The Relationship of Toothbrushing Knowledge and Gingival Tissue Condition in Class VII and VIII Students of SMP Negeri 1 Payakumbuh Limapuluh Kota District

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KEY WORDS	ABSTRACT
Knowledge, Brushing Teeth, Gingival Tissue Conditions and Gingival Index	A person's low knowledge about health can be a predisposing factor for the emergence of a disease. Knowledge is a cognitive domain that influences a person's health attitudes and behavior, especially actions to prevent and cure disease. The aim of this research was to determine the relationship between toothbrushing knowledge and the condition of gingival tissue in students of cchnique so that the sample was 150 people. The research was carried out by filling out a knowledge questionnaire and examining the gingival index. The data analysis used is univariate and bivariate analysis. The research results showed that students' toothbrushing knowledge had good criteria at 29.3%, adequate criteria at 49.3% and inadequate criteria at 21.3%. The condition of the gingival tissue is healthy criteria 8%, mild inflammation 77.3%, moderate inflammation 13.3% and severe inflammation 1.3%. The Chi-square test results obtained a p-value of 0.027 < 0.05. The conclusion of the research is that there is a significant relationship between knowledge of brushing teeth and the condition of gingival tissue in junior high school students. It is recommended for students to inlass VII and VIII of SMP Negeri 1 Payakumbuh District, Limapuluh Kota Regency. The research method used is quantitative with a cross sectional research design. The population of this research is students of class VII and VIII of SMP Negeri 1 Payakumbuh District. The sampling technique used Proportionate Stratified Random Sampling technique and inclusion criteria tecrease their knowledge about brushing their teeth by looking for more sources of information about dental and oral health, brushing their teeth twice a day in the morning after breakfast and at night before going to bed and regularly checking with dental and oral health services once every 6 months.

1. INTRODUCTION

Dental and oral health has an important role in human life, because the condition of the teeth and mouth can affect overall body health. The good condition of your teeth and mouth doesn't just matterona person's ability to eat and speak comfortably, but also has a broader impactonother body health. To achieve optimal dental and oral health, knowledge about dental and oral health is important to prevent disease(Amaliya, Prasetyo and Sopiatin, 2020).

The most common dental and oral diseases in society are dental caries,gingivitis, periodontitis, tooth loss, cancer of the lips and oral cavity. Even though it is categorized as a non-communicable disease, it has an impactsignificant health, social, economic. Periodontal disease, for example, attacks 90% of people in Indonesia and

is the first problem in the top ten diseases that people complain about.(Notohartojo, 2020). Based on 2018 National Basic Health Research (Riskesdas) data, it shows that 13.9% of the population in Indonesia experienced problems with bleeding gums, while in West Sumatra Province, 17.1% experienced problems with bleeding gums.on Limapuluh Kota Regency alone has a problem of bleeding gums at 21.6%. Based on the characteristics of 12 year olds it is 14.3% and 15 year olds is 17.2%, while in West Sumatra the problem of bleeding gums is 16.6% for 12 year olds and 19.2% for 15 year olds.(Indonesian Ministry of Health, 2018).

Causes of gingival inflammationcaused by plaque which is influenced by a lack of knowledge about good dental and oral health, this occurs due to inappropriate techniques and ways of brushing teeth so that plaqueonteeth and gingival sulcus cannot be completely cleaned(Purwaningsih, Shoumi and Ulfah, 2021). Based on the 2018 Riskesdas, it shows that the population's tooth brushing behavior in Indonesia is 94.7% but only 2.8% brush their teeth correctly. right whileonLimapuluh Kota Regency alone has 93.9% of the population who brush their teeth, but only 0.8% brush their teeth correctly (Ministry of Health of the Republic of Indonesia, 2018).

