

Original Research Article

## Oral Health Status of Intellectually Disabled 3-5 Years Children Attending Special Schools in Rajasthan

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### ABSTRACT

**Introduction:** The most difficult task existing in dental care programs for the intellectually disabled (ID) children is to effectively improve the oral hygiene status. The aim of the study is to determine the impact of intellectual disability levels on dental caries and oral hygiene status of 3-5 years preschool ID children in Sriganganagar city, Rajasthan.

**Methodology:** The study sample comprised of 150 subjects who were intellectually disabled, attending special schools in Sri Ganganagar city, Rajasthan. All the teeth were examined for dental caries. Mouth mirrors and CPI probes were used according to the WHO criteria. Clinical assessment of the oral hygiene status was done by using the simplified oral hygiene index Green and Vermilion. Chi square test and ANOVA were used to compare categorical variables. Multivariate analysis was carried out to test the risk factors associated with dental caries.

**Results:** The study consisted of 150 ID children who were divided into three groups. In the study group, 71 (47.33 %) were mildly affected, 45 (30%) and 34(22.66%), were moderately and severely affected, respectively. The mean dmft was found to be 3.066 ±2.84. The mean OHI-S scores rose significantly as the severity of intellectual disability increased among the groups. Conclusion: This study highlights the poor oral health status among ID Children. The NGOs, public health authorities and dental professionals ought to come together to improve the plight of this group.

**Key words:** Oral health behavior, intellectually disabled children, Dental caries

### INTRODUCTION

The American Health Association defines a child with disability as a child, who, for various reasons, cannot fully make use of all his or her physical, mental and social abilities. [1] In other words, a child who cannot play, learn, or do things those other children of his or her age can. According to AAIDD (American Association on Intellectual and Developmental Disabilities), Intellectual disability is characterized by significant limitations both in intellectual functioning and in adaptive behaviour as expressed in

conceptual, social, and practical adaptive skills. [2]

The recent National Sample Survey Organization (NSSO) report suggests that the number of disabled persons in the country is estimated to be 18.49 million which forms to about 1.8% of the total population and the mentally retarded population accounts to 0.44 million individuals. [3]

Children with an intellectual disability (ID) have been recognised to be at risk of receiving inadequate dental care and having poor oral health, partly because

of substantial dependence on others for the management of their oral care. [4]

Intellectual disabled have more compromised medical condition and have more dental problem may further compromise their general health. These individuals are also at a risk of developing systemic complication arising from oral diseases such as compromised immunity, endocarditis, etc. [5]

The prevention and treatment of the early stage of oral disease lies in the provision of self care but this may be difficult for challenged. [6] Dental caries is the most prevalent disease among mentally retarded children worldwide and “dental treatment is the greatest unattended health need of the disabled”. [7] Untreated caries and associated infection can cause pain, discomfort and reduce intake of food because eating causes pain and can worsen their quality of life and thereby growth. Preschool children with intellectual disability further require more attention towards oral health as this group of children are totally dependent on others for their oral health care and are more prone to childhood caries. However, with appropriate planning, clear communication and carefully drawn limits to the service provided, the dramatic dental neglect experienced by the majority of these individuals can be successfully alleviated. [8]

Literature on the dental management of ID subjects is scarce compared with that of the normal child. Until recent years, the management of handicapped subjects was not even mentioned in the undergraduate curriculum of most dental schools in different parts of the world.

In a developing country like India further research in this field is required as there are few reports available relating to dental health of 3-5 years ID children. Thus the aim of the study is to determine the impact of intellectual disability levels on dental caries and oral hygiene status of

3-5 years preschool ID children in Sriganganagar city, Rajasthan.

## **MATERIALS AND METHODS**

An institutional based cross-sectional study was conducted among a cluster of intellectual disabled subjects aged 3-5 years residing in an institution in Sri Ganganagar, Rajasthan, India. The ethical clearance was granted by ethical committee of the Surendera Dental College & Research Institute (SDCRI/IEC/2015/028) and permission to conduct the clinical examination of subjects was obtained from the institution authorities. World Medical Association Declaration of Helsinki principles for Medical Research involving human subjects were followed to maintain the ethics.

