

## ORIGINAL RESEARCH

# Comparative Assessment of Oral Health Status in Intellectually Disabled Children and their Normal Siblings

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## ABSTRACT

**Aim:** The purpose of this study was to assess and compare the oral health of intellectually disabled children with their normal siblings.

**Materials and Methods:** A cross-sectional study was conducted among 120 school going children aged 6–12 years. The children were divided into three groups. Group 1 - children with Down's syndrome and their normal siblings, Group 2 - children with cerebral palsy and their normal siblings, and Group 3 - children with autism and their normal siblings. The gingival status of the children was assessed using gingival index (Loe and Silness 1963) and Plaque index (Silness and Loe 1964). The dental caries status was assessed using the WHO scoring criteria.

**Results:** The overall comparison between intellectually challenged children and their normal siblings showed a highly statistically significant difference with relation to decayed, missing, and filled teeth ( $P < 0.001$ ) and was statistically significant with relation to plaque index and gingival index ( $P < 0.05$ ).

**Conclusion:** The results of this study revealed that there is a high prevalence of gingivitis and dental caries among disabled children. Taking into consideration the multifactorial influence on the oral health status of the disabled population, oral health promotion, modified toothbrushes, and intervention programs should be targeted toward these risk groups.

**Keywords:** Intellectually disabled, Noninstitutionalized, Oral health.

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## INTRODUCTION

Disability is defined as any restriction or lack of ability to perform an activity in a manner or within the range

considered normal for a person.<sup>[1]</sup> Around 10% of the world's population, or 650 million people, live with a disability.<sup>[2]</sup> According to the UN Development Program, around 80% of people with disabilities live in developing countries.<sup>[3]</sup> In India, around 26.8 million people are suffering from some kind of disability with 2.22 million suffering from some form of mental disability which constitutes 0.2% of Indian population.<sup>[4]</sup>

Despite marked improvements in the oral health of children in many developed countries in the past 20–30 years, evidence suggests that a small proportion of children in such nations carry the highest dental caries burden.<sup>[5]</sup> In India, the prevalence of orodental problems in children from the general population ranges from 45% to 55%.<sup>[6]</sup> However, the prevalence of dental caries in mentally handicapped children ranges from 79% to 100%.<sup>[7,8]</sup>

The comparative studies on the oral health status of normal and intellectually disabled children show that the intellectually handicapped individuals have poor oral hygiene and a high level of gingivitis and caries.<sup>[9-14]</sup> Institutional status plays an important role in determining oral health in intellectually disabled since it makes a considerable difference with regard to the daily personal care provided to the child.<sup>[15]</sup> Studies comparing the oral hygiene status of institutionalized children and normal children have reported conflicting results.<sup>[16-18]</sup>

Nowak *et al.*<sup>[15]</sup> emphasized the need to study the non-institutionalized handicapped population to determine whether the effects of deinstitutionalization and normalization and the preventive practices of plaque removal and carbohydrate restrictions have had any effect on the prevalence of dental disease.

Intellectually disabled children are inherently at high risk due to diet preferences, medications and uncooperative behavior. Hence, it would be interesting to compare the prevalence of dental disease of different intellectually disabled individuals and their normal siblings. Dajani *et al.*<sup>[19]</sup> compared the dental caries prevalence in patients with cleft lip and/or palate and their sibling controls and reported that subjects with cleft lip and palate are susceptible to dental caries independently of socioeconomic status. Macho *et al.*<sup>[20]</sup> compared oral health of children with downs syndrome and their normal siblings and reported that children with

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Downs syndrome have lower caries prevalence than their siblings.<sup>[20]</sup>

Literature search did not yield any studies on this aspect in the Indian scenario. This study is the first of its kind to evaluate and compare oral health status of intellectually disabled children and their siblings.

