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Original Research Article

Clinical spectrum of oral and dental conditions in intellectually disabled children attending the district early intervention centre of rural tertiary care hospital in coastal Tamil Nadu

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ABSTRACT

Background: Children with intellectual disabilities (ID) often experience challenges in maintaining oral hygiene due to cognitive, behavioural and environmental factors, making them more vulnerable to dental problems. Understanding the oral health status of this group is essential for planning preventive and therapeutic interventions.
Methods: A cross-sectional study was conducted among children aged 2-18 years with ID attending the District Early Intervention Centre (DEIC) in a rural tertiary care hospital in Coastal Tamil Nadu. Oral health was assessed using the DMFT/deft and OHI-S indices and intellectual functioning was evaluated using the Binet Kamat Test of Intelligence. Caregivers provided additional data regarding demographics, medical history, diet and hygiene practices.
Results: The study revealed a high prevalence of dental caries, gingival diseases and poor oral hygiene among children with ID, with severity increasing in those with lower IQ levels. Behavioural challenges during dental examinations were frequently observed, which complicated oral health assessments and interventions.
Conclusions: The findings underscore the need for early dental screening, routine follow-up, caregiver education and improved access to specialized dental care for children with intellectual disabilities, particularly in rural healthcare settings.

Keywords: Dental intervention, DEIC, Intellectual disability, IQ, Oral health

INTRODUCTION

Oral health is an integral component of general health and significantly influences quality of life, especially in high-risk populations such as children with ID. Intellectual disability is defined by considerable limitations in intellectual functioning and adaptive behaviours that emerge during early development. These limitations often extend to self-care abilities, making it difficult for individuals with ID to maintain proper oral hygiene and thereby increasing their vulnerability to various dental issues compared to children without disabilities.[1,2] Children with ID face multiple challenges in managing oral health, including impaired cognition, behavioural difficulties, motor skill deficits, communication issues and side-effects from certain medications.[3-5] Consequently, they are at higher risk for oral conditions such as dental caries, gum diseases, malocclusions, oral injuries and developmental abnormalities of teeth.[3,4,6] Additionally, dietary practices guided by caregivers, limited access to professional dental care and a general lack of emphasis on oral health in overall medical management further worsen their oral

health status.[4,5,7] In rural areas like coastal Tamil Nadu, healthcare systems often lack the infrastructure to address the specialized needs of children with ID, putting them at even greater risk. The District Early Intervention Centre (DEIC), functioning under the Rashtriya Bal Swasthya Karyakram (RBSK), offers crucial services for early detection and intervention, including screening for oral health problems. However, despite these efforts, comprehensive data on the dental health of children with intellectual disabilities in rural Indian contexts remains limited.[8]

A thorough understanding of the oral health status and related challenges in this population is crucial for several reasons. Early diagnosis can prevent disease progression, pain, infection and nutritional deficits, thereby supporting overall health. Moreover, identifying the nature and frequency of dental issues can guide the development of preventive strategies, improve caregiver awareness and inform the creation of specialized dental care programmes. This study, therefore, seeks to evaluate the types and frequency of oral and dental conditions among children with intellectual disabilities attending a DEIC in a rural tertiary care centre in coastal Tamil Nadu. The goal is to advocate for the integration of oral healthcare into standard health interventions for this group, especially in rural and underserved areas.

Dental intervention

Children diagnosed with intellectual disabilities often encounter specific difficulties related to their oral health, necessitating dental care that is customized to suit their unique needs. These challenges stem from cognitive limitations that may hinder their ability to carry out daily oral hygiene routines, understand dental procedures and cooperate during dental appointments.[4,9] Therefore, dental-care strategies must be modified to appropriately address their physical, mental and emotional requirements. Initiating dental care at an early stage is essential in preventing oral diseases and safeguarding overall health in children with ID. Given their increased vulnerability to issues such as dental caries, gum diseases, misaligned teeth and oral infections, regular dental evaluations are critical.[5,6] A preventive, individualized dental-care plan can address existing oral-health problems while fostering good habits for future maintenance.[4,9]

Preventive strategies include consistent and structured instruction for both children and their caregivers on effective brushing and flossing techniques, using visual aids and simplified steps. Fluoride treatments applied by dental professional's help strengthen tooth enamel and minimize cavity formation, while the use of sealants on molars can prevent plaque development and reduce tooth decay. Caregiver counselling regarding dietary practices, such as reducing sugary foods and promoting a nutrient-rich diet, also plays an important role in supporting oral health.[5] Behavioural support techniques are essential to enhance cooperation during dental care. Gradual acclimatization of children to dental environments helps reduce fear and anxiety, while adapted communication methods, such as simple speech or pictorial aids, cater to cognitive abilities. Reward-based motivation through praise or token reinforcement encourages participation. Clinical management approaches involve non-medicated techniques like shorter sessions, visual distraction and caregiver presence to ease anxiety.[4] In cases where behavioural challenges are significant, conscious sedation or general anaesthesia may be used to ensure safe and effective treatment.[4,9] Dental restorations, including minimally invasive techniques and extractions when necessary, address cavities and maintain oral function.

