Detection of Dental and Oral Diseases Using the Oral Hygiene Index-Simplefied (OHI-S) to Enhance Public Health

by Perpustakaan IIK Bhakti Wiyata

Detection of Dental and Oral Diseases Using the Oral Hygiene Index-Simplefied (OHI-S) to Enhance Public Health

Nyka Dwi Febria[1*], *Afryla* Femilian[2], *Dian Yosi* Arinawati[3], *Multia* Ranum Sari[4], *Nurul* Azizah[5]

[1] Medical Education Department, Faculty of Dentistry, 55183 Universitas Muhammadiyah Yogyakarta, Indonesia

[2] Oral Desease Department, Faculty of Dentistry, 55183 Universitas Muhammadiyah Yogyakarta, Indonesia

[3] Oral Biology Department, Faculty of Dentistry, 55183 Universitas Muhammadiyah Yogyakarta, Indonesia

[4] Medical Education Department, Faculty of Dentistry, Institute Ilmu Kesehatan Bhakti Wiyata Kediri, Indonesia

[5] Faculty of Dentistry, 55183 Universitas Muhammadiyah Yogyakarta, Indonesia

Abstract. The dental community widely recognizes that the buildup of dental plaque on teeth can lead to gingivitis, which may advance to chronic periodontitis in some instances. It is imperative to address plaque accumulation early through early detection and prevention of dental and oral issues. Regrettably, routine dental check-ups and good dental hygiene are frequently neglected by the general populace. The main purpose of the examination is to increase public awareness of the importance of dental health, provide the knowledge and skills necessary to maintain dental health, and facilitate access to high-quality dental care. Dental and oral hygiene examination was conducted on 18 people using the OHI-S (Oral Hygiene Index-Simplified) method, which revealed that a large number of them had OHI-S scores in the moderate range, indicating the need for the community to prioritize the promotion, prevention, and rehabilitation of dental health. The follow-up actions taken were to provide dental health education and referrals for dental care.

1 Introduction

Scientific research in the medical field consistently demonstrates that overall health begins with oral health. Nowadays, maintaining good oral health is not only essential for dental well-being but also significantly contributes to overall bodily health (1). Periodontal disease has a notable impact on overall health and is closely linked to diabetes and other systemic conditions. Additionally, periodontitis may serve as an early indicator of diabetic pathology (2). The dental community widely acknowledges that the accumulation of dental plaque on teeth can result in gingivitis, which may progress to chronic periodontitis in certain cases (3)(4). Therefore, taking steps to prevent and treat gingivitis also plays a crucial role in

* Corresponding author: nyka@umy.ac.id

preventing the onset of periodontitis (5). Extensive evidence supports the effectiveness of a range of mechanical and chemical methods plaque control in preventing gingivitis (6). When cleaning is conducted thoroughly and at appropriate time intervals, toothbrushing and interdental mechanical cleansing procedures can effectively manage plaque (6).

The management of plaque is essential from an early age through the early detection and prevention of dental and oral problems. This practice is crucial for maintaining optimal dental health throughout one's lifetime. Regular dental examinations, typically scheduled every six months, facilitate the early detection of indicators of dental and oral disease (7). The promotion of dental hygiene through public education and awareness is crucial for prevention (8). Health promotion and dental health checks play a crucial role in the prevention of systemic disease. Dental health checks involve assessing the cleanliness of the teeth and mouth. Utilizing the OHI-S method for dental hygiene examinations is a viable option for community-based assessments (9). The Debris Index (DI) and Calculus Index (CI) scores are added together to get the OHI-S score. The presence of calculus and debris on the six tooth surfaces is indicated by the DI and CI scores. Each person's OHI-S score is calculated by adding together their DI and CI values, then dividing that amount by six, which is the number of tooth surfaces that were looked at (10).

Regular dental check-ups and maintaining good dental hygiene are frequently disregarded by society, particularly in areas with limited access to healthcare services. Consequently, community service initiatives that emphasize dental hygiene education and the provision of dental health services play a vital role in promoting oral health. The primary objective of community service in dental and oral hygiene is to enhance public awareness regarding the significance of dental health, impart the necessary knowledge and skills required to uphold dental hygiene, and facilitate access to high-quality dental care. As a result, community service programs are designed to address not only the treatment of existing issues but also to emphasize sustainable preventive measures.

