

Oral Health Status of Disabled Children Attending Special Schools in Vishakhapatnam City

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Abstract

Background: Oral health is an important predictor of general health, happiness, and quality of life. According to reports, one of the most common unmet demands of the population with special health care needs is dental care. In many cases, another individual will be in charge of these children's dental hygiene, such as a parent, guardian, or caretaker.

Aim and Objectives: Was to assess the oral health status of differently abled children attending various special schools in Vishakhapatnam city, Andhra Pradesh.

Material and Methods: Data was collected using face to face interview and WHO oral health assessment form and a total of 20 schools were selected based on multistage random sampling technique and the sample obtained was 400 comprising of b Government, primary and NGO running schools. The data collected was entered in Microsoft Excel Sheet by the examiner. The entered data were exported to SPSS (Statistical package for social science) for statistical analysis. Statistical tests were done using SPSS 22.0. The level of significance was set at $p < 0.05$.

Results: Oral health conditions like dental caries (82%), bleeding (28.2%), dental trauma (14.5%) and dental fluorosis (12.2%) was observed in all regardless of the disability. This could be due to lack of proper caring of the oral health and most of the schools were institutionalized leading to low utilization of dental services.

Conclusion: The overall prevalence of oral diseases is more in these children and steps are to be taken to address the disparities in oral health and hygiene among disabled children, as well

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as the barriers to oral care, which include cost, fear, and social attitudes. It is utmost necessary to educate parents, caregivers about the importance of diet and oral care.

Keywords: Oral health status; Special needs children; Dental caries.

INTRODUCTION

The ability to live harmoniously in a changing whole environment is vital to the child's



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healthy development. The benefits of medical, psychological, and associated knowledge must be extended to all peoples in order to achieve optimal health. It has been recognized that the first priority in developing any health program is the children in a population. Disability is a universal feature of the human condition that no one is immune to. The condition of being impaired lies at the bottom of the development agenda, unrecognized as an issue for development.¹

People with disabilities are persons who have long-term physical, mental, intellectual, or sensory impairments that, when combined with additional impediments, prevent them from participating fully and effectively in society on an equal footing with others. According to the World Health Organization, disabilities are an umbrella word that includes impairments, activity limitations, and participation restrictions. Individuals with disabilities make up 10% of the population in affluent countries and 12% in developing countries, according to the WHO. Children with special health care needs (CSHCN) are defined as “those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally” by the federal Maternal and Child Health Bureau.²

Exceptional education, often known as aided education, is the practice of educating students with special needs. This method should ideally include an individually planned and systematically supervised arrangement of educational techniques, adapted equipment and materials, and accessible venues.

These treatments are intended to assist people with special needs in achieving a better level of personal self-sufficiency. Special schools are referred to children with severe multiple disabilities who have trouble coping in ordinary classrooms.³ A special school is a school that caters to pupils who have particular educational requirements due to learning difficulties, physical disabilities, or behavioral issues. Special schools can be specifically constructed, manned, and resourced to offer suitable special education for students with special needs. Students who attend special schools usually do not attend any classes in regular schools. The majority of these special schools are located in cities and are run by volunteer organizations. The bulk of them are residential schools, and boarding, lodging, and other resources are provided for free. Currently, over 3000 special schools for disabled

children operate throughout the country. The “Persons with Disabilities Act, 1995” defined “handicapped” as a person with one or more of the following disabilities: impaired vision, leprosy cured, hearing impaired, orthopedic impairment, mental retardation, and mental illness. In general, a child who is physically or intellectually disabled is neither accepted by society nor able to participate in social activities.⁴

According to the National Survey of Persons with Disabilities by National Statistical Office (NSO), the prevalence of disability in India, 2.3% reside in rural areas and 2% in urban areas, according to the March 2021 report, and according to census 2011, around 7.62 percent of India’s total population with disability was children, at approximately 2.04 million children out of 26.8 million disabled people. Meanwhile, disabled children in Bihar and Meghalaya accounted for around 12.48 percent and 11.41 percent of the total disability.

Population in these states, respectively. In comparison, children made up little more than 3.4 percent of impaired individuals in Sikkim and Kerala. India contributes for around 7.622% of overall disability, with Bihar having the most (12.48%) and Kerala having the lowest (3.44%). Andhra Pradesh contributes for 5.61% of the total.⁴

The National Policy for Persons with Disabilities (2006) recognizes that people with disabilities are a valued human resource for the country and tries to build an environment that provides equal opportunity and protection of their rights.⁵

Oral health is an important predictor of general health, happiness, and quality of life. According to reports, one of the most common unmet demands of the population with special health care needs is dental care. In many cases, another individual will be in charge of these children’s dental hygiene, such as a parent, guardian, or caretaker. Children with disabilities may have more severe oral diseases due to their impairment, other medical, economic, or social factors, or simply because their parents find it difficult to perform adequate daily oral hygiene. Students with disabilities have a difficult time gaining access to special education services, particularly health services. People with disabilities are vulnerable to oral health services because of the many barriers that prevent them from accessing oral health, rehabilitation, support, and education, such as poor assessments, limited training for teachers/caregivers, and poor collaboration between schools and caregivers.⁶

Most parents and caregivers are unaware of the

importance of oral health, and the instructional materials available to them are frequently insufficient and out of date.⁷

Thereby the present study was conducted to assess the oral health status of special children attending various special schools in Visakhapatnam city.

