

The Relationship Between Tooth Brushing Skills and Dental Caries Among Elementary School Students at SDN 3 Ngasinan Ponorogo in 2024

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ABSTRACT Dental caries is still often experienced by many people, including children. Elementary school age children aged 6-12 years are classified as vulnerable to dental caries. The problem of this research is the high rate of dental caries in students in grades III to V at SDN 3 Ngasinan Ponorogo, where almost all students have dental caries. The aim of the research was to determine the relationship between tooth brushing skills and dental caries in students in grades III to V at SDN 3 Ngasinan Ponorogo. This type of research is analytical research with a cross sectional method, with a sample of 32 students in class III to V at SDN 3 Ngasinan Ponorogo. The data collection instruments used were observation sheets and stopwatches to measure students toothbrushing skills as well as examination sheets to identify dental caries. The analysis technique uses the chi-square test. The results of research on the toothbrushing skills of students in grades III to V at SDN 3 Ngasinan Ponorogo were included in the low-skill category at 68.8%. Dental caries for students in grades III to V at SDN 3 Ngasinan Ponorogo was in the high category at 43.8%. There is a significant relationship between tooth brushing skills and dental caries in students in grades III to V at SDN 3 Ngasinan Ponorogo. Conclusion : The level of tooth brushing skills, both in terms of how to brush teeth and the duration of time for brushing teeth, will influence the level of dental caries in students.

KEYWORDS Tooth brushing skills, Dental caries, Elementary School Students

I. INTRODUCTION

Dental caries is still often experienced by many people, including children. Elementary school age children between the ages of 6-12 years are classified as vulnerable to dental caries because this is the transition period from deciduous teeth to permanent teeth [1]. Tooth change in children generally begins at the age of 6-8 years and the emergence of permanent teeth at the age of 12 years [2].

Basic Health Research in 2018 stated that in the 5-9 year age group the number of children who experienced dental caries was 54.0%. The average dental caries index for the 10-12 year age group is 1.89%. In East Java, the prevalence of dental caries in children is still relatively high, namely 42.4%. 40% of Ponorogo Regency residents experience dental and oral problems, the percentage of dental caries problems is 31.05% [3].

Dental caries is a dental tissue disease characterized by tissue damage, starting from the surface of the tooth, starting from the enamel, dentin and extending to the pulp [4]. This is caused by damage to tooth enamel by acid produced by bacteria in plaque that accumulates on the teeth, especially in the crevices of the tooth surface. Consuming foods that are high in carbohydrates causes these bacteria to produce high levels of acid which can cause the enamel layer or root surface of damaged teeth to demineralize [5].

Factors that cause dental caries in children include a lack of knowledge, awareness and independence of children in maintaining their own dental health, inappropriate brushing methods, cariogenic diets, and also difficulty in accessing dental health services.[6]. In general, children are the age where they really like to consume sweet foods and drinks compared to adults because of the availability of sweet, sticky types of children's snacks in the school environment [7]. This is supported by research which states that children at this age really like sweet and sticky foods but still tend to be lazy and cannot even brush their teeth independently [8].

According to [9] Dental caries in elementary school age children is caused by a lack of knowledge in maintaining oral hygiene. Lack of knowledge can affect children's skills in brushing their teeth. The expected tooth brushing skill is the child's ability to brush their teeth properly and correctly for the right duration independently without the help of others [10].

The impact that dental caries can have is disrupting children's quality of life. The pain caused by dental caries will cause a child's appetite to decrease, difficulty chewing, difficulty sleeping, and even disruption to learning activities. Of course, this inhibits the function and activity of the oral cavity, which can result in less than optimal nutritional intake for the child's growth and development [11].

One of the efforts to overcome dental caries in children is by providing education. Very effective education for elementary school age children is by combining theory with direct practice [12]. Elementary school age children do not understand behavior that can affect oral health, so dental health promotion is prioritized for elementary school age

children [13]. Health promotion is an effort to encourage the maintenance of dental and oral health in children [14].

Teeth brushing skills may influence a child's dental health. Brushing your teeth properly and correctly means brushing all parts of your teeth with the correct technique to avoid damage to your teeth. If you brush your child's teeth incorrectly, it will not be effective in cleaning food debris stuck to the teeth. If you don't get into the habit of brushing your teeth correctly every day, of course it won't affect your attitude and skills in the future. This will become a bad habit every day which can trigger the beginning of tooth decay and the oral cavity will have an acidic pH. Knowledge alone is not enough to ensure that children have good behavior in brushing their teeth [15].