Previous research on the relationship between the level of toothbrushing knowledge andgingival indexMadrasah Tsanawiyah students in Barito Kuala Regency showed that students had good knowledge of brushing their teeth and scoredgingival indexas many as 31 students (31%), students who had sufficient knowledge of brushing their teeth scoredgingival index0.1-1.0 as many as 29 students (29%) and students who have knowledge of brushing their teeth with a scoregingival index1.1-2.0 as many

as 7 students (7%).PThis research shows that there is a relationship between the level of knowledge of toothbrushing andgingival index (Maida, Widodo and Adhani, 2017).

This research was conducted at SMP Negeri 1 Payakumbuh District, Limapuluh Kota Regency. Based on previous studies conducted on 10 students of SMP Negeri 1, Payakumbuh District, Limapuluh Kota Regency, the highest number of gingival index examination results was obtained, namelyon8 people had mild inflammation and 2 people had moderate inflammation. After conducting interviews, researchers with 10 junior high school students showed that all of the students knew how to brush their teeth twice a day but the timing was not right, namely in the morning before breakfast and at night before bed/bathing in the afternoon. All of the students said that the proper time to brush their teeth was less than 2 minutes and they said that a hard-bristled toothbrush was effective at cleaning food residue. A total of 9 students said that the amount of toothpaste used to brush their teeth was as long as the bristles of the brush and only 1 student knew that the amount of toothpaste used was the size of a pea. All of the students brushed their teeth with inappropriate techniques. All students do not go to the dental and oral health service unit at least once every six months. The aim of this research was to determine the relationship between tooth brushing knowledge and the condition of the gingival tissue of students in grades VII and VIII of SMP Negeri 1 Payakumbuh District, Limapuluh Kota Regency.

2. METHOD

This research is an analytical survey with a cross sectional design. The population of this study were students of class VII and VII of SMP Negeri 1, Payakumbuh District, Limapuluh Kota

Regency. According to Arikunto, for a number of subjects less than 100, it is better if all of them are taken so that this research can be categorized as population research. However, if the number of subjects is large, namely more than 100, it can be taken between 10-15% or 20-50%. The population of this study was 503 people then use a sample size of 30%. So the sample of this research is 150 people. The sampling technique uses Proportionate Stratified Random Sample. Class VII consists of 8 classes and class VIII consists of 9 classes, so 9 people were chosen randomly from each class based on the name list. Data collection was carried out by means of a questionnaire and direct measurement of the gingival index. Data analysis used univariate analysis with descriptive statistics in the form of frequency distribution, bivariate with the Chi-square test.

3. RESULT AND DISCUSSION

The results of research on the frequency distribution of knowledge of tooth brushing and the condition of gingival tissue in students of class VII and VIII of SMP Negeri 1 Payakumbuh District, Limapuluh Kota Regency in 2024 can be seen in table 1.

Table 1.
Frequency Distribution of Knowledge of Toothbrushing and Gingival Tissue Conditions in Class VII and VIII Students of SMP Negeri 1 Payakumbuh District, Limapuluh Kota Regency, 2024

Variable	Category	F	Percentage (%)
Toothbrushing Knowledge	Good	44	29.3
	Not enough	74	49.3
	Enough	32	21.3
Gingival Tissue Conditions	Healthy	12	8
	Mild Inflammation	116	77.3
	Moderate Inflammation	20	13.3
	Severe Inflammation	2	1.3

Table 1 shows that the criteria for toothbrushing knowledge for students in class VII and VIII of SMP Negeri 1 Payakumbuh District is the highest at sufficient knowledge at 49.3%, while the criteria for the least knowledge at insufficient knowledge is 21.3% and the condition of the students' gingival tissue is at most inflammation. mild at 77.3% while the condition of the gingival tissue was least severe at 1.3%.

Table 2
The Relationship between Toothbrushing Knowledge and Gingival Tissue Conditions in Class VII and VIII Students of SMP Negeri 1 Payakumbuh District, Limapuluh Kota Regency, 2024.

