

## PERIODONTAL DISEASE IN CHILDREN WITH MENTAL RETARDATION: A SYSTEMATIC REVIEW

Hendry Boy <sup>1,2</sup>, Risda Alvia <sup>1\*</sup>, Hanifah Putri Rahmadeli <sup>1</sup>

<sup>1</sup> Departement of Dental Health, Politeknik Kesehatan Kementerian Kesehatan Jambi, Indonesia

<sup>2</sup>PUI-PK, Politeknik Kesehatan Kementerian Kesehatan Jambi, Indonesia

\*Corresponding author: [risdaalvia@gmail.com](mailto:risdaalvia@gmail.com)

### ABSTRACT

**Background:** Children with intellectual disabilities (IQ < 70 and impaired adaptive skills) struggle with daily oral hygiene, predisposing them to periodontal disease. This systematic review aims to synthesize current evidence on the prevalence and key determinants of gingivitis and periodontitis in this population.

**Method:** A systematic review was conducted by reviewing research through English data sources Pub Med, Proquest, Cochran, and Wiley. Four studies were included according to the inclusion criteria.

**Result:** Across these studies, most participants had periodontal disease, mainly gingivitis and periodontitis. Limited independent hygiene caused by cognitive and physical restrictions was the dominant risk factor. Children whose parents actively supervised brushing and dental visits displayed significantly healthier periodontal status.

**Conclusion:** Functional limitations expose intellectually disabled children to a high risk of periodontal disease; consistent parental involvement is essential for maintaining their oral health.

**Keywords:** mental retardation; periodontal disease

### INTRODUCTION

A person with a mental disability typically has an intellectual capacity (IQ) below 70, accompanied by an impaired ability to adapt to their environment, leading to various social challenges. Consequently, individuals with such conditions require specialised educational services and healthcare support (Setyaningsih et al., no date).

Mental disability can be viewed from multiple disciplinary perspectives, leading to various classifications and definitions. From a psychological standpoint, classifications include mild, moderate, severe, and profound mental retardation. In medical contexts, the terms debil, imbecile, and idiot are sometimes used, while in educational settings, individuals are categorised as educable, trainable, or needing care (Suharsiwi, 2017).

Clinical classifications often include physical characteristics such as those seen in

Down syndrome, cretinism, macrocephalus (hydrocephalus), and microcephalus (Setyaningsih et al., no date). According to the American Association on Mental Deficiency (AAMD), intellectual disabilities are grouped into four levels based on IQ:

1. Mild mental retardation (IQ 52–68; mental age 8.3–10.9 years)
2. Moderate mental retardation (IQ 36–51; mental age 5.7–8.2 years)
3. Severe mental retardation (IQ 20–35; mental age 3.2–5.6 years)
4. Profound mental retardation (IQ below 20; mental age below 3.1 years) (Suharsiwi, 2017).

These individuals tend to have below-average intellectual abilities, difficulties with attention and memory, poor abstract and logical thinking, and limited vocabularies. Nevertheless, some can acquire basic literacy and numeracy skills. Children with mild intellectual disabilities often display weak

attention spans and may quickly lose interest in academic lessons (Faisah et al., 2023).

Dental and oral health issues frequently encountered among mentally disabled individuals include dental caries, periodontal disease, poor oral hygiene, abnormal tooth eruption, and trauma (Asmawati et al., 2023). Compared to typically developing children, those with special needs are more likely to experience dental problems due to physical and mental impairments that limit their ability to independently maintain oral hygiene (Gunawi et al., 2024). These children often present with cognitive, mobility, behavioural, and muscular impairments, as well as uncontrolled movements and reflexes such as vomiting, all of which complicate oral care (Indriasari, 2023). Poor oral hygiene can lead to common dental diseases like caries and periodontitis (Arifian et al., 2022).

Dental and oral health are crucial aspects of general well-being. Poor oral health can impair chewing, speech, and systemic health. Maintaining oral hygiene is essential for preventing diseases, including those affecting periodontal tissues (Nazir et al., 2020). These tissues include the gingiva, cementum, periodontal ligament, and alveolar bone. Periodontal disease is a chronic inflammatory condition resulting in the destruction of these structures due to bacterial infection and immune response dysregulation (Rohmawati and Santik, 2016).

