Dental Therapist Journal
Vol. 6, No. 2, November 2024, pp. 43-49
P-ISSN 2715-3770, E-ISSN 2746-4539
Journal DOI: https://doi.org/10.31965/DTJ
Journal homepage: *https://jurnal.poltekkeskupang.ac.id/index.php/DTJ*

Knowledge about Dental Caries and The DMF-T Index in Adolescents

Etty Yuniarly[a], Quroti Ayun[a,1*], Dewi Erwanti Kumalasari[a], Dwi Eni Purwati[a]

[a] Department of Dental Health, Poltekkes Kemenkes Yogyakarta, Yogyakarta, Indonesia

[1] ayunquroti@yahoo.com*
* Corresponding Author

ARTICLE INFORMATION

Article History:
Received: July 4, 2024
Revised: November 3, 2024
Published: November 30, 2024

Keywords:
Knowledge
Caries
DMF-T
Adolescents

ABSTRACT

Dental caries is one of the most common diseases found in the oral cavity. Based on the 2018 Basic Health Research, 65.5% of 12-year-old children and 67.4% of 15-year-old children experienced caries or cavities, with a national DMF-T index of 7.1. This study aims to determine the level of knowledge about dental caries and the DMF-T index among adolescents. This analytical study used a cross-sectional approach involving 90 randomly selected seventh-grade students. The results showed that 53.3% of respondents had moderate knowledge about dental caries, with an average knowledge score of 8.21. The average DMF-T index was 3.41, with 51.1% of respondents falling into the moderate category. Analysis indicated a tendency for respondents with better knowledge to have a lower DMF-T index. Additionally, 26.7% of respondents with moderate knowledge had a moderate DMF-T index, suggesting a positive relationship between the level of knowledge and oral health status. The term "moderate" reflects a sufficient but not optimal understanding of oral health and a middle-level degree of tooth decay. Further research is recommended to use longitudinal designs to analyze causal relationships, explore the influence of social factors such as family support, and develop school-based educational programs to enhance awareness and prevent caries among adolescents.

INTRODUCTION

Oral and dental health is an integral part of overall body health, as it can influence overall health or other parts of the body. Oral hygiene plays a significant role in the occurrence of dental caries or cavities (Agusta et al., 2015). Dental caries is one of the most common diseases found in the oral cavity. It occurs due to the demineralization of dental surface tissues caused by sugar-containing foods and food debris (Boy & Khairullah, 2019).

According to the 2018 Basic Health Research (RISKESDAS), 65.5% of 12-year-olds and 67.4% of 15-year-olds experience dental cavities. Additionally, 57.6% of the Indonesian population faces oral health issues, with a national DMF-T (Decayed, Missing, and Filled Teeth) index of 7.1 (Kemenkes RI, 2018).

The increasing prevalence of dental and oral problems among adolescents is closely linked to their level of knowledge about oral health. Knowledge about oral health refers to an individual's ability to understand all aspects of oral and dental health. This knowledge indirectly impacts oral health, helping prevent dental problems. Knowledge serves as a form of self-education to achieve optimal oral and dental health (Hasanah et al., 2019).

Adolescence is a transitional phase between childhood and adulthood, marked by psychological, mental, and physical changes. Psychological changes, such as feelings of embarrassment, often arise when dental damage becomes visible due to poor maintenance (Boy & Khairullah, 2019). The risk of oral and dental health problems increases during adolescence, as this phase is characterized by greater freedom in making choices, including decisions about oral hygiene practices (Diananda, 2019).

Research conducted by Diananda (2019) explored adolescent psychological development, including the influence of peer pressure and conformity on behavior, but did not emphasize health behaviors, particularly those related to oral health maintenance. Meanwhile, research by Boy & Khairullah (2019) examined the relationship between dental caries and the quality of life among high school adolescents but found no significant connection and did not explore the role of knowledge about dental caries or include younger adolescents.

This study aims to fill the gap by analyzing the relationship between the level of knowledge about dental caries and the DMF-T index among younger adolescents, specifically seventh-grade students, to provide insights into the contribution of knowledge to caries prevention and improved oral health. The purpose of this research is to describe the knowledge of dental caries and the DMF-T index among adolescents.

METHOD

The type of research conducted is analytical research. This study employs a cross-sectional approach, which examines the relationship between factors and their effects through simultaneous observation or data collection at a single point in time (Notoatmodjo, 2018).