AIM

To assess the oral health status of differently abled children attending various special schools in Vishakhapatnam district.

OBJECTIVES

1. To assess the dental caries experience among differently abled children attending special schools using WHO oral health assessment form 2013.
2. To assess the periodontal status among differently abled children attending special schools using WHO oral health assessment form 2013.
3. To compare the oral health status between various divisions of differently abled children using WHO oral health assessment form 2013.

METHODOLOGY

A Descriptive cross-sectional study was carried out from June 2022 to November 2022 to assess the oral health status of differently abled children attending various special schools in Visakhapatnam district, Andhra Pradesh using WHO oral health assessment form 2013 and face to face interview.

Study Setting

Special schools in Visakhapatnam city, Andhra Pradesh, India.

Study Population

Differently abled children from special schools residing in Visakhapatnam city aged 5-15 years were recruited to the study. The visually impaired were 126, hearing and speech impaired were 96, intellectually impaired (autism, down syndrome and cerebral palsy) were 176 and both hearing and speech impaired were only 2.

Training and Calibration of Examiner

Prior to the study, the examiner was trained to record the questionnaire and WHO criteria (2013) for adults using mouth mirror and CPITN probe in the Department of Public Health Dentistry, Anil Neerukonda Institute of Dental Sciences to ensure standardization of clinical examination methods and diagnostic criteria training was carried out on 30 subjects within a week interval. The intra examiner reliability was determined using Cohen's Kappa coefficient obtained was 0.86 (almost perfect agreement).

The clinical examination of all the study subjects was done by a single calibrated examiner with the help of a recorder under the supervision of an expert examiner.

Pilot Study

A pilot study was conducted prior to the main study among a convenience sample of 30 special children from 2 special schools in Visakhapatnam city in an endeavor to standardize the methodology with diagnostic instruments, criteria and data recording procedure. The prevalence of dental caries obtained was 59.3%.

Sample size

Sample size determination was based on the dental caries prevalence obtained from pilot study (59.3%)

Formula used for estimation of sample size is:

$$\begin{aligned} \text{Sample size} &= \frac{Z^2 pq}{L^2} \\ &= \frac{4pq}{L^2} \end{aligned}$$

p = prevalence 59.3% (59/100=0.59)

q = 1- p (1-0.59 =0.41)

L = allowable error 0.05

z = 1.96 ~ 2 for 95% confidence interval for descriptive study.

$$\text{Sample size} = \frac{4 \times 0.59 \times 0.41}{0.05 \times 0.05} = 387$$

The calculated sample size was 387 which was rounded off to 400.

Sampling Method

Multistage sampling technique was employed to arbitrarily divide Vishakhapatnam district into

5 zones and randomly 20 special schools were selected from these zones which were included into the study.

Inclusion Criteria

Subjects/Teachers/Guardians who are willing to give consent to participate in the study.

- Children present on the days of examination.

Exclusion Criteria

- Children who are not highly cooperative.
- Children who are orthopedically disabled.
- Children who are under medical treatment for systemic conditions.

Obtaining Permission from Authorities

List of schools was obtained from District Education Officer (DEO), Visakhapatnam city. Approval to examine the study subjects was obtained from respective school authorities the study procedure was explained to the parents/teachers/guardians of the study subjects in local language followed by a signed consent form which was obtained.

Data Collection

1. Questionnaire regarding demographic characteristics
2. WHO health assessment form 2013

A face-to-face interview of teachers/guardians and parents which included the following information:⁷

- A. Demographic Information
- B. Type of disability
- C. Assistance in Tooth Cleaning
- D. Mode of cleaning
- E. Frequency of Brushing
- F. Brushing method

Procedure:

The examinations were carried out in a well illuminated classroom by a trained and calibrated examiner with the help of a recorder. Type III Dental examination of the study participants was carried out under natural light. The subjects were examined by making them sit on a chair, with his or her neck extended, and the examiner standing in front of them. The study was conducted in two phases. First a face-to-face interview was conducted among the school teachers/guardians and parents. Second, participants in the age group 5-10 years,

oral examination was done using WHO oral health assessment form 2013 for children and 11-15 years, oral examination was done using WHO oral health assessment form 2013 for adults. The examiner was accompanied by a trained assistant for recording the questionnaire and proforma.

The clinical examination of each study participant was done at various school premises with the subjects seated on parents in intellectually disabled in Visakhapatnam city.

Oral health education was provided to the teachers and parents after completion of examination using audio-visual aids and braille cards.

Subjects requiring comprehensive treatment were referred to our institute.