2 Methodology

The primary objective of this community service initiative is to proactively identify early signs of dental health issues through comprehensive dental hygiene assessments. By meticulously evaluating plaque and tartar levels, as well as the general condition of the teeth and gums, dental health professionals can effectively recognize potential dental problems warranting further attention. The community service takes place in elementary schol Klanggon, Argosari, Sedayu, Bantul, Daerah Istimewa Yogyakarta. The community service conducted examinations on 18 people with the goal of raising public awareness and improving dental health. The inclusion criteria for subjects were men or women aged over 17 years and willing to take part in the examination. Exclusion criteria include people who do not complete the examination. OHI-s detection was used during the examinations to identify any dental and oral issues and take necessary curative actions.

The participants were evaluated by the Simplified Oral Hygiene Index (OHI-S) according to the criteria of Greene & Vermillion (11). The examination was carried out by three dentists and assisted by students as recorders of the examination results. The examination is carried out in the UKS (Usaha Kesehatan Sekolah) room. The OHI-S examination uses diagnostic tools to help dentists determine scores. Three dental professionals conducted the examination, and a consensus was reached prior to this.OHI-S examination includes examination for debris and calculus. The debris score was determined by evaluating the presence of debris using the OHI-S method. A score of 0 was assigned when no debris or stains were detected. A score of 1 was assigned if soft debris or extrinsic stains covered one-third of a tooth surface. A score of 2 was assigned if soft debris covered

more than one-third but less than two-thirds of a tooth surface, and a score of 3 was assigned if soft debris covered more than two-thirds of a tooth surface.

In order to score OHI-S levels, kindly follow these instructions: Score 0 is assigned to cases in which supragingival calculus covers less than one-third of the tooth surface; score 1 is assigned to cases in which supragingival calculus or specific subgingival calculus spots cover between one-third and two-thirds of the tooth surface; score 2 is assigned to cases in which supragingival calculus covers more than two-thirds of the tooth surface; a score 3 was assigned in cases in which supragingival calculus was discovered to cover more than two-thirds of the tooth surface..

The OHI-S Score levels are categorized as follows:

Good	: 0-1.2
Moderate	: 1.3-3.0
Poor	: 3.1-6.0

The Ethical Clearent application was made for this activity with No. 177/EC-KEPK FKIK UMY/V/2024. Data collection was carried out using the OHI-S assessment, and then data processing was carried out based on good, moderate, and poor criteria. The data is analyzed descriptively and displayed in the form of tables and diagrams.

3 Results and Discussion

The respondents have been categorized by age in Table 1 for easy reference and analysis.

Table 1. Frequency distribution of respondents according to age

Age (years)	Amount	percentage
20-30	3	16,67%
31-40	9	50%
41-50	4	22,22%
51-60	2	11,11%
Total	18	100%

The data explains that the largest number of subjects were aged 31–40 years, for a total of 9 people.
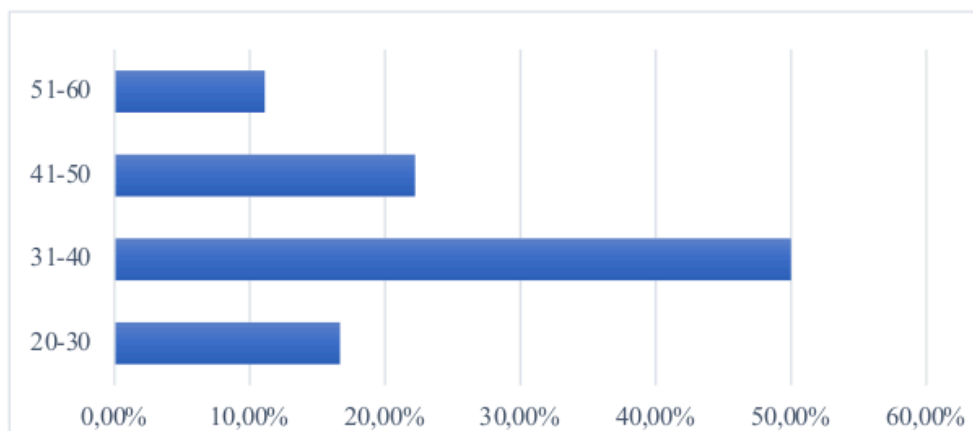