Gingivitis and periodontitis are the most prevalent forms of periodontal disease. Gingivitis is confined to gingival inflammation and often manifests as bleeding during brushing, while periodontitis involves deeper structures and is characterised by attachment loss and bone destruction (Theresia et al., 2023). Periodontal disease progresses slowly but, if left untreated, can lead to tooth loss.

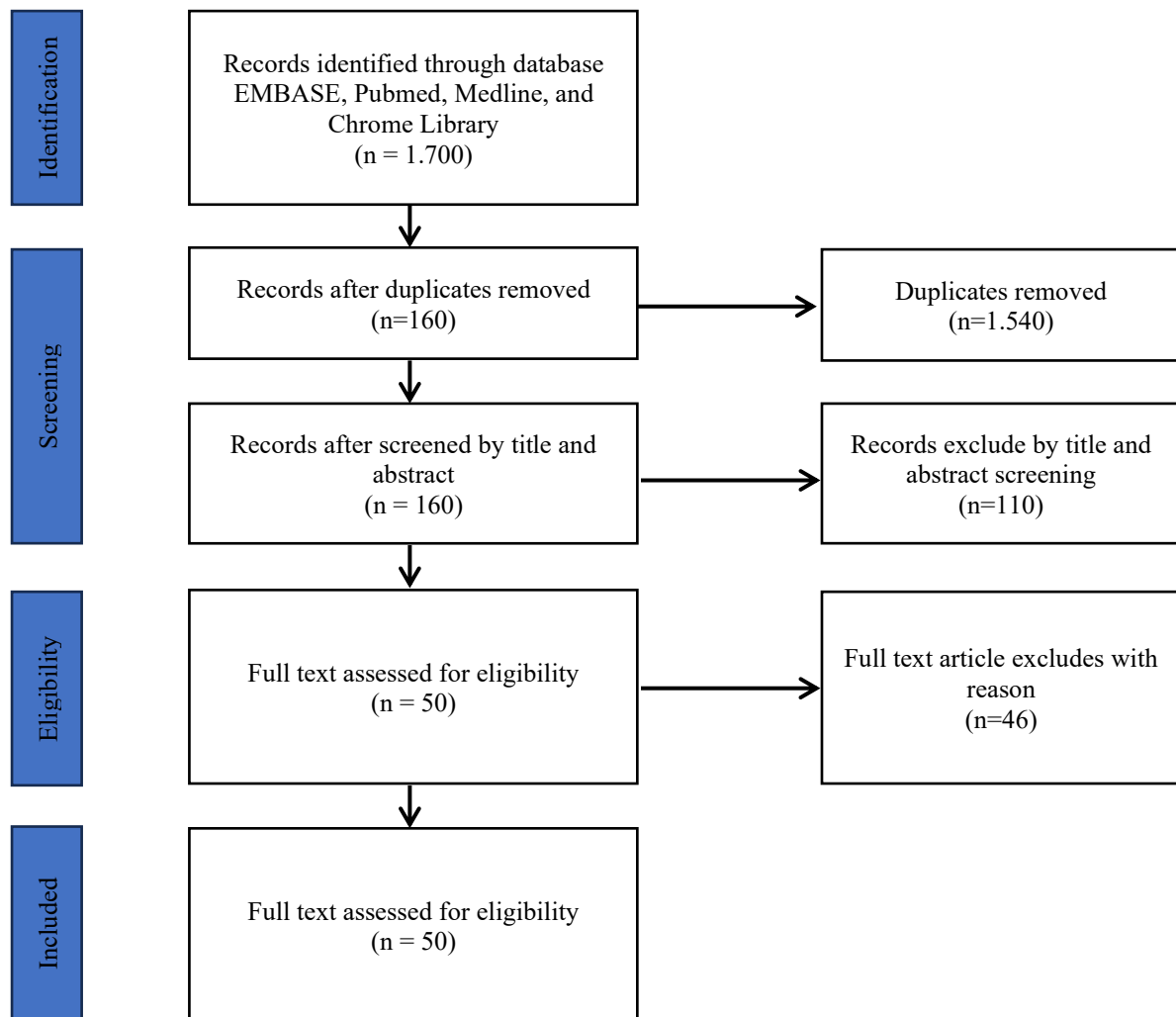
## METHOD

This study employed a systematic review approach based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Article selection was conducted through several databases, including PubMed, ProQuest, Cochrane, and Wiley, using the keywords "Diabetes Mellitus" and "dental caries." The search strategy was structured using the PICOS framework, with the population defined as children with intellectual disabilities, the intervention as periodontitis and gingivitis, and the outcome as a higher risk of periodontal disease in individuals with intellectual disabilities.