Intellectual disability

ID is a neurodevelopmental disorder marked by considerable impairments in both intellectual capabilities and adaptive behaviours.[10] Intellectual capabilities include functions such as logical reasoning, problem-solving, abstract thinking, learning from experience and planning. Adaptive behaviours refer to practical, social and conceptual skills required for everyday functioning, including communication, self-care and social engagement across home, school and community settings. This condition typically begins during developmental years, generally before 18 years of age.[10] The level of impairment ranges from mild to severe or profound and manifests differently in each individual, influenced by genetic, psychological and environmental factors.[10,11]

The origins of intellectual disability are multifactorial and may involve genetic disorders such as Down syndrome or Fragile X syndrome, prenatal issues including maternal infections, malnutrition or exposure to harmful substances, perinatal complications like birth injuries or premature delivery and postnatal influences such as infections, brain injuries or lack of a stimulating environment.[11] Children diagnosed with ID benefit from customized educational plans, medical care tailored to their needs and structured support networks. They may show developmental delays not only in intellectual and academic skills but also in speech, motor coordination and emotional control. Early diagnosis and prompt intervention are vital for improving developmental outcomes. A team-based approach involving teachers, doctors, therapists and family members is crucial for promoting overall growth and enhancing quality of life.[10,11]

METHODS

This descriptive, observational study was conducted at the District Early Intervention Centre (DEIC), operating within a rural tertiary care hospital in coastal Tamil Nadu during April 2023 to May 2024. The study sample comprised 100 children aged 2–18 years with a confirmed diagnosis of intellectual disability, based on clinical assessment and standardised developmental

evaluation tools. Children with serious systemic illnesses that could independently influence oral health were excluded. Ethical approval was obtained from the Institutional Ethics Committee and informed consent was obtained from caregivers prior to inclusion. A detailed oral examination was conducted by a qualified paediatric dentist under proper lighting conditions using sterilised dental tools such as mouth mirrors and probes. The examination aimed to detect a variety of oral and dental conditions, including dental caries, gum diseases, malocclusion and developmental dental anomalies, while evaluating overall oral hygiene. Dental health was quantified using the DMFT/deft index for decayed, missing and filled permanent and primary teeth and the Simplified Oral Hygiene Index (OHI-S).

Demographic information, medical background, dietary routines, oral hygiene habits and previous dental consultation history were collected through a structured proforma completed by caregivers. Intellectual functioning was assessed using the Binet Kamat Test of Intelligence. Data were analysed using SPSS version 23. Descriptive statistics summarised findings to examine the relationship between the severity of intellectual disability and oral-health indicators.

Tools administered

The study employed a combination of clinical assessment tools, standardised documentation formats and caregiver-reported data to systematically evaluate oral and dental health in children with ID. Each participant underwent a direct clinical oral examination by a trained dental professional under well-illuminated conditions, following standard infection control procedures. Examination focused on detecting dental caries, evaluating gum condition and oral hygiene, identifying developmental anomalies such as enamel hypoplasia, observing oral habits like tongue thrusting or bruxism and assessing bite alignment and tooth eruption patterns. Radiographs were not used due to practical limitations in the rural setting and all findings were based on visual inspection. A predesigned structured proforma was used for consistent documentation of personal and demographic details, type and severity of intellectual disability using the Binet Kamat Test, associated medical conditions and clinical dental findings such as caries, gingivitis and malocclusion. This format ensured uniform data collection and facilitated efficient analysis and retrieval.

RESULTS

From the analysis of data, it was found that, out of the 100 children included in the study, 60% were male (n=60) and 40% were female (n=40). The age of participants ranged between 2 and 18 years. From the above bar graph, it was identified tat in 100 children, 37% belongs to the category of Mild ID, 43% were in the category of Moderate ID and the 20% were in the category of severe ID.

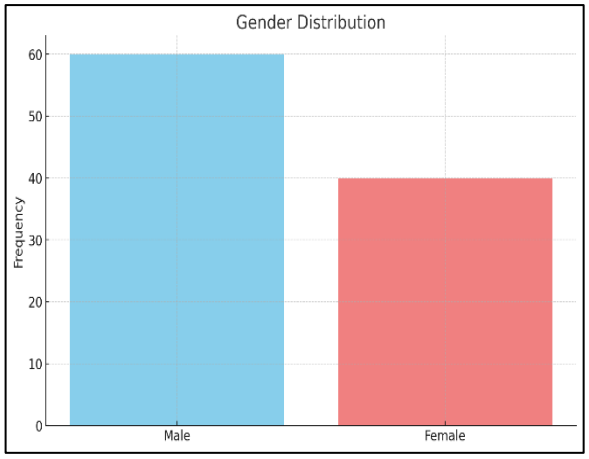

Figure 1: Gender distribution.