## MATERIALS AND METHODS

A total of 120 children with Down's syndrome, cerebral palsy, autism, and their 120 normal siblings between the age group of 6 and 12 years were included in the study. The diagnosis was made from the patient and parental history. The intellectually disabled children were attending special schools but were under home care. Ethical consent was obtained from the concerned Institutional Ethical Committee. Informed consent was obtained from the children's parents and the concerned school authorities. Children having an intellectual disability other than mentioned above and children without sibling were excluded from the study.

The children were divided into three groups:

- Group 1 - 40 children with Down syndrome and their 40 normal siblings.
- Group 2 - 40 children with cerebral palsy and their 40 normal siblings.
- Group 3 - 40 children with autism and their 40 normal siblings.

All data were recorded by a single examiner under natural light. Dental caries status was evaluated using the decayed, missing, and filled teeth (dmft/DMFT) index. The gingival and plaque status was recorded using the gingival index (Loe and Silness 1963) and plaque index (Silness and Loe 1964). All recorded data were subjected to statistical evaluation.

## Statistical Analysis

The data obtained were analyzed using unpaired *t*-test and SPSS 14 software.  $P < 0.05$  was considered to be statistically significant and  $P < 0.001$  was considered to be highly statistically significant.

## RESULTS

Table 1 shows the comparison between children with Downs syndrome and their normal siblings. The gingival index scores were higher in children with Downs syndrome, and this difference was statistically significant ( $P < 0.04$ ). Table 2 shows the comparison between children with cerebral palsy and their normal siblings. The DMFT ( $P < 0.034$ ), plaque index ( $P < 0.021$ ) and gingival index ( $P < 0.05$ ) were higher in children with cerebral palsy and this difference was statistically significant. Table 3 shows the comparison between children with autism and their normal siblings.

The DMFT ( $P < 0.001$ ), plaque index ( $P < 0.05$ ), and gingival index ( $P < 0.05$ ) were higher in children with autism and this difference was statistically significant. Table 4 shows the overall comparison between intellectually disabled children and their normal siblings. There was a highly statistically significant difference in DMFT ( $P < 0.001$ ), plaque index ( $P < 0.05$ ), and gingival index ( $P < 0.05$ ).

## DISCUSSION

Maintaining good oral health is particularly challenging among individuals with disabilities because of increased oral health risks due to underlying disease and competing demands.<sup>[21,22]</sup> This study aims to determine the oral hygiene status in intellectually disabled individuals when compared to their normal siblings.

In the present study, children with Down syndrome exhibited higher dmft/DMFT and plaque index scores as compared to their normal siblings though this difference

**Table 1:** Comparison of DMFT, Plaque Index and Gingival index scores among children with downs syndrome and normal siblings

	DMFT	PI	GI
Downs syndrome	7.53	0.91	0.91
Normal	7.03	0.87	0.79
P value	0.325	0.316	0.04*

\*significant Interpretation: P value less than that of 0.05 indicates significance of association.

**Table 2:** Comparison of DMFT, Plaque Index and Gingival index scores among children with cerebral palsy and normal siblings

	DMFT	PI	GI
Cerebral Palsy	7.63	0.91	0.96
Normal	6.48	0.81	0.81
P value	0.034*	0.021*	0.05*

\*significant Interpretation: P value less than that of 0.05 indicates significance of association.

**Table 3:** Comparison of DMFT, Plaque Index and Gingival index scores among children with autism and normal siblings

	DMFT	PI	GI
Autism	8.05	0.97	1.0
Normal	6.3	0.86	0.86
P value	0.001**	0.05*	0.05*

\*significant, \*\* highly significant

Interpretation: P value less than that of 0.05 indicates significance of association.

