ORIGINAL ARTICLE

Oral hygiene status of student with special needs at special educational needs and disabilities school: a cross-sectional study

Laelia Dwi Anggraini[1]*
Valendriyani Ningrum[2]
Nomundari Batsukh[3]

[1]Department of Pediatric Dentistry, Universitas Muhammadiyah Yogyakarta, Indonesia
[2]Department of Preventive and Public Health Dentistry, Universitas Baiturrahmah, Padang, Indonesia
[3]Fuji Dental Clinic, Ulaanbaatar, Mongolia

* Correspondence:
laelia.dwi@umy.ac.id

Received: 15 Februari 2025
Revised: 20 June 2025
Accepted: 26 July 2025
Published: 31 July 2025
DOI: 10.24198/pjd.vol37no2.64587

p-ISSN 1979-0201
e-ISSN 2549-6212

Citation:
Anggraini, LD. Ningrum, V. Batsukh, N. Oral hygiene status of student with special needs at special educational needs and disabilities school: a cross-sectional study. Padj J Dent, July. 2025; 37(2): 205-211.

ABSTRACT

Introduction: Oral health is an important part of overall body health. Children with disabilities are at risk or have chronic physical, developmental, behavioral, or emotional conditions; therefore, they commonly require some assistance in maintaining their cleanliness, particularly oral hygiene. This study aims to determine oral hygiene status of students with special needs at special educational needs and disabilities school. **Methods**: This was a descriptive study with a cross-sectional design, using total sampling technique. The subjects were 36 students aged 10-28 years from Special Educational Needs and Disabilities (SEND) school. Data were collected using the Oral Hygiene Index Simplified (OHI-S) which are Simplified Debris Index (DI-S) and a Simplified Calculus Index (CI-S) index. **Results**: The students with disabilities at SEND school had an average OHI-S score of 1.6, with DI-S score of 1.7 and CI-S score of 1.5, which falls into the severe category. **Conclusion**: The oral hygiene of students with disabilities is generally in poor condition. It is necessary to enhance promotive and preventive efforts specifically for children at SEND school with disabilities to improve oral health.

KEYWORDS

Oral Hygiene, OHI-S, special care dentistry, cross-sectional

INTRODUCTION

The occurrence of oral health disabilities is a significant concern in Indonesia and globally for individuals living with disabilities. The World Health Organization (WHO) acknowledges that people with disabilities typically experience more severe oral health issues compared to their individuals without disabilities. Studies show that this population faces increased incidences of dental cavities, gum diseases, and a diminished overall quality of oral health-related life (OHRQoL).[1-3] For example, children with intellectual disabilities and other special needs are particularly vulnerable, often exhibiting poor oral hygiene and a higher prevalence of oral health problems.[4-6]

A notable study conducted by Athira and Mathew in 2024 reported that 54.3% of children with intellectual disabilities showed substandard oral hygiene.[7] This finding is consistent with previous research regarding the common oral health difficulties these children face, such as that by Doichinova et al, which highlighted poor oral hygiene habits among children with disabilities. Similarly, another study found that an alarming 93.3% of children diagnosed with autism had

unsatisfactory oral hygiene, emphasizing the severity of oral health concerns in children with disabilities.[8] This pattern is confirmed across investigations, indicating that children with disabilities often lack the necessary abilities, support, or resource to maintain effective oral hygiene, thereby increasing their susceptibility to dental diseases.[9]

Multiple factors contribute to the inadequate oral hygiene seen in individuals with disabilities. One major factor is the difficulty in maintaining oral care due to physical and cognitive impairments. Studies reveal that children with physical disabilities like cerebral palsy, and those facing intellectual challenges such as Down syndrome, tend to have significantly worse oral hygiene than their non-disabled peers.[10] This is consistent with evidence showing a clear link between the severity of disability and oral hygiene quality, indicating that those with more significant impairments face greater difficulty in performing self-care tasks, including oral hygiene maintenance.[9]

The environment surrounding individuals with disabilities affects their oral health outcomes. The knowledge, attitudes, and practices of caregivers regarding oral hygiene can significantly influence the quality of dental care provided. Research has indicated that caregivers may lack sufficient training or resources to adequately manage the oral health needs of individuals with disabilities, potentially leading to inadequate care and oversight.[11] For example, a comprehensive review reported that caregivers' limited capacity to consistently provide oral care is associated with poorer oral health outcomes among children with disabilities.[12] Furthermore, social and economic barriers can impede access to dental care services, thereby exacerbating existing health disparities in this population.[13]