According to WHO, the dental caries index is a number that shows the number of cavities in a person or group of people. The DMF-T measuring instrument is usually used to measure the dental caries index in permanent teeth. The caries index categories are 0.0 - 1.1 = Very low, score 1.2 - 2.6 = Low, score 2.7 - 4.4 = Medium, score 4.5 - 6.5 = High, and score >6.6 = Very high [16].

The results of the initial survey conducted by researchers on August 5 2023 at SDN 3 Ngasinan, Ponorogo Regency, showed that 10 random students from classes III to V experienced dental caries with an average DMF-T score of 4.8 so they were included in high category.

Based on data, SDN 3 Ngasinan is a school supported by the Jetis District Health Center. In implementing school health services in the form of the UKGS program, SDN 3 Ngasinan is in UKGS stage II where health facilities, dental and oral health education are still limited, and there is no training for teachers regarding dental and oral health. However, knowledge from an early age is important to instill good tooth brushing behavior. Based on the description above, the problem is the high level of dental caries in students in grades III to V at SDN 3 Ngasinan Ponorogo.

II. METHOD

This research was conducted at SDN 3 Ngasinan, Ponoorgo Regency, which was held from January to March 2024. This research is an analytical research with cross sectional research. The population in this study was 35 students from class III to class V. The sample that was the object of this research was children from class III to class V at SDN 3 Ngasinan, Ponorogo Regency, totaling 32 children. Researchers used the Slovin formula to determine the number of samples. The research sampling technique was carried out using purposive sampling. Data collection method using an observation sheet which is given a value of 1 if it is "correct" and a value of 0 which is "wrong" in the column that corresponds to the student's toothbrushing skills. The data collection method is by carrying out an examination using an examination sheet to determine the DMF-T (amount of student dental caries).

Procedure The research was carried out by providing a permission letter to be ready to become a research respondent. This research was conducted at one time. Early stage researchers prepared tools and materials in the form of toothbrushes, toothpaste and mouthwash cups at the location and asked for help from the school to coordinate students. First, class III students were first asked to go to the east field of the school because there was a water tap there. The second stage explained to students that they would practice how to brush their teeth in front of the researcher, taking turns in order of name. In the third stage, the researcher recorded the observation results on an observation sheet by giving a score of 1 if "correct" and a score of 0 if "wrong", according to the results of the students' toothbrushing skills. Then the researcher also recorded the duration of time for brushing teeth on an observation sheet using a stopwatch. The same procedure was also carried out for class IV and class V students. Continuing with the dental caries data collection stage, students who had finished checking their teeth brushing skills went to class for an oral cavity examination. While in class, the researcher called students one by one to have their oral cavities examined. Researchers examined the students' oral cavities using a mouth mirror. Researchers recorded the results of the DMF-T examination on the examination sheet. Once completed, the data obtained is then calculated and added up and the DMF-T caries figures are averaged.

The analysis technique used in this research is the Chi-Square Test to determine the relationship between the two variables.

III. RESULTS

A. RESPONDENT CHARACTERISTICS

Based on the data presented in [TABLE 1](#), it can be concluded that the majority of respondents in this study were men (56.2%), while only a small portion were women (43.8%). In terms of age, the majority of respondents were 11 years old (40.6%). [TABLE 2](#) Most of the respondents had poor tooth brushing skills, namely 22 respondents with a percentage of 68.8%. [TABLE 3](#) that the majority of respondents from grades III to V at SDN 3 Ngasinan Ponorogo experienced high category dental caries, 14 students with a percentage of 43.8%.