The population in this study consisted of 224 eighth-grade students at MTS N 4 Sleman. Sampling was conducted using random sampling techniques, and the sample size was determined using the Slovin formula as described by Amin et al. (2023) as follows:

$$n = \frac{N}{1+Ne^2} = \frac{224}{1+224\ (0,1)^2} = 69,13$$

Based on the Slovin formula calculation, the minimum required sample size for this study is 69 respondents. However, to account for potential invalid data and enhance the accuracy of the results, the researchers chose to involve 90 respondents. A larger sample helps reduce sampling errors and provides more representative data. Additionally, a larger sample size supports more robust statistical analysis, making this decision appropriate to ensure the reliability of the research data.

The study was conducted at MTS N 4 Sleman. The research variables include knowledge about dental caries and the DMF-T index. The questionnaire on knowledge about dental caries consists of 11 questions, which were tested for validity and reliability, yielding a correlation value above 0.312 and an alpha value of 0.711.

According to Tarigan (2014), the DMF-T index is obtained through dental examinations by summing the scores for D (decay), M (missing), and F (filling). The D score represents teeth with cavities due to caries, the M score represents teeth extracted due to caries, and the F score represents filled teeth that are in good condition. The DMF-T index categories, modified from WHO (2013), are as follows: low (0.0 - 2.6), moderate (2.7 - 4.4), and high (above 4.5). The decay categories, according to Wahyuni et al. (2022), are classified as low (0 - 2), moderate (3 - 5), and high (> 6). These decay categories are a modification of WHO (2013): low (1-2), moderate (3-4), and high (> 4).

Data collection techniques in this study included dental examinations and administering a knowledge questionnaire on dental caries. The data were analyzed using descriptive statistics to describe the frequency distribution, mean, and standard deviation of the variables related to knowledge about dental caries and the DMF-T index. The results are presented in

tables and graphs to provide an overview of adolescents' knowledge about dental caries and their oral health conditions. This study has received ethical clearance from the Health Research Ethics Committee (KEPK) of Poltekkes Kemenkes Yogyakarta No. DP.04.03/e-KEPK.1/160/2024.