Out of total 187 subjects present on the day of examination, 150 subjects were enrolled in the study those who had parental consent/proxy consent. Students who were medically compromised or who didn't have the consent were not considered for the study.

The data was recorded during a face to face interview by a single examiner. The Performa consisted of two sections - First section comprised of the information regarding type of disability, socio-demographic factors and oral hygiene habits and second section was for oral health assessment of the child.

The sample populations of children with disability and respective IQ scores were derived from the databases of school records. Children with IQ [9] scores 50-70, 35-50, and below 35 were classified into mild, moderate, severe/profound intellectual disability, respectively.

Socioeconomic status (SES) was accessed according to revised Kuppaswamy's Socioeconomic Status Scale [10] 2013 which is calculated by summation of individual scores of education (1-7), occupation (1-10) and income (1-12) of any of the parent. Various categories according to scores are-

Upper class (26-29), upper middle (16-25), Middle/Lower middle (11-15 ), Upper Lower (5-10), Lower (<5).

The second section of Performa consists of oral examination. Caries examination was tooth-specific and all the teeth were examined. Mouth mirrors and CPI probes were used according to the WHO criteria. [11] Clinical assessment of oral hygiene status was done with a mouth mirror and No. 23 explorer according to criteria of simplified oral hygiene index by Green and Vermilion. [12]

The examiner training and calibration was done at SDCRI Dental College, Rajasthan. Pilot study was done

on 20 subjects using the Performa. Intra-examiner reliability was assessed using the kappa statistic, which was found to be 0.82 for the parameters studied, showing a good degree of consistency in the observations. Type III clinical examination was conducted by the examiner.

Statistical analysis – The chi square and ANOVA test was used to compare between categorical variables. Multivariate analysis was executed to test the risk factors associated with dental caries. Statistical analysis of the data was done using IBM SPSS. Statistics Windows, Version 20.0. (Armonk, NY: IBM Corp).

## RESULTS

**Table 1: Socio-demographic characteristics of study population**

Attributes	Mild N (%)	Moderate N%	Severe N%	p value
<b>Gender</b>				
Male	19 (26.76)	42(93.33)	26(76.47)	<0.0001
Female	52 (73.24)	3(6.67)	8(23.53)	
<b>Family type</b>				
Nuclear	10 (14.08)	22(48.89)	24(70.59)	<0.0001
Joint	61 (85.92)	23(51.11)	10 (29.41)	
<b>Income (INR)</b>				
<10000	9 (12.68)	5(11.11)	11(32.35)	0.002
10000-20000	38(53.52)	17(37.78)	6(17.65)	
>20000	24(33.80)	23(51.11)	17(50)	
<b>Mother Education</b>				
Illiterate	6(8.45)	3(6.67)	4(11.76)	0.88
School level	12(16.90)	10(22.22)	7(20.59)	
Graduate, Postgraduate	53(74.65)	32(71.11)	23(67.65)	
<b>Father Education</b>				
Illiterate	11(15.49)	8(17.78)	7(20.59)	0.32
School level	27(38.02)	16(35.56)	6(17.65)	
Graduate, Postgraduate	33(46.48)	21(46.67)	21(61.76)	
<b>Socioeconomic class</b>				
Upper	28(39.44)	19(42.22)	10(29.41)	0.48
Middle	23(32.39)	17(37.78)	11(32.35)	
Lower	20(28.17)	9(20)	13(38.24)	
<b>Brushing habits</b>				
Yes	62(87.32)	26(57.78)	18(52.94)	0.0001
No	9(12.68)	19(42.22)	16(47.06)	
<b>Tooth cleaning</b>				
Self	23(32.39)	17(37.78)	3(8.82)	<0.0001
Mother cleaning	44(61.97)	9(20)	7(20.59)	
Under supervision	4(5.63)	19(42.22)	24(70.59)	
<b>Frequency of tooth brushing</b>				
Once A Day	58(81.69)	25(55.56)	17(50)	0.37
Twice A Day	4(5.63)	1(2.22)	1(2.94)	
>Twice A Day	0	0	0	
<b>Visit to dentist</b>				
Never	3 (4.23)	10(22.22)	13(38.24)	<0.0001
Once	52 (73.24)	16(35.56)	7(20.59)	
≥Twice	16 (22.54)	19(42.22)	14(41.18)	