TABLE 1
Respondent Characteristics

Characteristics	Frequency	Percentage (%)
Gender	Man	18
	Woman	14
Age	9 years	8
	10 years	11
	11 years	13

TABLE 2

Frequency Distribution of Toothbrushing Skill Categories for Class III to V Students at SDN 3 Ngasinan Ponorogo in 2024

Category	Frequency	Percentage (%)
Skilled (5 correct tooth brushing movements + 2 minutes brushing time)	0	0
Fairly Skilled (3 - 4 correct tooth brushing movements + brushing time duration 2 minutes)	10	31.2
Less Skilled (1 - 2 correct tooth brushing movements + brushing time duration 2 minutes)	22	68.8
Total	32	100
Average	68.8%	

TABLE 3

Frequency Distribution of Dental Caries Categories for Class III to V Students at SDN 3 Ngasinan Ponorogo in 2024

Category of dental caries	Frequency	Percentage (%)
Very low	2	6.2
Low	3	9.4
Currently	6	18.8
Tall	14	43.8
Very high	7	21.9
Total	32	100

TABLE 4

Results of Chi-square Test Analysis of the Relationship between Teeth Brushing Skills and Dental Caries for Class III to V Students at SDN 3 Ngasinan Ponorogo in 2024

Toothbrushing Skills Category	Category					Total	PValue
	Very low	Low	Currently	Tall	Very high		
Skilled	0	0	0	0	0	0	0.008
Quite skilled	1	3	5	1	0	10	
Less skilled	1	3	1	13	7	22	
Total	2	6	6	14	7	32	

Based on [TABLE 4](#) as many as 22 students had less skilled tooth brushing skills, and 10 students had quite skilled tooth brushing skills. In the less skilled category, there were 13 students who experienced high category of dental caries, 7 students experienced very high category of dental caries, and the rest were in the medium and very low category of caries. Meanwhile, in the moderately skilled category, there were 5 students who experienced high category of dental caries, 1 student experienced high category of dental caries, and the rest were in the low and very low category of caries. The analysis results obtained by the asymp.sig (a) value show a value of 0.000. Because the sig value (p) < 0.05, so it can be concluded that H_1 is accepted and H_0 is rejected, meaning that there is a relationship between tooth brushing skills and

dental caries for students in grades III to V at SDN 3 Ngasinan Ponorogo in 2024.

IV. DISCUSSION

Based on the results of research conducted on the toothbrushing skills of students in grades III to V at SDN 3 Ngasinan, it was found that there were more students in the less skilled category than those in the moderately skilled category, and there were even no students in the skilled category. Students' lack of tooth brushing skills include incorrect tooth brushing movements on the part facing the palate, incorrect tooth brushing movements on the part facing the tongue, incorrect tooth brushing movements on the side facing the cheek, and insufficient duration of time for brushing teeth.

Based on the results of the interviews conducted, the part of the palate, the part facing the tongue, and the part facing the cheek received less attention because they considered it too difficult to reach than other parts because they were located inside the oral cavity. So they find it difficult and lazy and even skip brushing their teeth in that area. According to them, brush the side teeth near the cheeks with a back and forth motion, not a circular motion. They tend to brush their teeth only on the front and outer parts that are visible, with a horizontal movement pattern on almost all parts of the teeth. This is because students only receive limited counseling on how to brush their teeth in theory, without any direct demonstration/practice of brushing their teeth together.

This is in line with research which explains that most elementary school students do not know how to brush the inner bottom teeth near the tongue with a prying motion, brush the inner upper teeth near the ceiling with a prying motion, and brush the side teeth near the cheeks with a circular motion. Students only understand brushing their teeth, the important thing is that their teeth have been brushed. Students are less aware that brushing teeth requires paying attention to the movement of each part of the tooth surface and the duration of brushing time. This is due to a lack of education and not really understanding the knowledge they have.

One of the factors that causes respondents' toothbrushing skills to be in the less skilled category is because respondents do not know and do not understand how to brush their teeth properly and correctly and the correct duration of time for brushing their teeth [17]. Elementary school students' knowledge about how to brush their teeth is considered to be lacking. Most students don't know how to brush their teeth on the inside (facing the ceiling). This is due to a lack of education to students about how to brush their teeth properly and correctly [18].

The duration of time for brushing teeth for all respondents is <2 minutes, even the fastest duration of time is less than 1 minute, so this is not in accordance with the opinion which states that the duration of time for brushing

teeth that meets the ideal and efficient requirements for optimal brushing for cleaning teeth is 2 minutes [19].

This shows that students toothbrushing skills are lacking so they are not optimal. In accordance with Benjamin Bloom's theory where skills are the result of knowledge, poor toothbrushing skills are the result of students' lack of knowledge. This can have an impact on students' poor toothbrushing behavior.