RESULTS AND DISCUSSION

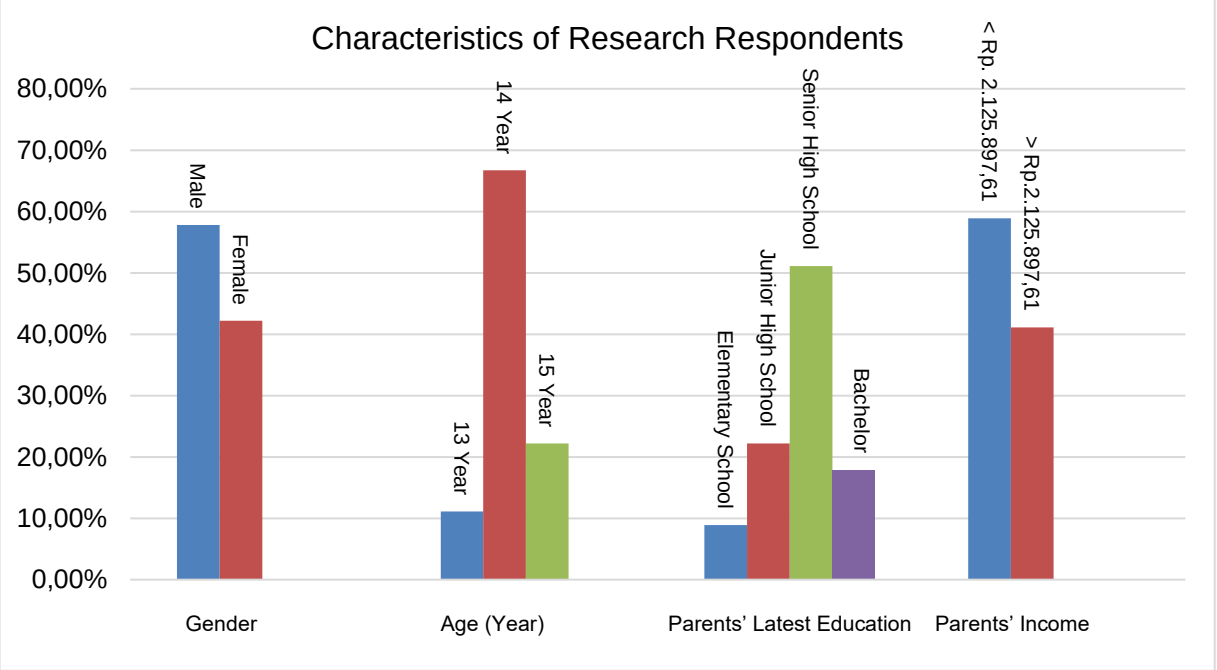

Figure 1. Characteristics of res earch respondents

Based on Figure 1, 52 respondents (57.8%) were male and 60 respondents (66.7%) were 14 years old. The characteristics of the respondents' parents were 46 respondents (51.1%) with the latest high school education and 53 respondents (58.9%) earning < Rp. 2.125.897.61.

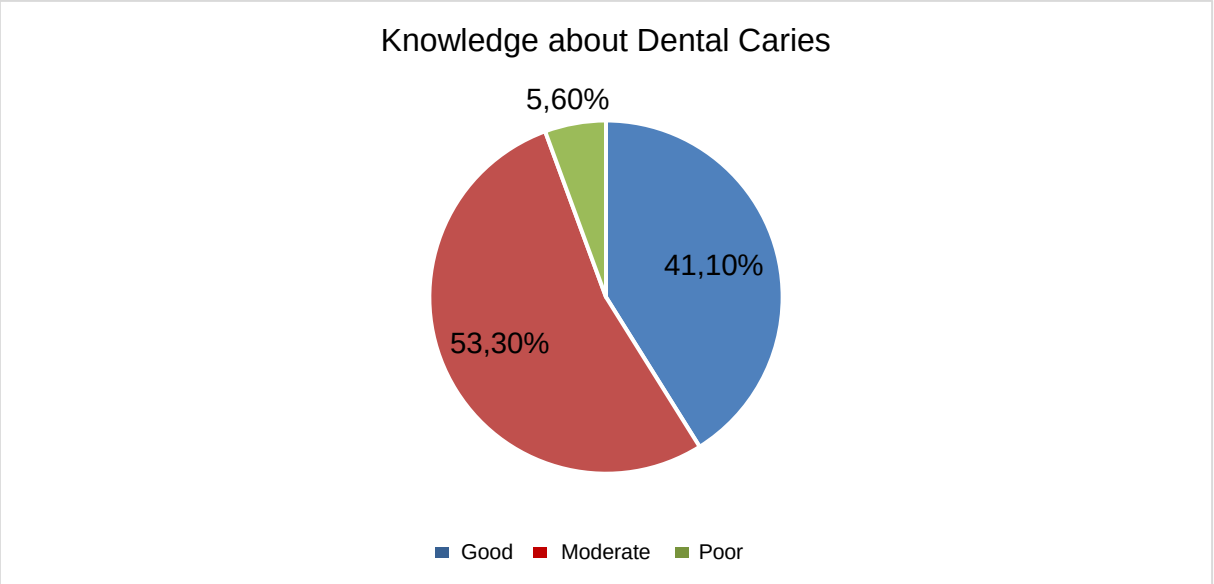

Figure 2. Distribution of respondents based on knowledge about dental caries**.**

Based on Figure 2, it shows that 48 respondents (53.3%) had moderate knowledge about dental caries.

Table 1. Total and DMF-T Index

DMF-T Components	Total
D (*decay)*	300
M (*missing*)	0
F (*filling*)	7
Total DMF-T	307

Based on Table 1, it shows that the number of decays is 300, missing is 0, and filling is 7. The data in Table 1 is obtained from a total of 90 respondents. This is in accordance with the research method described earlier, where the research sample consisted of 90 students. Each component of DMF-T (decay, missing, filling) was calculated based on dental examinations of all respondents. Total DMF-T is the accumulation of the three components.