Statistical Analysis:

1. The data collected was entered in Microsoft Excel Software by the examiner. The entered data were exported to SPSS (Statistical package for social science) for statistical analysis.
2. Statistical test (Chi-Squares) was done using SPSS 25.0
3. On subjecting the data to the normality test (Kolmogorov Smirnov), the distribution of data was found to be normal ($p < 0.05$).
4. Descriptive statistics was used for the analysis of Mean, Frequency, percentage of data distribution of study variables.
5. Chi square test was used to compare the oral health status among disabled children.
6. The level of significance was set at $p < 0.05$

RESULTS

Table 1: Demographic Details of the Study Participants

	5-10 years	11-15 years	P value
	n (%)	n (%)	
Visually impaired	104 (26%)	22 (5.5%)	0.082
Hearing and speech impaired	75(18.6%)	21(5.3%)	
Intellectually disabled	157(39.3%)	19(4.8%)	
Both hearing and speech impaired and intellectually disabled	2(0.5%)	0(0%)	

*Chi square test: $p < 0.05$ * is significant*

Table 1 shows the demographic distribution of

the study participants. Under the age group of 5-10 years, highest were intellectually disabled who comprised of 39% (157) and 4.8% (19) followed by visually impaired 26% (104) and 5.5% (22), hearing and speech impaired 18.8% (75) and 5.3% (21) and only 0.5% (2) were observed who had both hearing, speech and intellectually disabled.

Table 2: Gender wise Distribution of the Study Participants

-	Males n (%)	Females n (%)	P value
Visually impaired	96 (24%)	30 (7.5%)	0.638
Hearing and speech impaired	78 (19.5%)	18 (4.5%)	
Intellectually disabled	142 (35.5%)	34 (8.5%)	
Both hearing and speech impaired and intellectually disabled	2 (0.5%)	0 (0%)	

Chi square test p < 0.05 is Significant*

Table 2 shows the gender wise distribution of the study participants. Males constituted about 79.5% (318) whereas females constituted about 20.5% (83).

Table 3: Grade wise distribution of study participants

-	6th - 8th class n(%)	9th - 10th class n(%)	P value
Visually impaired	114 (28.5%)	12 (3%)	0.038*
Hearing and speech impaired	83 (20.8%)	13 (3.3%)	
Intellectually disabled	169 (42.3%)	7 (1.8%)	
Both hearing and speech impaired and intellectually disabled	2 (0.5%)	0 (0%)	

Chi square test: p < 0.05 is Significant*

Table 3 shows the grade wise distribution of study participants where intellectually disabled 42.3% (169) belong to 6th to 8th grades and 1.8% (7) belong to 8th to 10th grade followed by visually impaired 28.5% (114) from 6th to 8th grades and 3% (12) in 8th to 10th grades followed by hearing and speech impaired 20.8% (83) from 6th to 8th and 3.3% (13) and 0.5% (2) both intellectually and hearing and speech impaired in 6th to 8th grade and a statistical significance was seen which was p

< 0.05.

Table 4: Type of Disability in the study Participants

-	Congenital n (%)	Acquired n (%)	P value
Visually impaired	120 (30%)	6 (2.4%)	0.157
Hearing and speech impaired	97 (24.3%)	0 (0%)	
Intellectually disabled	171 (42.8%)	0 (0%)	
Both hearing and speech impaired and intellectually disabled	2(0.5%)	0 (0%)	

Chi square test: p < 0.05 is significant*

Table 4 comprises of type of disability among the study participants to check whether the disability is of congenital or acquired, 98.5% of all the disability were of congenital type whereas 1.5% of the visually impaired reported that it was acquired during the later stages of development.

Table 5: Assistance in Oral Hygiene Practices of the Study Participants

-	Themselves n (%)	Others help n (%)	P value
Visually impaired	87 (21.8%)	21 (5.3%)	0.001*
Hearing and speech impaired	68 (17%)	28 (7%)	
Intellectually disabled	155 (38.8%)	39 (9.8%)	
Both hearing and speech impaired and intellectually disabled	0 (0)	2 (0.5%)	

*Chi square test: p < 0.05 * is significant*

Table 5 shows the assistance of oral hygiene practices of the study participants and 77.6% (310) had no assistance and perform their oral hygiene practices by themselves whereas 22.6% (90) had assistance from their caretakers. Highest among themselves was observed in intellectually disabled followed by visually impaired and hearing and speech impaired. A highly statistical significance was seen p < 0.05.

Table 6: Oral Hygiene Practices of Study Participants

-	Visually impaired	Hearing and speech impaired	Intellectually disabled	Both hearing and speech impaired and intellectually disabled	P value
Mode of Cleaning					
Tooth brush	126 (31.5%)	96 (24%)	176 (44%)	2 (0.5%)	0.145
Finger	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Neem stick	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Aids used in cleaning their teeth					
Tooth paste	126 (31.5%)	96 (24%)	176 (44%)	2 (0.5%)	0.342
Tooth powder	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Others help	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Frequency of brushing their teeth					
Once a Day	115 (28.7%)	90 (22.5%)	163 (40.8%)	2 (0.5)	0.883
Twice a day	11 (2.8%)	6 (1.5%)	13 (3.3%)	0 (0%)	
Brushing method					
Horizontal	94 (23.5%)	72 (18%)	130 (32.5%)	2 (0.5%)	0.865
Vertical	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Circular	32 (8%)	24 (6%)	46 (11.5%)	0 (0%)	

Chi square test: p < 0.05 is significant*

Table 6 shows the oral hygiene practices of the study participants 31.5% (126) visually impaired, hearing and speech impaired 24% (96), intellectually disabled 44% (176) and 0.5% (2) all use a toothbrush and tooth paste. 92.5% brush once a day whereas 7.6% brush twice a day.