Fig. 1. Frequency distribution of respondent according to age

Table 2. Frequency distribution of respondents according to gender

Gender	Amount	percentage
Male	0	0%
Female	18	100%

The data reveals that all participants in the activity were women (100%).
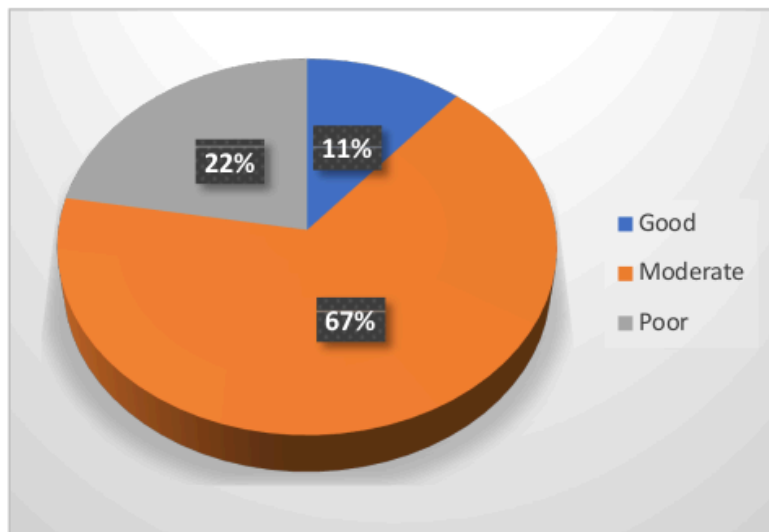
Table 3. Blood pressure data

Blood pressure	Amount	percentage
Hypotensi	1	0.06%
Normal	10	0.55 %
Hypertensi 1	6	0,33%
Hypertensi 2	1	0,06%

The data shows that 7 people experienced hypertension.

Table 4. OHI-S

OHI-S			
Good	Moderate	Poor	Total
2	12	4	18
11,11%	66,67%	22,22%	100%

The data shows that OHI-S is moderate numbering 12 people.

Fig. 2. OHI-S diagram

Table 5. Descriptive test based on percentage of data

			Respondent's Age				
			20-30	31-40	41-50	51-60	Total
OHI-S	Good	Count	1	1	0	0	2
		% within OHI-S	50,0%	50,0%	0,0%	0,0%	100,0%
		% of Total	5,6%	5,6%	0,0%	0,0%	11,1%
	Moderate	Count	3	6	2	1	12
		% within OHI-S	25,0%	50,0%	16,7%	8,3%	100%
		% of Total	16,7%	33.3%	11,1%	5,6%	66,7%
	Poor	Count	0	1	2	1	4
		% within OHI-S	0,0%	25,0%	50,0%	25,0%	100%
		% of Total	0,0%	5,6%	11,1%	5,6%	22,2%
	Total	Count	4	8	4	2	18
		% within OHI-S	22,2%	44.4%	22,2%	11,1%	100%
		% of Total	22,2%	44.4%	22,2%	11,1%	100%

The data shows that the most OHI-S is moderate at the age of 31–40 years.

Table 6. Descriptive Statistic

	N	Mean	Std. Deviasi
OHI-S	18	2,11	.58298
Age	18	37.3333	9.21635
Valid N (listwise)	18		

The data shows that the average OHI-S is 2.11 and the average age is 37.33 years.

Table 7. Test of normality

	Shapiro-Wilk		
	Statistic	df	Sig.
OHI-S	.753	18	.000
Age	.875	18	.021

The total amount of data in this study is 18 < 50, so the test used in the normality test is looking at the Shapirowilk test. The results show the significance values are 0.000 < 0.05 and 0.021 < 0.05. The significance values in the normality test are all below 0.05, so the data distribution is not normal. We use the non-parametric Spearman test as the correlation test.

Table 8. Sperman's parametric test

			OHI-S	Age
Spearman's rho	OHI-S	Correlation Coefficient	1.000	.504
		Sig. (2-tailed)		.033

			18	18
		N	18	18
	Age	Correlation Coefficient	.504	1.000
		Sig. (2-tailed)	.033	.
		N	18	18

The results of the Spearman parametric test, with a significance value of 0.033 < 0.05, mean there is a significant relationship between OHI-S and the respondent's age. The direction of the correlation is positive, with a value of 0.504 and moderate correlation strength.