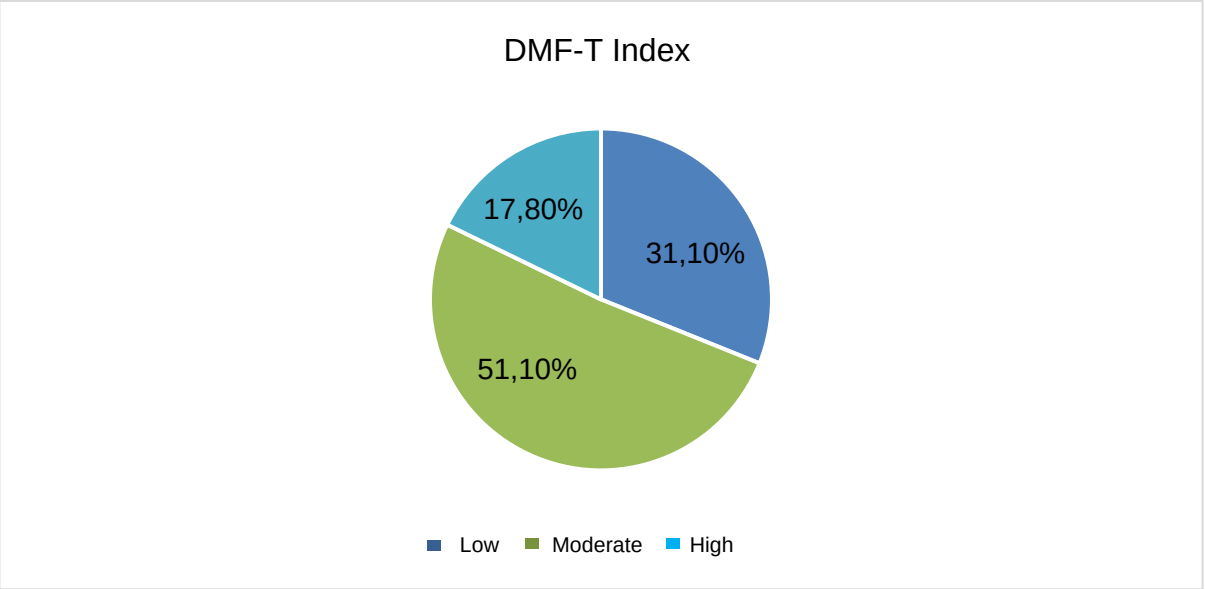

Figure 3. Frequency Distribution of Respondents Based on DMF-T Index

Based on Figure 3, the DMF-T index in the moderate category was observed in 46 respondents (51.1%).

Table 2. Comparison of Mean Values for Knowledge about Dental Caries and DMF-T Indeks

Variable	**Min**	**Max**	**Mean**	**Std. deviation**
Pengetahuan	3	11	8.21	2.025
Indeks	1	10	3.41	1.804
DMF-T				
D (*decay*)	1	10	3.33	1.818
M (*missing*)	0	0	0	0
F (*filling*)	0	1	0.08	0.269

Table 2 shows that the variable for knowledge about dental caries has a mean value of 8.21 with a standard deviation of ±2.025. The DMF-T index variable has a mean value of 3.41 with a standard deviation of ±1.804. The decay component has a mean value of 3.33 with a standard deviation of ±1.818, while the filling component has a mean value of 0.08 with a standard deviation of ±0.269.

Table 2 presents descriptive data comparing the mean, minimum, maximum, and standard deviation values for the variables of knowledge about dental caries and the DMF-T index, including the decay, missing, and filling components. However, this table only provides descriptive analysis and does not include inferential test results, such as p-values.

Table 3. Cross-Tabulation Between Knowledge about Dental Caries and DMF-T Indeks

Knowledge about Dental Caries	DMF-T Index						Total	
	Low		Moderate		High			
	n	%	n	%	n	%	n	%
Good	12	13,3	20	22,2	5	5,6	37	41,1
Moderate	16	17,8	24	26,7	8	8,9	48	53,3
Poor	0	0	2	2,2	3	3,3	5	5,6
Total	28	31,1	46	51,1	16	17,8	90	100

Table 3 shows that respondents with moderate knowledge about dental caries and a DMF-T index in the moderate category totaled 24 respondents (26.7%).

DISCUSSION

Based on the study results, knowledge about dental caries was categorized as moderate in 48 respondents (53.3%). According to Yunita et al. (2017), age influences a person's cognitive ability and thinking patterns. Older individuals generally possess better knowledge for maintaining oral and dental hygiene. However, Dewi et al. (2021) noted that younger adolescents may still demonstrate good oral health knowledge compared to older ones due to varying exposure to dental health education among individuals.

According to Table 2, the average decay falls into the moderate category, indicating that respondents did not adequately address their dental caries. Onlan et al. (2020) attributed this lack of knowledge about dental caries to the underutilization of available healthcare facilities and parental perceptions that dental health is not essential. Dewi et al. (2017) emphasized that behavior plays a critical role in influencing oral health status. A person's behavior and knowledge directly impact oral health, affecting the prevalence of caries. Afiati et al. (2017) further stated that educational level significantly influences knowledge, attitudes, and healthy behaviors. Individuals with higher education levels tend to have better knowledge and behaviors regarding health, positively impacting healthy practices.