**Table 4:** Overall comparison of DMFT, Plaque Index and Gingival index scores among both the groups

	DMFT	PI	GI
Mentally challenged	7.73	0.93	0.95
Normal	6.60	0.83	0.85
P value	<0.001**	0.05*	0.05*

\*significant, \*\* highly significant Interpretation: P value less than that of 0.05 indicates significance of association.

was not statistically significant. However, the gingival index scores showed statistical significance. It has been reported that Down syndrome patients experienced less caries than their unaffected siblings.<sup>[20,23]</sup> It has also been reported that Down syndrome adults who were caries-free had significantly lower *Streptococcus mutans* counts when compared with the patients with dental caries.<sup>[24]</sup> Delayed eruption, reduced time of exposure to a cariogenic environment, congenitally missing teeth, higher salivary pH, and bicarbonate levels (providing better-buffering action), microdontia, spaced dentition, and shallow fissures of the teeth are considered to contribute to this lower risk of dental caries.<sup>[25]</sup>

Children with cerebral palsy showed higher dmft/DMFT, plaque index, and gingival index scores as compared to their normal siblings and this difference was statistically significant. This was in accordance with previous studies where cerebral palsy group showed a higher mean dmft/DMFT than normal children.<sup>[10,26,27]</sup> Pope *et al.*<sup>[28]</sup> reported no significant difference in caries but found more extracted and untreated decay and poor quality of restoration in CP children. The poor oral conditions seen in these children are probably due to food stagnation in the buccal and labial sulci due to their poor masticatory muscular control, diet rich in soft mushy cariogenic food which is easy to swallow, sweetened highly viscous medications used at night to control seizures and difficulty in tooth brushing.<sup>[26,29]</sup>

In autistic children, the results showed high dmft/DMFT, plaque index, and gingival index score as compared to their normal siblings but the difference in dmft/DMFT was highly statistically significant. The difference in plaque index and gingival index showed statistical significance. This was in accordance to study by Tharapiwattananon *et al.*<sup>[30]</sup> who reported a higher caries incidence in children with autism. The results of the present study were in contrary to the results reported by Namal *et al.*,<sup>[31]</sup> Loo *et al.*,<sup>[32]</sup> Jaber *et al.*,<sup>[33]</sup> and Vajawat and Deepika<sup>[34]</sup> who reported that the prevalence of caries was significantly lower in autistic children compared to normal children. Lower caries in autistic children in these studies have been attributed to the good supervision by the parents and school teachers in the child's tooth brushing, lack of in-between snacking, less cariogenic diet, and regular behavior at meals. In these studies, autistic children are compared to normal children from the general population.<sup>[34]</sup> However, when the children are compared to siblings in the same household with supervision, brushing, snacking being same the autistic child is seen to have higher dental caries experience.

On the evaluation of plaque and gingival index, we found that autistic children had an increase in plaque

index and gingival index scores which are in accordance with Shapira *et al.*<sup>[35]</sup> and Luppapornlap *et al.*<sup>[36]</sup> This can be explained by the fact that autistic patients cannot brush as effectively as their normal counterparts. Medina *et al.*<sup>[37]</sup> have stated that self-injurious habits can also be the reason for increased gingival diseases. Friedlander *et al.*<sup>[38]</sup> stated that the changes in gingiva can be due to the side effects of medications given to autism patients.

The overall results showed that dental caries status, gingival index, and plaque index were significantly higher in intellectually disabled children. Many authors have reported that intellectually disabled children tend to show poorer oral hygiene level when compared to the non-disabled children of the same age group.<sup>[11,13,39,40]</sup>

In the present study, non-institutionalized disabled children were compared to their normal siblings. Further studies evaluating the extent of handicapping conditions, medications and its association with dental caries need to be conducted to recommend appropriate preventive measures for the intellectually disabled child.

## CONCLUSION

People with mental health problems are entitled to the same standards of care as the rest of the population. Oral health has a significant impact on overall health. The oral health status of the mentally challenged population is poor and influenced by the etiology of the disability, IQ level, and parent's level of education. Oral health promotion programs should be aimed specifically at special needs schools and parents of disabled children. Oral health promotion should include facilitating access and regular use of oral health services. Taking into consideration the multifactorial influence on the oral health status of the present disabled population, oral health promotion and intervention programs should be targeted and concentrated toward these risk groups.

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