Index Gingiva (GI) / Toothbrushing Knowledge	Healthy (0)		Mild Inflammation (0.1-1.0)		Moderate Inflammation (1.1-2.0)		Severe Inflammation (2.1-3.0)		Total		P-Value
	f	%	f	%	f	%	f	%	f	%	
Good	6	13.6	36	81.8	2	4.5	0	0	44	100	0.027
Enough	3	4.1	53	82.4	7	12.2	1	1.4	74	100	
Not enough	3	9.4	27	59.4	11	7.3	1	3.1	32	100	

Table 7 shows that respondents with good knowledge had the most gingival tissue conditions in mild inflammation at 81.8%, sufficient knowledge had the most gingival tissue conditions in mild inflammation at 82.4% and poor knowledge of gingival tissue conditions had the most in mild inflammation at 59. 4%. The p-value < 0.05 showed that there was a significant relationship between knowledge of brushing teeth and the condition of gingival tissue in students in grades VII and VIII of SMP Negeri 1 Payakumbuh District.

The results of research conducted on students in class VII and VIII of SMP Negeri 1 Payakumbuh District, the criteria for the highest knowledge was sufficient knowledge was 49.3%, while the criteria for the least knowledge was insufficient knowledge at 21.3%. The researchers' assumption stated that respondents had received oral health education, but other factors influenced their knowledge, such as lack of family support for good tooth brushing habits.

So that most respondents know the purpose of brushing their teeth, the right time, and maintaining toothbrushes and toothpaste. However, there are still respondents who do not know the frequency and technique of brushing their teeth. Based on the questionnaire question items, it is known that 92% of respondents know the purpose of brushing their teeth, 87% know the right texture of brush bristles for brushing their teeth, 69% know the right time to brush their teeth, 85% know when to change their toothbrush, 87% know how to maintain their brush. teeth, and 62% know the correct toothpaste. However, there were also several questions where the respondent's understanding was not optimal; only 41% of respondents know the frequency of brushing their teeth, 45% know the technique for brushing the back teeth facing the cheeks, and 54% know how to brush the chewing surface.

This research is in accordance with theory. Brushing teeth is done at least twice a day, namely in the morning after breakfast and in the evening before bed. Brushing your teeth in the morning after breakfast aims to clean stuck food residueontooth surface (Irawan, 2020). Brushing your teeth before bed is important because bacterial activity before bed increases 2-fold. The length of time you brush your teeth affects the effectiveness of brushing your teeth in removing plaque and food residue. The time needed to brush your teeth is 2-5 minutes (Putri, Herijulianti and Nurjannah, 2018).

According to the ADA, the recommended toothbrush bristles are soft bristles because they can reach food residue and plaque on the gingival margins (ADA, 2023). Bristles that are blooming and damaged or toothbrushes that are 3 months old will lose their ability to clean teeth properly (Putri, Herijulianti and Nurjannah, 2018). Toothbrushes can become a breeding ground for germs and fungi. After brushing your teeth, clean the toothbrush by rinsing it under running water then store the toothbrush using the toothbrush head cover in a standing position (Ramadhan, 2010).

Good and correct tooth brushing is brushing your teeth in a way that can clean the entire surface of your teeth without injuring the soft tissue in the mouth and is done evenly from one side to the other on a regular basis. The toothbrushing technique is to clean the surfaces of the front and back teeth using an up-down or circular motion, a back-and-forth motion can be used to clean the chewing part and the inside part can be cleaned by moving the brush up and down (Ministry of Health, 2015).

The results of this research are in line with research in 2017 regarding the description of the knowledge level of toothbrushing of class VII students at SMPN 1 Kebonagung Pacitan, showing that the highest criteria for knowledge of toothbrushing was sufficient knowledge at 46.4% (Hapsari et al., 2017). This research is also in line with research in 2021 regarding the description of the toothbrushing knowledge of An-Nawah Islamic Middle School students, Batukerbuy Village, Pasean District, Pamekasan Regency, which shows that the criteria for toothbrushing knowledge is mostly sufficient knowledge at 55.3% (Alif et al., 2021).