The study findings indicate that a significant number of individuals have OHI-S scores within the medium range, suggesting a need for society to focus on promoting, preventing, and rehabilitating dental health. Furthermore, it was observed that four individuals exhibited poor OHI-S scores, signifying an immediate requirement for tartar cleaning. It is imperative to enhance public education regarding good dental hygiene and effective toothbrushing techniques. Community service programs can play a crucial role in expanding educational efforts and offering practical advice for improving daily dental care habits. The study results revealed that lack of education and public unawareness about dental hygiene examinations are key factors contributing to high OHI-S scores within the medium range.

The results show that there is a relationship between OHI-S and a person's age. This shows that the older you get, the worse your oral hygiene becomes if you don't take care of cleaning your teeth with scaling. Poor dental hygiene, characterized by the presence of a lot of tartar, is a cause of periodontal disease and systemic disease (12). Dental hygiene is influenced by daily habits. Correct habits can be obtained from sufficient knowledge about dental health. Lack of knowledge can be overcome with health education. Health education programs are provided for various ages (13). Education should start as soon as possible to achieve better results (14)(15). Lack of health education is one factor that can contribute to low levels of dental hygiene in the population (16). Without adequate understanding of the importance of dental hygiene and correct techniques for caring for teeth, people may not realize the negative impact that plaque and tartar can have on their oral health.

The results of explaining data related to blood pressure found that there are systemic factors in the form of hypertension 1 and hypertension 2. Participants have high blood pressure, so education is carried out in the form of counseling. Community service initiatives that incorporate counseling (17) and referrals for curative action are integral to enhancing community dental health. Through outreach sessions, the public is equipped with comprehensive and easily understandable information regarding the significance of dental hygiene, correct brushing techniques, the use of dental floss, and the role of a healthy diet in preventing dental health issues. This counseling also encompasses discussions on the signs and symptoms of dental health problems that necessitate further treatment. During educational sessions, participants are provided with details about available dental health services within their communities and referrals for curative treatment if dental health problems requiring additional attention, such as teeth cleaning, are identified.

4 Conclusions

The results of the OHI-S examination found that the majority of participants had a moderate oral hygiene index. The oral hygiene index can detect dental and oral diseases. This can be used as a preventive reference so that counseling, education, and action can be taken as early as possible for health services.

Acknowledgements

References

1. Fiorillo L.Oral health: The first step to well-being. Vol. 55, Medicina (Lithuania). MDPI AG; 2019.
2. Cervino G, Terranova A, Briguglio F, De Stefano R, Famà F, D'Amico C, et al. Diabetes: Oral health related quality of life and oral alterations. Vol. 2019, BioMed Research International. Hindawi Limited; 2019.
3. Sälzer S, Graetz C, Dörfer CE, Slot DE, Van der Weijden FA. Contemporary practices for mechanical oral hygiene to prevent periodontal disease. Vol. 84, Periodontology 2000. Blackwell Munksgaard; 2020. p. 35–44.
4. Kinane DF, Attström R. Advances in the pathogenesis of periodontitis. Group B consensus report of the fifth European Workshop in Periodontology. J Clin Periodontol . 2005;
5. Chapple ILC, Van Der Weijden F, Doerfer C, Herrera D, Shapira L, Polak D, et al. Primary prevention of periodontitis: Managing gingivitis. Vol. 42, Journal of Clinical Periodontology. Blackwell Munksgaard; 2015. p. S71–6.
6. van der Weijden F, Slot DE. Oral hygiene in the prevention of periodon- tal diseases: the evidence. Periodontol 2000. 2011;55(1):104-123.
7. Vyas T, Bhatt G, Gaur A, Sharma C, Sharma A, Nagi R. Chemical plaque control - A brief review. J Family Med Prim Care. 2021;10(4):1562.
8. Nakre PD, Harikiran AG. Effectiveness of oral health education programs: A systematic review. Vol. 3, Journal of International Society of Preventive and Community Dentistry. Wolters Kluwer (UK) Ltd.; 2013. p. 103–15.
9. Bhatt R, Patel M, Relwani AH, Kiran S. Impact of Dental Health Education on "Specific Learning Needs" Children. Int J Clin Pediatr Dent. 2016 Mar;9(1):31–4.
10. Sosiawan A, Wahjuningrum DA, Setyowati D, Suhartono M, Audrey NW, Mawantari TP, et al. The relationship between parents' oral hygiene knowledge and children with Down Syndrome's oral hygiene via OHI-S. F1000Res. 2022 Mar 31;11:374.
11. Mashima I, Theodorea CF, Thaweboon B, Thaweboon S, Scannapieco FA, Nakazawa F. Exploring the salivary microbiome of children stratified by the oral hygiene index. PLoS One. 2017 Sep 1;12(9).
12. Li Q, Luo K, Su Z, Huang F, Wu Y, Zhou F, et al. Dental calculus: A repository of bioinformation indicating diseases and human evolution. Vol. 12, Frontiers in Cellular and Infection Microbiology. Frontiers Media S.A.; 2022.
13. Soldo M, Matijević J, Ivanišević AM, Čuković-Bagić I, Marks L, Borić DN, et al. Impact of oral hygiene instructions on plaque index in adolescents. Cent Eur J Public Health. 2020;28(2):103–7.
14. Petrie J, Bunn F, Byrne G. Parenting programmes for preventing tobacco, alcohol or drugs misuse in children <18: A systematic review. Health Educ Res. 2007 Apr;22(2):177–91.
15. Finlayson TL, Siefert K, Ismail AI, Sohn W. Maternal self-efficacy and 1-5-year-old children's brushing habits. Community Dent Oral Epidemiol. 2007 Aug;35(4):272–81.
16. Charzyńska-Gula M, Sygit K, Sygit M, Goździewska M, Dobrowolska B, Gałęziowska E. Problems of health education in rural areas in Poland [Internet]. Vol.