Certain disabilities can heighten these challenges; individuals with developmental disabilities, such as cerebral palsy and Down syndrome, are reported to have significantly increased occurrences of gum disease and oral infections. These issues often stem from ineffective plaque control and insufficient dental care practices.[14,15] Difficulties with manual dexterity, cognitive challenges impacting memory and comprehension, and sensory processing disorders can all impede a person's capacity to effectively maintain their oral health. Additionally, the psychological effects of disabilities, which may include feelings of social isolation and low self-esteem, can discourage individuals from pursuing regular oral health care.[16,17]

Helen Keller SEND (Special Educational Needs and Disabilities) school, located in Yogyakarta, Indonesia, is a special school dedicated to providing education for children with disabilities, including visual impairments, hearing impairments, and intellectual disabilities. Therefore, it is important to conduct oral hygiene examinations among students as an initial step in efforts to improve dental and oral health. This special school has not previously undergone any oral health examinations. This study aims to determine oral hygiene status of students with special needs at SEND school.

METHODS

The present study employed a cross-sectional design using total sampling technique and is descriptive in nature. This study was conducted in February 2024 at Helen Keller SEND school, Yogyakarta, Indonesia. The study involved a sample of 36 individuals, including 9 males and 27 females, ranging in age from 10 to 28. The population under study comprised 9 male and 27 female members, including Helen Keller SEND school's students with special needs, ranging in age from 10 to 28. Individuals with special needs typically exhibit three characteristics: they are intellectual, physical, or hearing impairments based on secondary data from the SEND school.

The inclusion criteria were children with disabilities at Helen Keller SEND school who were able to follow the operator's instructions, while the exclusion

criteria were children who were uncooperative. To identify research participants, the complete sampling method was employed. The research instruments included a diagnostic set (mouth mirror, sonde, dental tweezers), a disclosing solution, and an OHI-S examination form. Developed by Greene & Vermillion (1964), OHI-S is a widely used tool for assessing oral hygiene status based on debris (plaque) and calculus accumulation.

The OHI-S has been identified as a pragmatic initial approach for the evaluation of oral hygiene in individuals with disabilities. This method is straightforward and well-suited for expeditious screening within the context of school-wide oral health assessments. In comparison to comprehensive oral health indices, the OHI-S is regarded as a more accessible instructional modality.

Primary data were collected through fieldwork, direct clinical evaluation of the oral cavity, and physical assessment, which served as the basis for the data collection. This study anticipates selection bias, as only accessible participants were included and measurement bias was minimized examiner calibration (kappa>0.8 for inter-rater reliability). Univariate analysis was conducted using Microsoft Excel by organizing the dataset with variables in columns and cases in rows, followed by generating frequency distributions and percentages by assigning variables to both row and value fields.

RESULTS

The research subjects were 36 students, categorized based on gender characteristics. The absence of missing data can be attributed to the efforts of trained researchers, who ensured the completeness of clinical examinations and adapted examination techniques for students with severe disabilities. The implementation of alternative methods, such as partial-mouth exams, may have helped prevent the occurrence of missing entries. The number of female subjects was greater than that of the male subjects (Table 1).

Table 1. Characteristics of research subjects based by gender, age, and types of special needs

Age (year)	n	%	Male	Female	Deaf	Physical disabilities	Intellectual disabilities
0-10	19	52.77	1	18	5	8	6
13-15	8	22.22	3	5	2	3	3
16-18	4	11.11	2	2	2	1	1
19-21	3	8.33	2	1	2	1	0
>21	2	5.6	1	1	1	0	1
Total	36	100	9 (25%)	27 (75%)	12 (33.33%)	8 (22.22%)	16 (44.5%)

According to table 1, most of the participants were students aged 10-12 years (19 students), and the fewest were over >21 years old (2 students). The table presents the characteristics of research subjects based on the number of students with special needs at Helen Keller SEND school. The majority of students had intellectual disabilities (44.5%).

Table 2. Distribution of oral hygiene status among children with special needs at Helen Keller SEND school.