The DMF-T index among the 90 eighth-grade students at MTS N 4 Sleman was categorized as moderate for 46 respondents (51.1%). According to Mathur & Dhillon (2018), dental caries is a disease of the hard tissues of teeth caused by microorganisms in the mouth. Putri et al. (2023) noted that dental caries among adolescents has a high potential due to the transitional period of puberty (ages 13–20). This phase is marked by a desire to explore new behaviors and hormonal changes, such as gum swelling, which can compromise oral hygiene. Alrowaili (2021) stated that while all age groups are at risk for dental caries, children and adolescents are at higher risk. Preventive efforts during youth are beneficial for future oral health. Ryzanur et al. (2022) emphasized that even with high knowledge levels, reducing dental caries incidence requires appropriate attitudes and behaviors toward oral health care in daily life. Mbipa et al. (2019) highlighted that untreated dental caries in children could impact general health, growth, quality of life, productivity, and concentration. Pain caused by caries can disrupt overall health, leading to behavioral changes such as a preference for soft, easily chewed foods, potentially resulting in nutritional deficiencies.

Based on Table 3, the majority of respondents had moderate knowledge about dental caries (24 respondents, 26.7%), and their DMF-T index also fell into the moderate category. The study found that respondents with good knowledge of dental caries tended to have a low DMF-T index, while those with poor knowledge tended to have a high DMF-T index. These findings align with a study by Namira et al. (2021), which stated that the higher students' knowledge about maintaining oral and dental health, the lower the incidence of oral and dental damage. According to Putri et al. (2023), dental health knowledge is crucial for preventing caries, as knowledge influences behavior, which, in turn, affects current and future oral health.

This study has several limitations. First, the cross-sectional nature of the data collection does not allow for establishing causal relationships between knowledge and the DMF-T index. Second, the study only involved eighth-grade students from one location, limiting the generalizability of the findings to adolescents in other regions with different social and cultural

characteristics. Third, other factors that may influence oral health, such as dietary habits, home dental care routines, or access to healthcare services, were not explored in detail in this study.

CONCLUSION

This study indicates a relationship between adolescents' knowledge about dental caries and their DMF-T index levels, where adolescents with better knowledge tend to have better oral health. This finding underscores the importance of raising awareness and providing education about oral health as a preventive measure against dental caries in adolescents. Further research is recommended to explore the relationship between dental care behaviors and DMF-T index outcomes in greater depth and to test various educational intervention methods, such as school-based outreach programs, to enhance knowledge and reduce dental caries. Additionally, longitudinal studies could be conducted to observe the long-term impact of knowledge on oral health. Psychological and social aspects, such as family support and daily habits, should also be considered to achieve a more comprehensive understanding of the factors influencing adolescents' oral health.

REFERENCES

Afiati, R., Duarsa, P., Ramadhani, K., & Diana, S. (2017). Hubungan Perilaku Ibu Tentang Pemeliharaan Kesehatan Gigi. *Dentino Jurnal Kedokteran Gigi*, *II*(1), 56–62.

Agusta, M. V., Ismail, A., & Firdausy, M. D. (2015). Hubungan pengetahuan kesehatan gigi dengan kondisi. *Mendali Jurnal*, *2*(1), 64–68. https://doi.org/http://dx.doi.org/10.30659/medali.v2i1.453

Alrowaili, E. F. (2021). Self-reported knowledge about dental caries at young age and variations between dental practitioners in the Ministry of Health in Bahrain. *BDJ Open*, *7*(1), 1–7. https://doi.org/10.1038/s41405-021-00073-6

Amin, N. F., Garancang, S., & Abunawas, K. (2023). Konsep Umum Populasi dan Sampel dalam Penelitian. *Jurnal Pilar*, *14*(1), 15–31.