Table 7: Mean "Dmft" Scores of Study Participants

-	Mean scores (Mean + SD)
Decayed (D)	2.46 ± 1.45
Missing (M)	0
Filled (F)	0.28 ± 0.59
Decayed missing filled teeth (DMFT)	2.74 ± 1.62

Table 7 shows the mean DMFT. The mean decayed is 2.46 ± 1.45, mean filled is 0.28 ± 0.59 and the mean DMFT is 2.74 ± 1.62.

Table 8: Mean "Deft" Scores of Study Participants

-	Mean scores (Mean + SD)
Decayed (d)	1.63 ± 0.68
Extracted (e)	1.77 ± 0.835
Filled (f)	0.22 ± 0.44
Decayed extracted filled teeth (deft)	3.63 ± 0.88

Table 8 shows the mean deft. The mean decayed is 1.63 ± 0.68, mean extracted is 1.77 ± 0.835 and the mean deft is 3.63 ± 0.88.

Table 9: Mean "Dmft" and "Deft" Scores of Study Participants According to Disability

-	Mean Scores	
	DMFT	deft
Visually impaired	2.91	3.53
Hearing and speech impaired	3.29	3.67
Intellectually disabled	2.92	3.69
Both hearing and speech impaired and intellectually disabled	3.50	3.00

Table 9 shows the mean DMFT and mean deft according to the disability. The highest mean DMFT is observed in hearing and speech impaired and intellectually disabled (3.50) and least in visually impaired (2.91). Mean deft is highest in intellectually disabled (3.69) and least in hearing and speech impaired and intellectually disabled (3.00).

Table 10: Distribution of Gingival Bleeding in Various Disabled Types

-	Bleeding n (%)	P value
Visually impaired	37 (32.7%)	0.12
Hearing and speech impaired	24 (21.2%)	
Intellectually disabled	50 (44.2%)	
Both hearing and speech impaired and intellectually disabled	2 (1.8%)	

Chi square test: p < 0.05 is significant*

Table 10 and graph 1 shows the distribution of periodontal conditions and 44.2% (50) was observed in intellectually disabled followed by visually impaired 37% (32) hearing and speech impaired 21.2% (24) and both intellectually, hearing and speech impaired 1.8% (2).

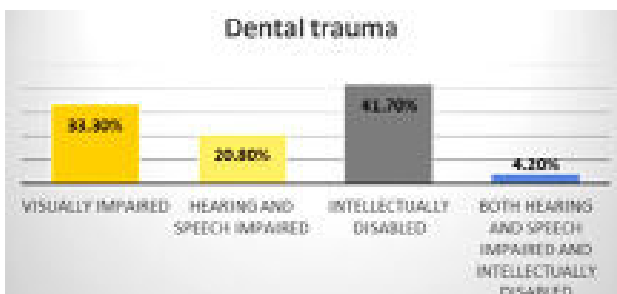


Graph 1: Shows the distribution of periodontal conditions

Table 11: Distribution of Dental Trauma in Various Disabled Types

-	Dental trauma n%	P value
Visually impaired	16 (33.3%)	0.002**
Hearing and speech impaired	10 (20.8%)	
Intellectually disabled	20 (41.7%)	
Both hearing and speech impaired and intellectually disabled	2 (4.2%)	

Chi square test: $p < 0.05^*$ is significant



Graph 2: Shows the distribution of dental trauma

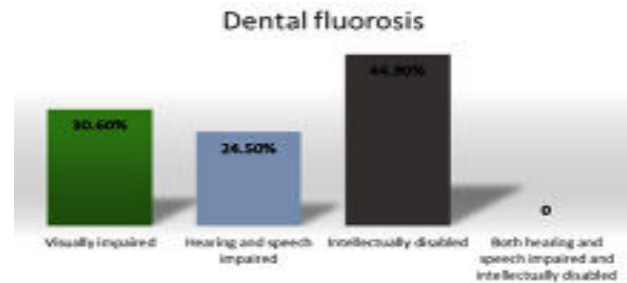
Table 11 and graph 2 shows the distribution of dental trauma among the study participants and 48 had dental trauma, 41.7% (20) was observed in intellectually disabled followed by visually

Table 14: Distribution of Intervention urgency

Intervention	Visually impaired	Hearing and speech impaired	Intellectually disabled	Both hearing and speech impaired and intellectually disabled	P value
0	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.02*
1	14 (3.5%)	3 (0.8%)	6 (1.5%)	0 (0%)	
2	112 (28%)	93 (23.3%)	170 (42.5%)	2 (0.5%)	
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
4	0 (0%)	0 (0%)	0 (0%)	0 (0%)	

Chi square test: $p < 0.05^*$ is significant, 0 - no treatment needed, 1 - preventive

impaired 33.3% (16) hearing and speech impaired 20.8% (10) and both intellectually, hearing and speech impaired 4.2% (2). This showed a highly statistical significance.