OHI-S	n	%	Score OHI-S
Good	0	0	0
Moderate	13	36.11	1.5
Poor	23	63.89	1.7
Total	36	100	1.6

As shown in table 2, dental and oral hygiene status was categorized as good, moderate or poor according to the OHI-S criteria. The OHI-S is scored based on debris (DI-S) and calculus (CI-S) accumulation, with a total score range of 0–6. The standard cut-off boundaries to classify oral hygiene status are: 0-1.2 (good), 1-3-3 (moderate), >3 (poor). Most students had moderate oral hygiene scores, with some classified in the poor category. The dental and oral hygiene status of all research subjects was calculated based on the OHI-S score by adding up the DI-S and CI-S scores, which had a poor score.

Table 3. Characteristics of research subjects based on special needs.

Types of special needs	OHI-S							
	Good		Moderate		Poor		Total	
	n	%	n	%	n	%	n	%
Deaf	0	0	7	58.3	5	41.7	12	33.33
Physical disabilities	0	0	3	37.5	5	62.5	8	22.22
Intellectual disabilities	0	0	3	18.7	13	81.3	16	44.44
Total							36	100

As shown in Table 3, poor oral hygiene was most prevalent among students with intellectual disabilities (81.3%), followed by those with physical disabilities (62.5%) and hearing impairments (41.7%). The following figures illustrate the oral health assessment of children at Helen Keller SEND school (Figure 1 and Figure 2). A tailored behavioral approach was required to gain the cooperation of some children during clinical examination.

Figure 1. With teachers at Helen Keller SEND school.

Figure 2. A behavioral approach used during oral examination of children with special needs at Hellen Keller SEND school.

DISCUSSION

Of the 36 students, 13 (36.11%) had moderate levels of oral hygiene, whereas 23 (63.89%) had poor oral hygiene, according to the research data (Table 2). Inadequate and ineffective tooth-cleaning techniques are potential causes of poor dental and oral hygiene. With an OHI-S score of 1.6, oral hygiene is generally considered to be moderate overall. The results of this study are in line with research conducted in Brazil, which indicated that 64.1% of children with intellectual disabilities demonstrated poor oral hygiene practices and 54.3% of children had similarly poor oral hygiene, underscoring systemic issues present in these populations.[7,12]

Additionally, a cross-sectional analysis performed on children with disabilities in Karachi showed that 31.8% of participants exhibited inadequate oral hygiene.[18] Studies indicate that numerous deaf children display significantly elevated amounts of plaque and gingivitis in comparison to children who can hear, with research revealing that around 31.8% of deaf youngsters possess poor oral hygiene practices.[19] These findings are consistent with existing literature highlighting the higher prevalence of gum disease and oral hygiene problems in disabled communities.

The challenges faced in maintaining oral hygiene among individuals with disabilities, particularly those with intellectual disabilities, stem from multiple contributing factors. Their physical limitations may prevent them from achieving effective oral care, resulting in serious consequences for their oral health, such as a heightened likelihood of gum disease and tooth decay.[20]

In addition, impairments in sensory perception and cognitive function frequently make it more challenging to adhere to appropriate oral care practices. Research suggests that people with intellectual disabilities tend to have higher plaque levels and experience more severe gum diseases compared to those without disabilities. The inability to maintain effective oral hygiene can be attributed to both physical restrictions and cognitive barriers, which result in serious impacts on their oral health.

Table 3 showed significantly higher rates of poor oral hygiene among students with intellectual disabilities (81.3%) compared to those with physical disabilities (62.5%) and hearing impairments (41.7%), reflecting the varying challenges each group faces. The highest prevalence among students with intellectual disabilities likely stems from cognitive limitations impairing their ability to understand and perform oral care.

Furthermore, the obstacles in communication encountered by people who are deaf can lead to reduced health literacy, which significantly impacts the maintenance of oral hygiene. Insufficient awareness about the significance of oral health may result in a lack of care, which is evident in their elevated plaque scores and gum health. Research has indicated that educational programs, especially those designed for the deaf population that employ visual tools or sign language, have been shown to significantly improve knowledge and behaviors related to oral hygiene in these individuals.

