition is seen in the control group (Table 2).

## Dental erosion

Special child group has shown a significant difference in the incidence of dental erosion in study groups with a percentage of 29% enamel erosion and 19.4% of dentinal erosion. In the control group, 98.4% showed no signs of dental erosion (Table 2).

## Treatment urgency

The results of the study showed that the majority (85.5%) of children with disabilities need immediate and prompt treatment, whereas children in the control group need for preventive and routine therapy (Table 2).

# DISCUSSION

Oral diseases are one of the common health problems among individuals with

mental disabilities. The prevalence and severity of oral disease among this group are higher when compared to the general population. However in the special child with one or more of the following disabilities: impaired vision, hearing impaired, loco-motor disability, mental retardation, and mental illness it is difficult to maintain proper oral hygiene status [2]. These "God's forbidden children' are at an increased risk of developing oral diseases such as gingival and periodontal diseases and dental caries, a large number of missing teeth due to traumatic or carious lesions, excessive tooth wear due to severe bruxism and with a high incidence of trauma particularly in anterior teeth can be observed throughout their lifetime [4]. Out of this, dental caries is the most prevalent disease because of lack of understanding and poor ability in maintaining oral hygiene among developmentally disabled children worldwide and dental treatment is the greatest unattended health need of the disabled.

Lack of services to these segment of populations is the actual matter to worry, and this may be due to inadequate recall systems, practical difficulties facing during treatment sessions, underestimation of treatment urgency, lack of communication skills, bad cooperation and the additional burden placed on families with children having disabilities, deepens the impact of economic poverty and may further perpetuate discriminatory attitudes towards these groups [2, 5].

As oral hygiene maintenance is difficult in these children, there is a marked increase in scores of DMFT, periodontal status, and traumatic injuries. DAI score in the majority of cases (61.3%) varies from 26-30 that implies definitive malocclusion in which elective treatment is required.

Suhani RD et al. (2015) reported that due to the presence of habits like tongue thrusting, mouth breathing, and thumb sucking in the mentally disabled children increases the incidence of malocclusion and dental trauma [6].

The present study showed that the high prevalence of dental caries is due to poor oral hygiene maintenance. These results are in accordance with the studies conducted by Lee JY et al. (2019) [7].

In the current study, a substantial percentage of subjects need advanced periodontal treatment. A total of 87.1% children with special health care needs to show a positive finding of bleeding on probing a significant sign for the diagnosis of gingivitis with a noticeable range of debris and calculus on the surface of the tooth, whereas in control group presence of the condition is seen only in 38.7% of individuals. Similar results were obtained in the study done by Prasad M et al (2018) [8].

The intervention urgency of the special child group, with 85.5%, showed that prompt treatment is needed. The demand for dental treatment was quite high in these children. It is essential that dental surgeons know about the most frequent oral alterations to offer adequate dental care to these children.

From the results observed, it would be essential to develop health promotions like lectures, Audiovisual aids, etc. to instruct caretakers and parents to emphasize the importance of good oral hygiene and the problems that arise from its negligence.

## CONCLUSION

We hereby conclude that a high prevalence of dental caries and periodontal diseases among special children.

Oral hygiene maintenance is difficult among mentally disabled children due to their improper level of understanding.

It is mandatory to bring awareness and knowledge among the parents and caregivers about maintaining proper oral hygiene status and preventive measures that help in reducing the risk of oral diseases, thereby improving general health.

**Acknowledgement:** None

**Conflict of Interest:** None

**Source of Funding:** None

**Ethical Approval:** Approved

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How to cite this article: Katragadda N, Teja Mounika V, Mahendra TVD et.al. Oral health status of special children in tribal population of Southern India. *International Journal of Research and Review*. 2021; 8(6): 226-231. DOI: *https://doi.org/10.52403/ijrr.20210627*

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