20, Annals of Agricultural and Environmental Medicine. 2013. Available from: www.aaem.pl

17. Bahammam HA, Bahammam SA. Service-learning's impact on dental students' attitude to community service. BMC Med Educ. 2023 Dec 1;23(1).

Detection of Dental and Oral Diseases Using the Oral Hygiene Index-Simplefied (OHI-S) to Enhance Public Health

PRIMARY SOURCES

1	pmc.ncbi.nlm.nih.gov Internet Source	4%
2	Endro Dwi Hatmanto, Fitria Rahmawati. "Unleashing the Potential: Exploring Attitudes and Overcoming Challenges in Implementing Differentiated Instruction in the Philippines' English Language Classrooms", E3S Web of Conferences, 2023 Publication	1%
3	Slamet Riyadi, Annisa Divayu Andriyani, Ahmad Musthafa Masyhur, Cahya Damarjati, Dyah Mutiarin, Yessi Jusman, Shofwatul 'Uyun. "Improving Administrative Efficiency Using Image Processing Technology Through Fingerprint Attendance System", E3S Web of Conferences, 2023 Publication	1%
4	rjoas.com Internet Source	1%
5	Submitted to The Islamic College Student Paper	1%
6	journals.plos.org Internet Source	1%
7	assets-eu.researchsquare.com Internet Source	1%
8	Abu Shawish, GK, and DK Abbas. "Oral Health Status of 15-year-old Qatari Students", Qatar	1%

Medical Journal, 2012.
Publication

9   pt.scribd.com
     Internet Source   1 %

10   www.jidmr.com
     Internet Source   1 %

11   Submitted to Miami-Dade Community College   <1 %
     Student Paper

12   psaspb.upm.edu.my   <1 %
     Internet Source

13   Nyka Dwi Febria, Nabila Hasna Fitria, Multiya   <1 %
     Ranum Sari. "Student stress levels in the
     dentistry professional education environment
     during the Covid-19 pandemic", AIP
     Publishing, 2024
     Publication

14   www.jpda.com.pk   <1 %
     Internet Source

15   Ashkan Salari, Masoumeh Nikkhah, Azita   <1 %
     Alamzadeh. "Comparative evaluation of
     mouthwashes containing propolis and
     chlorhexidine for controlling inflammation
     resulting from plaque accumulation in
     patients with chronic gingivitis", Journal of
     Advanced Periodontology & Implant
     Dentistry, 2023
     Publication

16   Sri Ramdaniati, Susy Hermaningsih, Muryati .   <1 %
     "Comparison Study of Art Therapy and Play
     Therapy in Reducing Anxiety on Pre-School
     Children Who Experience Hospitalization",
     Open Journal of Nursing, 2016
     Publication

17 Yeni Rosilawati, Fitria Rahmawati, Tommi Hidayat. "Engaging Stakeholders through Proper Waste Management System to Achieve a Sustainable Campus: A Case Study at UMY, Indonesia", E3S Web of Conferences, 2023
Publication

<1 %

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		