Graph 3: Shows the distribution of dental fluorosis

Table 12: Distribution of Dental Fluorosis in Various Disabled Types

-	Dental fluorosis n (%)	P value
Visually impaired	15 (30.6%)	0.95
Hearing and speech impaired	12 (24.5%)	
Intellectually disabled	22 (44.9%)	
Both hearing and speech impaired and intellectually disabled	0 (0%)	

Chi square test: $p < 0.05^*$ is significant

Table 12 and Graph 3 shows the distribution of dental fluorosis among the study participants and 49 had dental fluorosis, 44.9% (22) was observed in intellectually disabled followed by visually impaired 30.6% (15) hearing and speech impaired 24.5% (12) and both intellectually, hearing and speech impaired 0%. According to the severity, most of the subjects have mild fluorosis.

Table 13: Dental Fluorosis According to the Severity

Fluorosis	n (%)	P value
Questionable	12 (25%)	P < 0.05
Very Mild	11 (22.9%)	
Mild	15 (31.25%)	
Moderate	7 (14.58%)	
Severe	3 (6.25%)	

Chi square test: $p < 0.05^*$ is significant

or routine treatment needed, 2 - prompt treatment (including scaling) needed, 3 - immediate (urgent treatment) needed, 4 - referred for comprehensive evaluation for any medical/systemic condition.

Table 14 shows the level of intervention urgency, 28 (112) visually impaired, hearing and speech impaired 23.3% (92), intellectually disabled 42.5% (170) and both intellectually, hearing and speech impaired 0.5% (2) have an interventional urgency of prompt treatment required and 23 study participants had no interventional treatment required. A statistical significance was seen $p < 0.05$.

DISCUSSION

With this view point, the present study was conducted among special children to assess the oral health status and treatment needs. This present study included 400 special children from various special schools among Vishakhapatnam who were divided into visually impaired, hearing and speech impaired, intellectually impaired. This study included oral health survey design utilizing WHO oral health assessment proforma 2013 for children which was used by *Purohit et al.*³ The present study showed male child population was significantly higher than its female child population, which could be due to the fact that the Indian population still believes that female child education does not contribute to the economic development of a family.

The present study showed 44.1% comprised of intellectually impaired, 31.5% visually impaired, 23.9% hearing and speech impaired and 0.5% in which both had hearing and speech and intellectually disabled. Majority of the intellectually disabled children belong to 6-8th grade although due to their low intellectual development, it may vary.

The examination in this study was carried out in natural light. The criteria for diagnosis were a brownish-black lesion that was soft and produced a "catch" while probing (with a CPI probe). The mean DMFT is 2.74 and the visually impaired population has a mean DMFT of 2.91 which shows a high prevalence of dental caries, this is in contrast with the study done by *Avasthi K et al.*⁸ in India in which all the study participants have dental caries and mean DMFT of the visually impaired group is 2.40. This is consistent with the findings of the study conducted by *Jain et al.*⁹ in Udaipur, *Mehta et al.*¹¹ who conducted among blind and deaf children in Delhi India and *Singh et al.*¹⁰ who conducted

among blind and deaf children in Rajasthan, India. The results in the present study are in line with the results obtained by *Gizani et al.* who have reported a mean DMFT value of 2.90.¹¹

In the present study, dental caries was the most common finding observed and this is in line with result is similar to the studies done by *Wei et al.*¹² and *Sandeep et al.*¹³ and these in contrast to the study done by *Jhaneswar et al.*¹⁴ and study done by *Bharathwaj et al.*¹⁵

The mean deft in the present study was 3.37 which is higher than the deft result obtained from the study done by *Rao et al.*¹⁶ this might due to the reason that the lack of awareness of the parents, caretakers' attitudes towards the oral health of their children.

In this study, 27.5% of the total study sample had gingival bleeding. Majority of the intellectually disabled children (44.2%) had gingival bleeding followed by visually impaired (32.7%), hearing and speech impaired group (21.2%), and the lowest percentage of children with gingival bleeding was from both intellectually and hearing and speech impaired (1.8%). The findings are in line with the study done by *Bhambal A et al.*¹⁷, this could be due to that children with mental disabilities have poor oral health compared to their peers, making oral cavity functions such as eating, swallowing, speech, and chewing which is difficult for them, resulting in malocclusion, poor aesthetics, and general health. They require good oral health because the severity of medical conditions and perceived general health are strongly related to dental functional status and the severity of dental disease. This could be because visually impaired children cannot see how to brush their teeth, which is still thought to have a greater influence on oral hygiene maintenance.¹⁸ Next followed by visually impaired which is in line with study done by *Avasthi et al.*⁸, *Mehta et al.*¹⁰ in Delhi but in contrast to the study conducted by *Jain et al.*⁹ in Udaipur, India. This may be possibly because visually impaired children cannot see the way of tooth brushing, which is still believed to have a greater influence on the maintenance of their oral hygiene.