The study design focused on cross-sectional and observational studies published between January 2020 and June 2025. From an initial pool of 1,700 articles, 50 met the inclusion criteria following evaluation. Ultimately, four high-quality articles were selected for detailed review, offering valuable insights into periodontal disease among children with intellectual disabilities.

An article search was carried out according to keywords and inclusion criteria, there were 1700 articles found but after evaluation 50 articles met the inclusion criteria. Then 4 articles are rated quality, which can be seen in Chart 1.

This study included 4 articles in the analysis the features outlined in Table 1, providing a comprehensive summary of the reasons for dental health in mentally retarded individuals who have periodontal disease. Review results from 4 journals showing. Children with mental retardation have a higher risk for those affected by periodontal disease.



Picture 1. PRISMA Flow Diagram of Study Selection Process

Table 1. Summary of Results for Systematic Review

Author, Year of publication	Title	Purpose	Design	N	Results
Radosveta Andreeva & Siyana Atanasova <i>Journal of IMAB</i> , Vol. 26 No. 4, 2020	Prevalence of Periodontal Diseases in Children with Down Syndrome	The aim of this study was to compare the prevalence of periodontal disease in children with Down syndrome and healthy children	Comparative observational study	60 children and adolescent with Down syndrome 60 healthy children for control group	The plaque index of children with Down syndrome under 6 years old was 0.81. For children between 6-11 years old, this index was 1.4 and for the third group it was 1.8. For healthy children, the PI values were under 6 years old – 0.9; between 6-11 years old – 1.2; between 11-15 years old – 2.2. The measured pocket depths of children with DS for the three examined were as follows; under 6 years –

Author, Year of publication	Title	Purpose	Design	N	Results
					3.5; between 6-11 years old – 4.1; between 11-15 years old – 4.7. For healthy children, the PDD values were under 6 years old – 2.6; between 6-11 years old – 3.3; between 11-15 years old – 3.0
Roman – Torres et al, 2021 Journal of Dental Health, Oral Disorders & Therapy	Evaluation of periodontal conditions in individuals with Down syndrome: a case-control study	The aim of the current observational study was to evaluate periodontal conditions in individuals with down syndrome	Case control study	30 people aged 17-25 years old with down syndrome and 30 people aged 17-25 years old without down syndrome	The results of the study showed that for the Plaque Index 41.2% in the DS group while in the control group 45.5% without statistical difference. For the Gingival Index, it was observed that in the DS group 39.7% and in the control group 44.2% without statistical difference between group (p<0.05)
Siti Fitria Ulfah, Agus Marjianto, and Isnanto Malaysian Journal of Public Health Medicine 2024, Vo. 24 (1): 142-148	The relationship between oral hygiene status of children with down syndrome and parent's self-efficacy in maintaining their oral hygiene	The purpose of this study was to analyze the relationship between the dental and oral hygiene status of children with Down syndrome and parental self-efficacy in maintaining dental and oral hygiene in the Surabaya area	A cross-sectional design	The respondents were parents of children with Down syndrome and children with Down syndrome totalling 100 respondents who had agreed through informed consents	Data analysis using Spearman correlation test. The results showed that the oral hygiene status of Down syndrome children had a low score (54%) and parental self-efficacy in maintaining oral hygiene of Down syndrome children had a low category score (53%). There was a very significant relationship between the oral hygiene status of Down syndrome children and parental self-efficacy in maintaining oral hygiene children (p=0.000; -0.507)
Shoumi, F., Isnato Mahirwatie, I, D Indonesian Journal of Health and Medical 2023	The relationship between oral hygiene and the occurrence of gingivitis in mentally disabled students at	The study aims to determine relationship between oral hygiene and gingivitis in mentally retarded students at Karya Bhakti Spesial School, Surabaya	A cross-sectional design		Most of the students of SLB Karya Bhakti Surabaya have a simplified oral hygiene index with a poor category, have a gingival index with a moderate category. Chi-square data analysis obtained a p

Author, Year of publication	Title	Purpose	Design	N	Results
	the Karya Bhakti Special School in Surabaya				value 0.168 which means it is greater than the significant value ( $\alpha$ ) set 0.05 ( $0.168 > 0.05$ ), so H1 is rejected and H0 is accepted, it can be concluded that there is no relationship between oral hygiene and gingivitis in mentally retarded students of SLB Karya Bhakti, Surabaya City