The results of the research that has been carried out show that the condition of the students' gingival tissue is the highest with mild inflammation at 77.3%, while the condition of the gingival tissue is the lowest for severe inflammation at 1.3%. The researcher's assumption is that the mild inflammatory condition in the respondents was caused by not maintaining the cleanliness of their teeth and mouth, rarely having their teeth checked by health services, inappropriate methods and

times for brushing their teeth (brushing their teeth in the morning before breakfast and at night before bed) and the students' gingiva not showing plaque. as well as tartar but the gingiva looks slightly reddish and discolored.

This research is in line with the theory that the mouth is an ideal place for the development of bacteria. If it is not cleaned properly, food remains stuck with bacteria will remain attached to the teeth and will increase in number and form colonies called plaque, which is a thin, sticky and colorless film layer (Sariningsih, 2014).Dental plaque cannot be cleaned by gargling or spraying water and can only be cleaned completely by mechanical means. This mechanical method is by brushing your teeth(Putri, Herijulianti and Nurjannah, 2018). The way you brush your teeth greatly influences the level of dental hygiene, because brushing your teeth correctly and regularly can control the formation of dental plaque which is the cause of problems.gingival inflammation(Suwarni et al., 2018)

Gingival inflammationMost often caused by poor oral hygiene, causing the buildup of plaque and calculus in between and on the surface of the teeth. Plaque-forming bacteria create toxins that irritate the gingival tissue. When plaque accumulates around the teeth and gingiva, these bacteria trigger the body's immune response which results in swelling and inflammation of the gingiva (Blackwell, 2015).

Accumulated tartar is the next cause of gum problems after plaque. Tartar is a nest for bacteria, because the surface is hard, bacteria easily and happily breed on the surface of tartar. In addition, the rough surface of tartar easily causes irritation or friction so that the gums bleed easily. Tartar is tightly attached to the surface of the teeth and cannot even be removed just by brushing your teeth but by scaling it at a dental and oral health service center(Amaliya, Prasetyo and Sopiatin, 2020).

Adolescence is a transition period from children to adults, this period is a period that lasts from the age of 10-19 years. During adolescence, periodontal tissue is includedgingivabecomes more sensitive to some irritants, such as plaque, calculus and food debris that collects in the sulcusgingiva (Laksmiastuti, 2023). This occurs due to an imbalance in endocrine hormonesonpuberty. Increased levels of endocrine hormones during puberty cause tissue vasodilationgingivathat causeinflammation (Pitriana and Herwanto, 2019).

The incidence of gingival inflammation reaches its peakonDuring puberty, these changes will still occur even though plaque control remains unchanged. Some plaqueonother age groups cause little inflammationgingiva, while the influence of plaqueonPuberty can cause intense inflammation followed by swellinggingivaand bleeding. Once puberty has passed, inflammation will continue to decrease on its own but cannot disappear completely unless plaque control is carried out properly.(Manson and Eley, 2013).

The results of the research are in line with other research in 2017 regarding the description of the status of dental and oral hygiene and the condition of the gingiva of MTsN Tiku Selatan students, Tanjung Mutiara District, Agam Regency, the condition of the gingival tissue was mostly mild inflammation at 84.4% (Rosmalia and Minarni, 2017). Research in 2019 on the relationship between plaque and gingival status in students at SMP Negeri 1 Agam Regency showed that the condition of the gingival tissue was mostly mild inflammation at 48% (Sriani, 2019).

The research that was carried out showed that respondents with good knowledge had the most gingival tissue conditions in mild inflammation at 81.8%, sufficient knowledge had the most gingival tissue conditions in mild inflammation at 82.4% and poor knowledge of the most gingival tissue conditions in mild inflammation was 82.4%. 59.4%. This means that students with good knowledge tend to have better gingival tissue conditions, with the highest levels of mild inflammation. In contrast, students with less knowledge tended to have worse gingival tissue conditions, although mild inflammation was still the most

common among them.