The present study showed an overall prevalence of 12% for dental trauma, which is low compared the previous studies done by *Bagattoni S et al.*²⁰ and *Ferreira MC et al.*²¹ and this is in contrast to the study done by *Suma et al.*²² in which dental trauma was found in 10.6% of the children. This is also in contrast to study done by *Nayak et al.*²³ who reported dental trauma of 20% that is higher than results obtained in this study among special needs

children.²⁴ This could be due to hearing disability, venturing into more risks, or participating more in sports activities in hearing impaired children.²⁵ And This may be due to the difference in geographic population, age group, and diagnostic criteria used to assess dental trauma.²⁶ The children with intellectually disabled presented.²⁷

With significantly higher prevalence (45%) followed by visually impaired (31.5%), hearing and speech impaired (23.8%) which is statistically significant. This high prevalence may occur due to limited motor coordination and involuntary physical movements leading to increased risk of accidental falls.²⁸

In the present study, the total prevalence of dental fluorosis is 12.25% and is higher in intellectually disabled (44.9%) followed by visually impaired (30.6%), hearing and speech impaired (24.5%). According to the severity, 31.2% have mild fluorosis. This is in contrast to study done by Goud V *et al*²⁶ at Gulbarga in which the prevalence of dental fluorosis was 5% and majority had mild fluorosis, the increase in the present study could be due to the reason that most of the population reside in higher fluoride concentration areas, and the results are higher compared to a study done by *Shyma et al* in Kuwait, on disabled children and young adults, where a prevalence of 10% had dental fluorosis.²⁷ The results obtained in the present study is also in contrast to a study done by *S. Kalaivani et al*²⁸ where the prevalence of fluorosis is 18.6%.

The present study showed 5.75% of the children required preventive treatment which is in contrast to a study done by *S. Kalaivani et al*²⁸ where higher prevalence 13% was found. This can be due to the fact the parents and caregivers lack proper awareness in maintaining good oral health that could result in poor oral health.

Around 94.2% in the present study required prompt treatment, which in contrast is more than the study done by *Mehta et al*.¹⁰ The lack of treatment was reflected with the results from the current study.²⁹ These findings propose the need to emphasize of prompt care in these disabled children. These finding implies that all groups were deprived of dental care with very high unmet needs.³⁰

The majority of study participants' oral hygiene was compromised due to the presence of calculus and/or bleeding gums, with no significant difference between disability types.³¹ The findings in the present study showed that all the participants use toothbrush and toothpaste as oral hygiene aids.

The type of disability and how that disability affects the maintenance of adequate or sound oral hygiene are the most important variables in determining oral health status.³³ But due to lack of improper technique, their oral health can be hampered. These are in line with a study done by *Rakibul Hassan et al*¹, study done by *S Gizani et al*¹¹ where most of the children use a tooth brush to clean their teeth and similar findings were reported in studies conducted in Turkey by *Altun et al*.³¹ among 136 disabled people and in Belgium among 12-year-old disabled children in which showed poor oral hygiene. Our study showed 92.5% brushed their teeth once daily and only 7.5% brushed twice daily. This is higher and in contrast with the study done by *Suma G et al*²² where once daily habit of brushing was seen among 82.89% and twice daily in 17.11%. This could be due to the reason that lack of concern over the oral health of the parents and guardians. There are numerous types of specially designed manual toothbrushes on the market. The triple-headed brush, for example, is designed to clean the oral, buccal, and occlusal surfaces of the teeth with a single stroke and is recommended for individuals with intellectually disabled.

The present study showed 77.5% had no assistance in toothbrushing but there was poor oral health especially in the intellectually disabled population which is in line with study by *Lamba R et al* as to blame are the learning difficulties³³ and an inability to properly control the tooth brush in order to provide adequate tooth cleaning. Children who were more reliant on caregivers for oral hygiene maintenance activities had poorer oral health. It has also previously been demonstrated that children who require tooth brushing assistance have poorer oral hygiene than those who are able to brush their teeth, indicating an inadequacy in the efficiency with which care providers may provide oral care and also the functional ability is more important than the medical diagnosis.³⁴

The oral health literacy of the primary caregiver has been linked to the oral health status of children with special needs. It has been reported that parents and caregivers' oral health literacy is a significant determinant of oral health related expenditure. As majority of the parents and caregivers in the present study had a low literacy rate this could be the reason that the poor oral hygiene status.³⁵

The higher rates of dental disease in these physically challenged children appear to be due to a lack of access to dental services, and there is a

need for dental education among these children's caregivers.³⁶ Better access to dental services and oral health education are required to ensure that these underprivileged children have access to optimal dental health. *Lewis C et al*³⁷ reported that primary care providers can influence access to dental care by performing oral health assessments and referring patients to dentists as soon as possible. One of the current themes in disability policy is the encouragement of collaboration among all key stakeholders, including people with disabilities, their families, and caregivers. The development of relationships with family support groups in order to reach parents and other caregivers will improve children's oral health.

Strengths

1. This is the first study to be conducted in children with special needs across Vishakhapatnam city.
2. Majority the disability types were included into the study.
3. Accessing these population created an impact on awareness on their oral health.
4. Special oral health education was given to these individuals, parents and caregivers.
5. After examination, a treatment camp was organized and subjects were also referred to our institution for comprehensive treatment.
6. Use of mobile apps such as "brush your teeth" and other apps were installed on the parents and caregivers' mobile phones as to reinforce their children with intellectual disabled.