The role of caregiver support and education is critically important in shaping the oral health outcomes of individuals with disabilities. Research has shown that initiatives aimed at instructing caregivers on effective oral care techniques can lead to substantial improvements in metrics like the Gingival Index and the Simplified Oral Hygiene Index. These findings suggest that proactive caregiver involvement can foster better oral hygiene routines, which in turn enhances the overall oral health of individuals with disabilities. Caregivers who are properly trained play an essential role in addressing the unique needs of this population, a factor that health policies should emphasize to reduce the oral health disparities they experienced.[21]

Moreover, the connection between oral health and quality of life is particularly significant among individuals with disabilities. The state of one's oral

health can greatly influence their self-esteem, social interaction, and general well-being. Research further highlights the importance of customized oral health educational initiatives tailored to individuals with intellectual disabilities and their caregivers to improve awareness and promote effective oral hygiene practices.

This study represents the first documented oral health assessment conducted at hellen keller SEND school, highlighting the importance of ensuring comfort during oral examinations for children with disabilities. Consequently, the findings of this study are not generalizable. One of the limitations of the study was the presence of behavioral and communication challenges, which precluded the execution of further examinations.

To strengthen dental and oral health promotion and prevention initiatives, future research on the state of oral hygiene and oral health among students with special needs might be conducted across various settings. In order to preserve dental and oral health for students with special needs, routine checkups every six months should be encouraged, involving collaboration among parents, educators, and dentists. Special education and counseling programs should be provided to students with disabilities to emphasize the importance of maintaining good oral hygiene.

However, the research has several limitations, including a small sample size due to the specialized student population, variability in the types of disabilities (e.g., autism, cerebral palsy) complicates the ability to draw generalized conclusions, potential resistance from students during oral assessments, and reliance on caregiver-reported data, which may introduce recall bias.

Additionally, the cross-sectional design limits the ability to establish causal relationships. Despite these limitations, the findings will contribute valuable insights into oral health disparities among students with disabilities and support the development of targeted interventions for improving dental care in special needs settings.

CONCLUSION

The OHI-S score of 1.6 indicates that the average dental and oral hygiene level falls into the poor category. This study's implications extend beyond academia, potentially influencing school-based practices, healthcare policies, and public awareness regarding oral hygiene among students with disabilities. Future research may build upon these findings by evaluating the effectiveness of targeted intervention or by examining the cultural and socioeconomic factors that influence oral health in this population.

Acknowledgement: We would like to thank the professionals who helped with the research
Author Contributions: Conceptualization, LDA & NB; methodology, VN; writing original draft preparation,LDA; writing review and editing, VN & NB. All authors have read and agreed to the published version of the manuscript.
Funding: No external entity provided funding for this research.
Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board from Faculty of Medicine, Universitas Muhammadiyah Yogyakarta.
Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.
Data Availability Statement: Data is unavailable due to privacy or ethical re-strictions, a statement is still required.
Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

1. Zhou N, Wong HM, Wen YF, McGrath C. Oral health status of children and adolescents with intellectual disabilities: a systematic review and meta-analysis. Dev Med Child Neurol. 2017;59(10):1019-26. https://doi.org/10.1111/dmcn.13486
2. Teshome A, Girma B, Adane A, Muche A, Ayele TA, Getahun KA, et al. Oral health-related quality of life and oral hygiene status among special need school students in amhara region, Ethiopia. HQLO. 2023;21(1). https://doi.org/10.1186/s12955-023-02110-4