Boy, H., & Khairullah, A. (2019). Hubungan Karies Gigi Dengan Kualitas Hidup Remaja Sma Di Kota Jambi. *Jurnal Kesehatan Gigi*, *6*(1), 10. https://doi.org/10.31983/jkg.v6i1.3888

Dewi, K. S., Nurjanah, N., Marah Laut, D., & Anggrawati Koesoemah, H. (2021). Gambaran Tingkat Pengetahuan Kesehatan Gigi Dan Mulut Di Rw 15 Perum Baros Kencana Kota Sukabumi. *Jurnal Kesehatan Siliwangi*, *2*(2), 690–695. https://doi.org/10.34011/jks.v2i2.707

Dewi, P. K., Aripin, D., & Suwargiani, A. A. (2017). Indeks DMF-T dan def-t pada anak di Sekolah Dasar Negeri Mekarjaya (SDN) Kecamatan Cimenyan Kabupaten Bandung. *Padjadjaran J Dent Res Student*, *1*(2), 122–126.

Diananda, A. (2019). Psikologi Remaja Dan Permasalahannya. *Journal ISTIGHNA*, *1*(1), 116–133. https://doi.org/10.33853/istighna.v1i1.20

Hasanah, S. N., Ta'adi, & Khasanah, F. (2019). Hubungan antara tingkat pengetahuan karies gigi dengan indeks DMF-T pada siswa kelas V SD Negeri Walitelon Utara Temanggung. *Journal of Oral Health Care*, *7*(1), 40–45. https://doi.org/10.29238/ohc.v7i1.344

Kementerian Kesehatan RI. (2018). *Hasil Riset Kesehatan Dasar Tahun 2018*. Kementrian Kesehatan RI.

Mathur, V. P., & Dhillon, J. K. (2018). Dental Caries: A Disease Which Needs Attention. *Indian Journal of Pediatrics*, *85*(3), 202–206. https://doi.org/10.1007/s12098-017-2381-6

Mbipa, M. M., Pay, M. N., Manu, A. A., & Nubatonis, M. O. (2019). Perbedaan Tingkat Kejadian Karies Gigi (DMF-T) antara Laki-Laki dan Perempuan Usia 12-14 Tahun. *Dental Therapist Journal*, *1*(1), 23–27. https://doi.org/10.31965/dtl.v1i1.355

Namira, H. M., Hatta, I., & Sari, G. D. (2021). Hubungan Pengetahuan, Sikap Dan Tindakan Kesehatan Gigi Dan Mulut Terhadap Tingkat Kerusakan Gigi Pada Siswa Smp. *Dentin*, *5*(1), 47–51. https://doi.org/10.20527/dentin.v5i1.3234

Notoatmodjo, S. (2018). *Metodologi Penelitian Kesehatan*. Jakarta : Rineka Cipta.

Onlan, Y. N. R., Variania, R., Manu, A. A., & Krisyudhanti, E. (2020). Pola Karies Dan Tingkat Pengetahuan Tentang Pencegahan Karies Gigi Pada Murid Sekolah Dasar St. Arnoldus Penfui Kupang. *Dental Therapist Journal*, *2*(1), 1–7.

Putri, Y., Yulia Maritasari, D., & Antoro, B. (2023). Faktor-Faktor Yang Berhubungan Dengan

Kejadian Karies Gigi Pada Remaja di Klinik Gigi Cheese Bandar Lampung Tahun 2022. *Jurnal Kesehatan Gigi (Dental Health Journal)*, *10*(1), 1–10. https://doi.org/10.33992/jkg.v7i1

Ryzanur.A, M. F., Widodo, W., & Adhani, R. (2022). Hubungan Antara Pengetahuan Kesehatan Gigi Dengan Nilai Indeks DMF-T Siswa Sekolah Menengah Pertama. *Dentin*, *6*(1), 1–5. https://doi.org/10.20527/dentin.v6i1.6226

Tarigan, R. (2014). *Karies Gigi*. Jakarta : ECG.

Wahyuni, S., Hanum, N. adiba, & Fransisca, R. (2022). Kejadian Karies Gigi (Def-T) Berdasarkan Sikap Anak dI TK Putra II Sukarami Palembang. *(JKGM) Jurnal Kesehatan Gigi Dan Mulut*, *4*(2), 67–75.

WHO. (2013). Oral Health Surveys Basic Methods Fifth Edition. *World Health Organization*. https://doi.org/10.1007/978-3-642-15352-5_3

Yunita, W. P., Susilarti, & Purwati, D. E. (2017). Gambaran Tingkat Pengetahuan Pemeliharaan Diri Kesehatan Gigi dan Mulut dengan Status OHI-S Pada Remaja Karang Taruna. *Journal of Oral Health Care*, *3*(2), 1–7.