## RESULT AND DISCUSSION

Children with special needs, particularly those with intellectual disabilities, often face significant challenges in maintaining proper oral hygiene due to both physical and cognitive limitations. These challenges are compounded by a lack of awareness and inadequate involvement from caregivers or parents, which significantly impacts the child's oral health status (Setyaningsih et al., 2020). One of the key behavioral factors influencing oral health among these children is the inability to independently perform effective toothbrushing (Gunawi, Rejeki and Wijayanti, 2024). This limitation is particularly evident among children with intellectual disabilities, who often struggle with basic oral hygiene tasks due to restricted motor and sensory abilities, resulting in the accumulation of plaque and calculus (Asmawati et al., 2023).

These children often fail to detect or communicate their oral health issues, delaying timely treatment. Furthermore, educational efforts directed at improving oral hygiene are hindered by cognitive limitations, necessitating tailored approaches by caregivers and educators (Indriasari, 2023). Periodontal disease is a complex inflammatory condition influenced by multiple interacting factors, and it is among the most prevalent oral health conditions worldwide (Nazir et al., 2020; Rohmawati and Santik,

2016). If left untreated, its progression may result in tooth loss in adulthood. Recent studies have explored the use of artificial intelligence in diagnosing and predicting periodontal disease, highlighting the importance of preventive care (Sardi, Adnyasari and Pinatih, 2023).

Rahmat et al. (2023) found a significant association between poor brushing habits and gingivitis in school-aged children. Gingivitis, an early stage of periodontal disease, is primarily caused by plaque accumulation, with additional local (e.g. food debris, poor oral hygiene) and systemic (e.g. hormonal, genetic, nutritional) contributing factors. Effective toothbrushing—ideally performed at least twice daily, in the morning after breakfast and before bed—is crucial for gingivitis prevention (Purwaningsih et al., 2022).

Several studies have compared the oral health of children with and without intellectual disabilities. A study by Andreeva and Atanasova (2020) on 60 children with Down syndrome and 60 neurotypical peers revealed that children with Down syndrome had a higher plaque index (PI) and probing pocket depth (PPD), particularly in older age groups. Similarly, Ulfah, Marjianto and Isnanto (2024) reported that 54% of children with Down syndrome had poor oral hygiene, which correlated significantly with low parental self-efficacy. A strong negative correlation was found ( $r = -0.507$ ;  $p < 0.001$ ), suggesting that

better parental involvement contributes to improved oral hygiene outcomes.

However, findings are not always consistent. Shoumi, Isnanto and Mahirawatie (2023) found no significant relationship between oral hygiene status and periodontal disease among children with Down syndrome. Nonetheless, most literature supports the notion that oral hygiene in children with intellectual disabilities is heavily dependent on caregivers. As such, targeted educational interventions for parents and teachers are essential (Lestari et al., 2023). With consistent training and habit formation, even children with mild to moderate intellectual disabilities can learn to maintain better oral hygiene.

Plaque accumulation among children with disabilities is influenced by both intrinsic factors—such as poor fine motor skills and low IQ—and extrinsic factors—such as dietary habits and sugar intake (Andreeva and Atanasova, 2020). Interestingly, Torres et al. (2021) found no statistically significant differences in plaque and gingival indices between children with and without Down syndrome, attributing this to the proactive role of parents and schools in maintaining oral hygiene.

Overall, maintaining good oral hygiene in children with intellectual disabilities requires regular toothbrushing and, most importantly, active participation from caregivers. Sari, Daeli and Koto (2023) found a statistically significant relationship ( $p = 0.007$ ) between parenting style and children's independence in fulfilling daily living activities, including oral care. Rudita, Huda and Pradipta (2021) further confirmed a strong positive correlation ( $p = 0.808$ ) between parenting patterns and toothbrushing awareness among mentally disabled children.

Family plays a critical role in fostering independence among children with disabilities, particularly in daily routines such as oral hygiene. Parents serve as the primary source of guidance, discipline, and support, helping their children develop habits that promote autonomy (Rahmatika and Apsari, 2020). Parental

involvement is thus not only essential for oral health but also for broader developmental outcomes.

## CONCLUSION

Dental health mouth in children mentally retarded people greatly influenced by the people around them child especially family. Family a role help child in guard health teeth and mouth Because inability child mentally disabled in a way physique and also cognitive for do matter That in a way independent.

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