3. Asiri FYI, Tennant M, Kruger E. Disabilities and disparities in oral health-related quality of life: a systematic review and meta-analysis in saudi arabia. Medicina. 2024;60(12):2005. https://doi.org/10.3390/medicina60122005
4. Njoroge N, Magan A, Hlongwa P. Oral health in children and adolescents with special healthcare needs in south africa: a narrative review. S Afr Dent J. 2024;79(02):102-8. https://doi.org/10.17159/sadj.v79i02.17137
5. Ningrum V, Bakar A, Shieh TM, Shih Y-H. The oral health inequities between special needs children and normal children in asia: a systematic review and meta-analysis. Healthcare. 2021;9(4):410. https://doi.org/10.3390/healthcare9040410
6. Dewi RK, Hakim AQ, Oktiani BW, Nabila N. The effectiveness of video oral health education special needs children on the oral hygiene status. Dentino J Kedokteran Gigi. 2022;7(2):198. http://dx.doi.org/10.20527/dentino.v7i2.14630
7. Athira R, Mathew M. Effectiveness of audio visual modelling on oral hygiene practices and oral health among children with intellectual disability. IJRPN. 2024;6(1):98-101. https://doi.org/10.33545/26641291.2024.v6.i1b.158
8. Doichinova L, Gateva N, Hristov K. Oral Hygiene Education of special needs children. part 1: children with autism spectrum disorder. Biotechnol. Biotechnol. Equip. 2019;33(1):748-55. https://doi.org/10.1080/13102818.2019.1615846
9. Suresh S, Indiran MA, Doraikannan S, Prabakar J, Balakrishnan S. Assessment of oral health status among intellectually and physically disabled population in chennai. J Family Med Prim Care. 2022;11(2):526-30. https://doi.org/10.4103/jfmpc.jfmpc_1038_21
10. Wilson NJ, Lin Z, Villarosa AR, Lewis P, Philip P, Sumar B, George A. Countering the poor oral health of people with intellectual and developmental disability: a scoping literature review. BMC Public Health. 2019;19(1). https://doi.org/10.1186/s12889-019-7863-1
11. Azfar M, Quershi S, Ahmed O, Abid K. Comparison of oral health status among normal and disabled children of karachi, pakistan. TPMJ. 2019;26(11):2009-14. https://doi.org/10.29309/TPMJ/2019.26.11.4230
12. Mustafa M, Asiri FYI, Alghannam S, AlQarni IAM, Alateeg MA, Anil S. Extent of awareness regarding oral health and dental treatment needs among individuals with hearing and speech impairments in saudi arabia. JISPCD. 2018;8(1):70. https://doi.org/10.4103/jispcd.JISPCD_194_17
13. Bhadauria US, Purohit B, Agarwal D, Priya H, Upadhyay AD. Oral hygiene status in individuals with hearing difficulties: a systematic review and meta-analysis. Spec Care Dentist. 2023;44(1):75-88. https://doi.org/10.1111/scd.12845
14. Lee JY, Lim K-C, Kim S, Paik H-R, Kim YJ, Jin BH. Oral health status of the disabled compared with that of the non-disabled in korea: a propensity score matching analysis. PLoS One. 2019;14(1):e0208246. https://doi.org/10.1371/journal.pone.0208246
15. Sermsuti-anuwat N, Pongpanich S. Factors associated with periodontal diseases and oral hygiene status among community-dwelling adults with physical disabilities in thailand: a cross-sectional study. Glob J Health Sci. 2019;11(9):52. https://doi.org/10.5539/gjhs.v11n9p52
16. Sabilah DD, Sukarsih S, Fitria KT. Effectiveness of animated video media in enhancing dental health knowledge among children with intellectual disabilities: a quasi-experimental study. ICoHPJ. 2023;2:60-3. https://doi.org/10.35910/icohpj.v2i0.704
17. Sermsuti-anuwat N, Pongpanich S. Perspectives and experiences of thai adults using wheelchairs regarding barriers of access to dental services: a mixed methods study. Patient Preference and Adherence. 2018;12:1461-9. https://doi.org/10.2147/PPA.S174071
18. Alkhabuli J, Essa EZ, Al-Zuhair AM, Jaber AA. Oral health status and treatment needs for children with special needs: a cross-sectional study. Pesquisa Brasileira Em Odontopediatria E Clínica Integrada. 2019;19(1):1-10. https://doi.org/10.4034/PBOCI.2019.191.127
19. Soesilaningtyas, Widati S, Nurmala I. The effectiveness of the story book with picture on oral health knowledge of deaf students. IJPHCS. 2018;5(6). https://doi.org/10.32827/ijphcs.5.6.138
20. Santos MUC, Aluísio Eustáquio de Freitas Miranda F, Molena KF, Léa Assed Bezerra da S, Stuani MBS, Queiroz AMd. The impact of caregiver training on the oral health of people with disabilities: a systematic review. Spec Care Dentist. 2024;45(1).https://doi.org/10.1111/scd.13072
21. Abullais SS, Al-Shahrani FMF, Al-Gafel KMS, Saeed A-HA, Al-Mathami SA, Bhavikatti SK, Khan AA. The Knowledge, attitude and practices of the caregivers about oral health care, at centers for intellectually disabled, in southern region of saudi arabia. Healthcare. 2020;8(4):416. https://doi.org/10.3390/healthcare8040416