Limitations

1. The present study was limited by cross-sectional design which reports the presence or absence of conditions at that particular time.
2. Dentition status was assessed at tooth level which is less sensitive than tooth surface level.
3. Diet history and past dental history was not recorded.
4. Questionaries was filled by the examiner and there is chance for social desirability bias and also Response bias.

CONCLUSION

Oral health is a vital component of overall health and well-being. People with disabilities have the same right to good oral health as any other citizen of the country. The subjects in this study had a high prevalence of dental caries need for oral hygiene care. Thereby the present study was conducted to assess the oral health status of Special children attending various special schools in Vishakhapatnam city so that oral health education and some school based programs can be planned for the parents, caregivers and children. Steps must be taken to address the disparities in oral health and hygiene among disabled children, as well as the barriers to oral care, which include cost, fear, and social attitudes. It is utmost necessary to educate parents, caregivers about the importance of diet and oral care. Newer methods are to be implemented and the usage of digital technology can be used in addressing the needs of these special needs' population.

RECOMMENDATIONS

It is suggested that: school dental health programs should be extended in these special schools focusing on parents/guardians and caregivers:

- a. School dental health education - Caregivers should be taught about dental health, and teachers, parents, and caregivers should be trained in maintaining oral hygiene through proper brushing techniques, the use of fluoride tooth paste, and mouth washes.
- b. School dental health services, such as periodic check-ups for early diagnosis and treatment, should be provided.
- c. To promote oral health, the dental team should plan on offering comprehensive school based initiatives and workshops, such as oral health education to the parents and caregivers to help children develop skills, fluoride supplements and sealants, and dietary and nutrition counseling.
- d. Use of other aids such as power points presentations to the caregivers, teachers and use of braille instructions for visually impaired, use of three headed toothbrushes for special children and use of modern technology such as mobile apps that can be installed in the children's parents' mobiles so that they can show to their kids which

is helpful for children with intellectually disabled.

- e. Further longitudinal studies are required.

Ethical Clearance:

The protocol for the study was submitted before Institutional ethics committee and a request for ethical clearance was made. The ethical clearance was obtained on with reference number (ANIDS/IEC/2021014)

REFERENCES

- Khan M R, Ahmad M, Islam M M, Ahmed S, Prodhon M R, Sharminakter. Oral Health Status of Disabled Children Attending Special Schools of Dhaka City. *Update Dent. Coll. J.* 2019; 9(2), 32-35.
- Bhatia Rupinder, Mathrawala Namrata R. The Oral Health Status and Treatment Needs of Institutionalized and Non-Institutionalized Disabled Children in Navi Mumbai, India. *Int J Contemp Med Res* 2016; 3(4):1041- 1045.
- Purohit BM, Acharya S, Bhat M. Oral health status and treatment needs of children attending special schools in South India: a comparative study. *Spec Care Dentist.* 2010 Nov-Dec; 30(6):235-41.
- India's 2.2% population suffering from disability: NSO survey for July-Dec 2018. The economic times (newspaper on the internet) 2019, Nov 23 Health (about1p) (Available from), <https://economictimes.indiatimes.com/news/economy/indicators/indias-2-2-population-suffering-from-disability-nso-survey-for-july-dec2018/articleshow/72202650.cms?from=mdr> (Accessed on 29 Oct 2020).
- National policy for persons with disabilities (2006) (NHP CC DC) [Internet source] May-1:2015 [Oct-12:2015] (Available from) https://www.nhp.gov.in/national-policy-for-persons-with-disabilities-2006_pg (Accessed on 29 Oct 2020).
- Naidu AS, Sownetha T, Ramdasally S, Ankush B, Muppa R, Srinivas NCH. Evaluation of Oral Health Status, Practices and Treatment Needs of Children Attending Special Schools in the Twin Cities of Telangana State; *Oral Health Dent Manag* February 2018. 17(1); 1-8.
- Prasad M, Patthi B, Singla A, Gupta R, Niraj LK, Ali I. Special care with special child-oral health status of differently abled children attending special schools in Delhi: A cross-sectional study. *J Indian Assoc Public Health Dent* 2018; 16(2), 137-43.
- Ubido J, Huntington J, Warburton D. Inequalities in access to healthcare faced by women who are deaf. *Health Soc Care Community.* 2002; 10:247-253.
- Avasthi K, Bansal K, Mittal M, Marwaha M. Oral health status of sensory impaired children in Delhi and Gurgaon. *Int J Dent Clin* 2011; 3:21 3.
- Jain M, Bharadwaj SP, Kaira LS, Bharadwaj SP, Chopra D, Prabu D, *et al.* Oral health status and treatment need among institutionalised hearing-impaired and blind children and young adults in Udaipur, India. A comparative study. *Oral Health Dent Manag* 2013; 12:41-9.
- Singh A, Kumar A, Berwal V, Kaur M. Comparative study of oral hygiene status in blind and deaf children of Rajasthan. *J Adv Med Dent Sci* 2014; 2:26-31.
- Gizani S, Declerck D, Vinckier F, Martens L, Marks L, Goffin G. Oral health condition of 12-year-old handicapped children in Flanders (Belgium). *Community Dent Oral Epidemiol* 1997; 25:352-7.
- 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.
- Sandeep V, Kumar M, Vinay C, Chandrasekhar R, Jyostna P. Oral health status and treatment needs of hearing-impaired children attending a special school in Bhimavaram, India. *Indian J Dent Res* 2016; 27:73 7.
- Jnaneswar A, Subramaniya GB, Pathi J, Jha K, Suresan V, Kumar G. Assessment of dental caries and periodontal status in institutionalized hearing-impaired children in Khordha District of Odisha. *J Indian Soc Pedod Prev Dent* 2017; 35:203 8.
- Bhardwaj VK, Fotedar S, Sharma KR, Luthra RP, Jhingta P, Sharma D. Dentition status and treatment needs among institutionalised hearing and speech impaired children in Himachal Pradesh in India: A cross-sectional study. *SRM J Res Dent Sci* 2014; 5:78-81.
- 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.
- Bhambal A, Jain M, Saxen S, Kothari S. Oral health preventive protocol for mentally disabled subjects – A review. *J Adv Dent Res* 2011; 1:21-6.
- Avasthi K, Bansal K, Mittal M, Marwaha M. Oral health status of sensory impaired children in Delhi and Gurgaon. *Int J Dent Clin* 2011; 3:21 3.
- Inclusion International. Hear our Voices: A Global Report: People with an Intellectual Disability and their Families Speak out on Poverty and Exclusion. London: Inclusion International; 2006. (Available from): <http://www.inclusion-international.org/wp-content/uploads/2013/07/>. (Accessed on November 5 2022).
- Bagattoni S, Sadotti A, D'Alessandro G, Piana G. Dental trauma in Italian children and adolescents with special health care needs. A cross-sectional retrospective study. *Eur J Paediatr Dent.* 2017;