The study consists of 150 intellectually disabled (ID) children,

divided into three groups. Out of which 71 (47.33 %) were mildly affected, 45 (30%)

were moderately and 34(22.66%) were severely affected. Table 1 illustrates the distribution of socio-demographic characteristics, oral health behaviour variables among the group subjects. A statistically significant difference was detected among all the socio-demographic variables in the groups, except for parental education and SES class ( $p>0.5$ ). When brushing habits was compared among the

group subjects, it was found that 47.06 % of severely ID children did not brush their teeth as compared to 13% of mildly ID children ( $p<0.0001$ ). 70.59% of severely ID children and 42.22 % of moderately ID children reported to be dependent on guardians for their tooth cleaning ( $p<0.0001$ ). The frequency of dental visit was quite less among severely ID children as compared to other groups ( $p<0.0001$ ).

**Table 2. Comparison of Mean dmft and OHI-S scores with intellectual disability levels among ID children**

Clinical variables	Mild (mean±sd)	Moderate (mean±sd)	Severe (mean±sd)	p-value
dmft				
dt	(2.71±1.80)	(2.36±1.54)	(2.97 ± 2.09)	0.02
mt	0.17±0.56	(0.77 ±1.79)	(0.36 ± 0.78)	0.03
ft	0	0	0	0
dmft	3.0±2.13	2.76±2.08	3.44±2.84	0.043
OHI-S	1.1±0.73	1.8±1.26	2.7±0.81	<0.04

**Table 3. Risk factor analysis of the relationship between sociodemographic characteristics and caries experience in ID children**

Variables	Caries	No caries	OR (95% CI)	P
	N	N		
<b>Gender</b>				
Male	77	10	2.85 (1.20-6.74)	0.0174
Female	46	17	1	
<b>Intellectual disability</b>				
Mild	54	17	1	0.09
Moderate	39	6	2.41 (0.88-6.55)	
Severe	30	4	2.50 (0.78-8.04)	
<b>Education</b>				
Illiterate	21	5	0.96 (0.31-3.0)	0.95
School level	41	8	1.18 (0.45-3.06)	0.74
Graduate and postgraduate	61	14	1	
<b>Income</b>				
<10000	18	7	0.59 (0.20-1.74)	0.34
10000-20000	53	8	1.53 (0.58-4.05)	0.40
>20000	52	12	1	
<b>Occupation</b>				
Profession	43	15	1	
Clerical, shop-owner, farmer	57	7	2.84 (1.07-7.57)	0.04
Unemployed	23	5	1.60 (0.52-4.98)	0.41
<b>Socioeconomic class</b>				
Upper	51	6	1	
Middle	43	9	0.56 (0.19-1.71)	0.31
Lower	29	12	0.28 (0.09-0.84)	0.02
<b>OHI-S</b>				
Good	29	13	1	
Fair	65	12	2.43 (0.99-5.96)	0.05
Poor	29	2	6.50 (1.35-14.41)	0.01
<b>Brushing habits</b>				
Yes	82	24	1	
No	41	3	4.0 (1.14-14.06)	0.03
<b>Sugar score</b>				
Excellent	12	7	1	
Good	31	6	3.01 (0.84-10.82)	0.09
Watch out zone	80	11	4.24 (1.38-13.07)	0.01
<b>Visit to dentist</b>				
≥Twice	55	10	1	
Once	51	17	0.55 (0.23-1.30)	0.17
Never	17	0	6.62 (0.37-13.38)	0.20
<b>Reason for dental visit</b>				
Preventive	37	22	1	<0.0001
In need	86	5	10.23 (3.6-29.07)	

Table 2 depicts the individual components of dmft and OHI-S scores among the three groups. It was observed that with increasing level of intellectual disability, mean dmft and individual components in the groups showed a steady rise and it was found to be statistically significant. Whereas Mean OHI scores also showed a significant rise as the severity of intellectual disability increased among the groups ( $p < 0.05$ ).