The results of this research on toothbrushing skills show that there is a need to increase education by demonstrating it to students. According to research, education for elementary school-aged children is very effective, namely by combining theory with direct demonstrations on how to brush teeth properly and correctly, without the help of other people, so that it is hoped that the child's dental and oral health status will improve. This demonstration method will be easier for elementary school age children to understand so that it is hoped that students will understand more about the material being explained and get maximum results.

Based on the results of an examination using the dmft-caries index on the dental caries of students in grades III to V at SDN 3 Ngasinan, it is known that of all the respondents who had dental caries, the most were students in the high dental caries category, followed by the very high dental caries category. This shows that dental caries still occurs frequently in elementary school children.

Based on the results of examinations carried out, the high rate of dental caries in students in grades III to V at SDN 3 Ngasinan is due to the fact that most of them still brush their teeth incorrectly. They tend to brush their teeth in a horizontal pattern only and only on the outside. Tends to skip deep brushing of teeth. As a result, some parts of the tooth surface are not as clean as possible. Over a long period of time, this will cause plaque buildup which can trigger dental caries. According to research [20] which states that inappropriate tooth brushing methods and tooth brushing patterns in children can influence the high rate of dental caries.

Apart from that, the results of the interview showed that another factor in dental caries for students in grades III to V at SDN 3 Ngasinan could be caused by a cariogenic diet. They really like to consume sweet foods and drinks compared to adults because of the availability of sweet, sticky snacks for children in the school environment. In general, children are at an age where they really like sweet and sticky foods but still tend to be lazy and can't even brush their teeth independently. Of course this can trigger dental caries [8].

According to the Indonesian Ministry of Health, the high rate of dental caries in students can occur due to several factors, including improper brushing of teeth so they are not maximally clean, the diet of elementary school students who prefer sweet foods, lack of knowledge and self-awareness,

and children's lack of independence. in maintaining the health of their own teeth [3].

Based on the results of data analysis, it shows that there is a relationship between tooth brushing skills and dental caries in students in grades III to V at SDN 3 Ngasinan Ponorogo. It can be seen that most respondents have the categories of high dental caries and very high dental caries. Students with a high category of dental caries turned out to be less skilled at brushing their teeth, both in terms of the method and duration of brushing their teeth. This also happened to students in the very high dental caries category, where they also turned out to be in the less skilled category regarding the method and duration of brushing their teeth.

The student's tooth brushing category is less skilled, this means that students only do 1-2 correct tooth brushing movements and brush their teeth for an inappropriate amount of time [21]. In fact, the correct way to brush your teeth according to several studies is 5 correct movements and the ideal duration of time for brushing your teeth is 2 minutes, because this has the benefit of keeping the surface of your teeth maximally clean [19].

Most of the students in grades III to V at SDN 3 Ngasinan Ponorogo are not skilled at brushing their teeth, both in terms of the method and duration of brushing their teeth, which will cause some parts of their teeth to not be as clean as possible. As a result, plaque builds up. Plaque buildup that occurs over a long period of time will cause dental caries.

V. CONCLUSION

Based on the results of data analysis and discussion, the researcher concluded that the toothbrushing skills of students in grades III to V at SDN 3 Ngasinan Ponorogo were in the less skilled category. Dental caries for students in grades III to V at SDN 3 Ngasinan Ponorogo is in the high category. There is a relationship between tooth brushing skills and dental caries in students in grades III to V at SDN 3 Ngasinan Ponorogo.

Teachers at SDN 3 Ngasinan Ponorogo can take part in dental and oral health maintenance training to increase their knowledge of dental health maintenance so they can play a role in providing knowledge and motivation to students as well. Always remind students how to brush their teeth properly and correctly, brush their teeth twice in the morning after breakfast and at night before bed, check with the nearest health facility at least once every 6 months, and eat a healthy diet.

Dental health workers can hold teacher participation training and coaching meetings with parents to help community health center dental health workers participate in motivating students to always maintain healthy teeth and mouth. This is intended to reduce the rate of dental caries among students at SDN 3 Ngasinan Ponorogo.

Carrying out research development regarding other possible causes or researching other variables that have not

been studied that can influence dental caries in elementary school children.

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