- 18(1):23-26.
21. Ferreira MC, Guare RO, Prokopowitsch I, Santos MT. Prevalence of dental trauma in individuals with special needs. *Dent Traumatol.* 2011 Apr; 27(2):113-6.
 22. Suma G, Das UM, Bs A. 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.
 23. Nayak PP, Kakarla PV, Shetty PJ, Bhat MY. Dental trauma prevalence and disability types: A comparative study among children and adolescents in Dharwad, India. *J Indian Assoc Public Health Dent* 2015; 13:19 23.
 24. Al-Batayneh OB, Owais AI, Al-Saydali MO, Waldman HB. Traumatic dental injuries in children with special health care needs. *Dental Traumatology.* 2017 Aug; 33(4):269-275.
 25. Holan G, Peretz B, Efrat J, Shapira Y. Traumatic injuries to the teeth in young individuals with cerebral palsy. *Dent Traumatol* 2005; 21:65-9.
 26. Goud V, Gupta R, Suresh Babu AM, Das D, Kulkarni G, Swathi K. Oral health status and treatment needs among deaf, mute and visually impaired children of Gulbarga district - A population based cross sectional study. *J Family Med Prim Care* 2021; 10:3664-9.
 27. 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.
 28. Kalaivani S, Shavi GR, Shanmugam S, Sanga R, Gunasekaran L, Rahila C. Oral health status of hearing and speech-impaired schoolchildren in Erode district, Tamil Nadu - A cross sectional study. *SRM J Res Dent Sci* 2021; 12:198-203.
 29. Rao D, Amitha H, Munshi AK. Oral hygiene status of disabled children and adolescents attending special schools of South Canara, India. *Hong Kong Dent J.* 2005;2(2):107-13.
 30. Gizani S, Declerck D, Vinckier F, Martens L, Marks L, Goffin G. Oral health condition of 12-year-old handicapped children in Flanders (Belgium). *Community Dent Oral Epidemiol.* 1997 Oct; 25(5):352-7.
 31. Altun C, Guven G, Akgun OM, Akkurt MD, Basak F, Akbulut E, *et al.* Oral health status of disabled individuals attending special schools. *Eur J Dent* 2010; 4:361-6.
 32. Doğan MC, Alaçam A, Aşici N, Odabaş M, Seydaoğlu G. Clinical evaluation of the plaque-removing ability of three different toothbrushes in a mentally disabled group. *Acta Odontol Scand.* 2004 Dec; 62(6):350-4.
 33. Lamba R, Rajvanshi H, Sheikh Z, Khurana M, Saha R. Oral Hygiene Needs of Special Children and the Effects of Supervised Tooth Brushing. *Int J Sci Stud* 2015;3(5):30-35.
 34. Chambers HG, Chambers JA. Effects of caregiving on the families of children and adults with disabilities. *Phys Med Rehabil Clin N Am* 2015; 26:1-19.
 35. Vann, W. F., Divaris, K., Gizlice, Z., Baker, A. D., & Lee, J. Y. Caregivers' Health Literacy and Their Young Children's Oral-health-related Expenditures. *Journal of Dental Research*, 2013, 92(71), 55-62.
 36. NSSO 58th Round. Report No. 485 (58/26/1), Disabled Persons in India; July December, 2002. (Available from): http://www.mospi.nic.in/mospi_nsso_rept_pubn.htm. (Accessed on 2022 Nov 2).
 37. Lewis C, Robertson AS, Phelps S. Unmet dental care needs among children with special health care needs: implications for the medical home. *Pediatrics* 2005, 116:426-4.
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