Table 3 illustrates single factor analysis for assessing the relationship between the risk factors and dental caries experience among the subjects. Boys were more likely to have dental caries, as compared to girls with an odds ratio (OR) of 2.85. The odds for moderate ID children to have dental caries was 2.41 times where as the odds for severely ID children having dental caries was 2.50 times more than mild ID children. Subjects from joint families had 2.43 times more chances of having dental caries than those from nuclear family and it was found to be statistically significant ( $p=0.04$ ). Statistically significant association was found between poor oral hygiene and lack of tooth brushing habits with dental caries ( $p<0.05$ ).

## DISCUSSION

Children with intellectual disabilities often have limitations in their abilities to perform activities of daily living. They may have more marked oral pathologies, either because of their actual disability or for other medical, economic or social reasons, or even because their parents find it very difficult to carry out proper daily oral hygiene. [13] As a group, children with developmental disabilities are more likely to have unmet dental needs than are typically developing children [14,15] and are considered to be at greater risk of developing dental disease, hence require more opportunity for dental services than healthy counterparts. Considering these points, this study was conducted to assess the impact of level of

intellectual disability on dental caries and oral hygiene of 3-5 years ID children.

In the present study it was found that mean dmft for ID children was  $3.066 \pm 2.84$  which is relatively more when compared to a study conducted among similar aged normal children by Mahejabeen et al. [16] This difference of disease prevalence is supported by Purohit et al but is in contrast to the study done by Sagheri et al. [17] The increased risk of caries experience in ID children might be related to complications such as seizures, and motor impairment, etc and that could lower their physical abilities and be barriers to perform oral hygiene practices, [18] in addition to this medication may also contribute towards the increased risk of dental caries, as medication administered to control seizures in children is frequently laced with sugars to make it more palatable. The medication then reduces salivary flow, making the child more vulnerable to dental decay. [19] In the present study boys were found to have more dental caries than girls however a study conducted by Altun et al [1] reported to have more dental caries in girls. This difference in caries prevalence may be due to the Indian social attitude of paying more attention towards the diet of their male children [20] which consist of more frequent snacking than girls. [21]

The oral hygiene (OHI-S) scores of the ID children in the current study are seen to be increasing along with the increase in severity of intellectual disability. Such association of oral hygiene and degree of mental retardation is supported by Martens et al [22] who observed that children who were mildly ID had significantly better manual dexterity skills than the severely affected individuals, which explains the findings in the present study.

However a study conducted by Tesini et al [23] and Gizani et al [24] showed no difference in oral hygiene status and degree of mental retardation.



In current study more than 80% of mildly affected ID children were found to be brushing at least once daily which is in accordance with the reduced plaque accumulation and hence lower OHI-S scores for the respective group. As the severity of ID level increases, the brushing habits were found to be declining as severely ID children always have difficulties in self-cleaning and communicating oral health needs which affects their oral hygiene and moreover mother's involvement in oral hygiene practices of their children is found to be inadequate showing lack of parental awareness towards child's oral health.

Limitations of the current study is that children with intellectual disability had significantly more borderline and definite motor problems than the normal children which has not been examined in the current study. To nullify the effect of socio-demographic factors involved in the study, the siblings of the ID children could have been included in the research but it was beyond the scope of the study. Another limitation is that due to cross sectional nature of the study, it did not allow assessment or tracking changes in oral health assessment with advancing intellectual disability. So, further longitudinal studies are recommended in this direction.

## CONCLUSION

The results of the present study showed poor oral health among ID Children. Thus there is an imperative need for comprehensive preventive treatment to promote better oral health and prevent the development and progression of oral diseases, since the hallmark of management of such intellectually disabled children is prevention. According to the authors the best suited policy towards reducing oral health diseases among ID children is making guardians aware of the impact of intellectual disability and associated factors on the child's oral health. Along with that oral

health educational programs for parents should be carried out to improve parental skills in maintaining the oral health of their ID children.

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