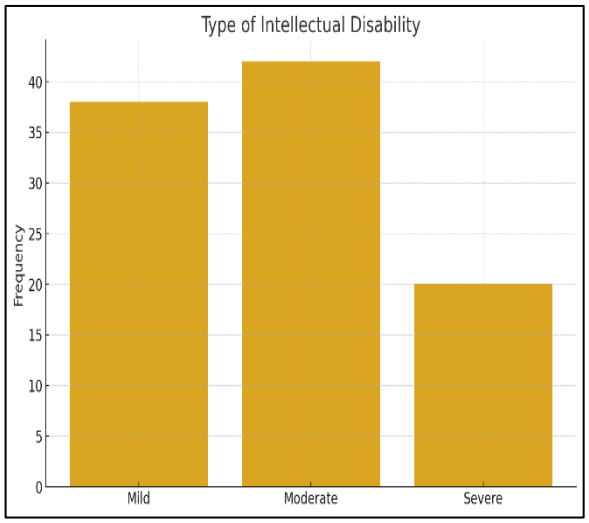

Figure 2: Types of intellectual disability among children.

Table 1 represents the prevalence rate of oral conditions among the children included in the study. By analyzing the collected data, it was identified. Among the collected data from children, the most common was dental caries with 76%, gingivitis with 58% and the poor oral hygiene with 60%. The other minor conditions were, Malocclusion 34%, Bruxism 21%, Mouth Breathing 17% and Thrusting 14%.

Table 1: Showing the prevalence rate of oral conditions among children with ID.

Oral condition	Frequency (n)	(%)
Dental caries	76	76
Gingivitis	58	58
Malocclusion	34	34
Bruxism	21	21
Mouth breathing	17	17
Tongue thrusting	14	14
Poor oral hygiene	60	60

DISCUSSION

The findings of this study reveal a strong association between the degree of intellectual disability and the prevalence of various oral health problems in the children assessed. Dental caries was the most widespread condition, affecting approximately 76% of the sample. This high rate aligns with previous studies that have reported caries prevalence ranging between 60–85% among children with intellectual disabilities, primarily due to poor oral hygiene, irregular brushing habits and diets high in fermentable carbohydrates.[12,13] Similar to earlier findings by Jain et al and Bhandary et al, the current study underscores that difficulties in maintaining daily personal care, limited manual dexterity and dependence on caregivers contribute significantly to caries occurrence in this population.[14,15]

Gingivitis (observed in 58% of children) and poor oral hygiene (60%) were also common and their prevalence increased with the severity of cognitive impairment. These outcomes are consistent with reports by Oredugba et al and Nqcobo et al who found higher rates of gingival inflammation and plaque accumulation in children with moderate to severe intellectual disabilities compared to their peers with mild impairment.[16,17] Notably, in this study, those classified with severe intellectual disability (20.8%) were almost entirely reliant on caregivers for oral hygiene maintenance, rendering them more vulnerable to plaque buildup and associated periodontal issues an observation also supported by Kaye et al.[18]

Overall, the study highlights a clear trend: as the severity of intellectual disability increases, so does the likelihood of oral health problems. This pattern has been documented in earlier Indian and international research, emphasizing the crucial role of caregiver support and specialized preventive dental programs for this group.[19,20] Targeted prevention efforts, combined with caregiver education particularly for families of children with moderate to severe intellectual disabilities are essential for improving dental health outcomes and reducing the burden of oral disease in this vulnerable population.

Implications

There is a pressing need to integrate dental care services into existing Early Intervention Programs. Primary healthcare providers and staff at DEICs should be trained in basic dental screening techniques and in identifying early signs of common dental issues in children with intellectual disabilities. Since children with ID especially those with severe impairments are largely dependent on caregivers for daily oral hygiene, it is vital to educate parents, particularly mothers, on proper oral care practices, balanced nutrition and the importance of regular dental visits. Informed and involved caregivers can play a pivotal role in preventing dental problems in these children and in promoting overall oral health.

CONCLUSION

This study examined the range of oral and dental conditions present in children with intellectual disabilities receiving services at a District Early Intervention Centre (DEIC) within a rural tertiary care hospital in coastal Tamil Nadu. It also explored how factors such as the child's cognitive level and the parents' educational background influenced oral health outcomes. The results clearly demonstrate a high incidence of dental caries, gum diseases and other oral health concerns among the children studied, with those having more severe intellectual disabilities at higher risk for these conditions. Moreover, a significant association was observed between the mother's level of education and the child's oral hygiene status. The study highlights the urgent need for early and ongoing preventive dental care for children with intellectual disabilities. Raising awareness among parents, incorporating oral health assessments into early intervention services and ensuring timely dental referrals are key strategies for reducing oral health burdens in this at-risk population.

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