Based on statistical analysis tests using the Likelihood Ratio test, it shows that there is a significant relationship between knowledge about tooth brushing and the condition of gingival tissue in students in grades VII and VIII of SMP Negeri 1 Payakumbuh District. The statistical test results obtained p value $0.027 < 0.05$. Thus, it can be concluded that there is a significant relationship between knowledge about tooth brushing and the condition of gingival tissue in students in grades VII and VIII of SMP Negeri 1 in Payakumbuh District.

The researcher's assumption states that students have sufficient knowledge about brushing their teeth, including the purpose of brushing their teeth, when to brush their teeth, caring for their toothbrush, and choosing the right toothpaste, but there are still some who do not know the technique of brushing their teeth and the frequency of brushing their teeth in a day. Plaque is the cause of gingival inflammation, and the way to clean plaque is by brushing your teeth.

Other factors can influence the application of toothbrushing knowledge in daily activities. It is possible that although students understand how important it is to brush their teeth regularly and correctly, they may pay less attention to proper brushing techniques, which causes them to neglect proper brushing habits. Sufficient knowledge about dental and oral health, especially about brushing teeth, tends to form correct habits in brushing teeth. A person's level of knowledge about dental and oral health plays a very important role in forming habits and maintaining optimal dental health. Therefore, adequate knowledge about toothbrushing can help in the prevention or control of plaque which is the main cause of gingival inflammation.

This research is in accordance with the theory that knowledge is information that is the basis for doing something because knowledge will enable someone to take different or more effective actions compared to not having knowledge.(Rosdiana et al., 2023). Knowledge is a very important domain for the formation of a person's actions (overt behavior). A behavior can be applied if someone already knows the meaning and benefits of the behavior(Swarjana, 2022)..

The causes of gingival inflammation are divided into two, namely the main cause and secondary causes. The main cause of gingival inflammation is plaque(Manson and Eley, 2013). Dental plaque is a sticky layer (biofilm) consisting of bacteria, proteins from saliva and shed epithelial cells(Kumar and Frcpath, 2019). Dental plaque cannot be cleaned by gargling or spraying water and can only be cleaned completely by mechanical means. This mechanical method is by brushing your teeth(Putri, Herijulianti and Nurjannah, 2018).

Adequate knowledge about good tooth brushing techniques and methods can help a person take more effective actions in maintaining the health of their teeth and mouth, such as brushing their teeth regularly, when to brush their teeth, the tools and materials used to brush their teeth and how to brush their teeth properly. true (Sholiha et al., 2021). The way you brush your teeth has a big influence on the level of dental hygiene, because the right and regular way of brushing your teeth can control the formation of dental plaque which is the cause of the problem.gingival inflammation(Suwarni et.al, 2018)..

This research is supported by researchonin 2017 which stated that there was a significant relationship between toothbrushing knowledge and tissue conditionsgingiva, the better a person's knowledge, the lower the scoregingival index. In this study, it is also stated that individuals who have knowledge of brushing their teeth will avoid gingival inflammation by maintaining healthy teeth and mouth, one of which is by brushing their teeth properly and correctly, so that they get optimal dental and oral health status.(Maida, Widodo and Adhani, 2017)].

4. CONCLUSION

Based on research conducted with students in classes VII and VIII at SMP Negeri 1, Payakumbuh District, Limapuluh Kota Regency in 2024, it has been found that while a majority of students have an adequate understanding of proper tooth brushing practices, the condition of their gingival tissue is predominantly characterized by mild inflammation. A significant relationship was identified between students' knowledge of tooth brushing and the condition of their gingival tissue, as indicated by a statistical test result.

To improve oral health outcomes, it is recommended that students enhance their knowledge about dental hygiene. They should brush their teeth at least twice daily—after breakfast and before bedtime—and use dental floss following brushing. Additionally, regular dental check-ups at an oral health service facility every six months are advised to maintain optimal dental and oral health.

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