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## Relationship Between Cariogenic Food Consumption Patterns And Brushing With The Event Of Dental Caries In Early Childhood

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### ABSTRACT

Dental caries is a major problem in the oral cavity today. Preschool children have a high susceptibility to dental caries caused by the activity of a microorganism in a fermentable carbohydrate characterized by demineralization of the hard tooth tissue and followed by the breakdown of organic matter. Children's dental health plays a role in children's growth and health. The problem in this study is the high incidence of dental caries in children under five. The design of this research is analytic with a cross sectional approach. Sampling using Simple Random Sampling technique. The population in this study were all children aged 3-5 years in Early Childhood Education Programs Sooko Mandiri I. The sample obtained was 38 respondents in October 2021. Data were collected using a closed questionnaire and observation sheets filled out by the researcher. After that, the data was tabulated and analyzed using Cross Tabulation and Linear Regression. The results showed that most of the respondents were in the category of cariogenic food consumption with a frequency of sometimes 50%, while most of the respondents were in the category of brushing their teeth with an occasional frequency of 52.7%. Based on the Linear Regression test with  $p < 0.05$ , the p value for the relationship between cariogenic food consumption patterns and dental caries and tooth brushing patterns with dental caries was 0.57. Thus there is no relationship between the consumption pattern of cariogenic food and the habit of brushing teeth with the incidence of dental caries. Seeing the results of this study, it is still necessary to have periodic counseling in order to further improve the habit of brushing children's teeth and reduce children's consumption patterns of cariogenic foods.

Keywords: Cariogenic Food, Brushing tooth, Dental Caries

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### *Article history :*

*Received: 10 Februari 2022*

*Received in revised form: 17 Maret 2022*

*Accepted: 25 April 2022*

*Available online: 1 Juni 2022*



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## INTRODUCTION

Children's dental health plays a role in the growth and health of children. Because the teeth are the body's hardest tissue compared to others. The structure is layered, starting from the very hard enamel, the dentin (bone of the tooth) inside, the pulp which contains blood vessels, nerve vessels, and other parts that strengthen the teeth. However, teeth are body tissues that are easily damaged. This occurs when teeth do not receive proper care. Dental caries is a chronic disease that most often affects individuals at all ages. Dental caries is a major oral problem in children and adolescents. Based on the 2018 RISKESDAS, it shows that the dental health condition of the Indonesian people tends to be not good. From the results of the health survey, it was found that 57.6% of the Indonesian population experienced dental and oral problems. The prevalence of cavities in early childhood is very high at 93%, meaning that this number is still far from the target of the World Organization (WHO) which wants 50% of early childhood to be free from dental caries. Dental caries is a major problem in the oral cavity today. Preschool children have a high susceptibility to dental caries because the enamel layer is still maturing after eruption, so there is a high probability of dental caries. Dental caries is a disease of dental tissue, namely enamel, dentin, and cementum caused by the activity of a microorganism in a fermentable carbohydrate characterized by demineralization of the hard tissues of the teeth and followed by the breakdown of organic matter. Dental caries is caused by 2 factors, namely the main factor and the supporting factor. The main factor is cariogenic bacteria, fermentable carbohydrates (substrates) of teeth that are susceptible to dental caries and time. Supporting factors include age, gender, diet, individual behavior and habits, knowledge and place of residence. Preschool children aged 3-5 years have a high caries percentage of 40%-75%. Factors that cause caries in preschool-aged children are the frequency of brushing their teeth, the supply of water that lacks fluoride, the long distance to access dental health services, diet and the most important thing is the knowledge of parents about dental and oral health and their awareness to guide their children.

Based on the survey results obtained from Early Childhood Education Programs Mandiri Sooko I Mojokerto, 12 children aged 3-5 years. From this number, it was found that there were 9 children with caries and 3 children without caries. Pre-school age children are very fond of sweet foods, milk, candy, chocolate. In the school canteen, they also provide snacks that they like. The active role of parents is needed especially at the preschool age. Preschoolers, especially children aged 4-6 years, need parental assistance in brushing their teeth, even though children are able to manipulate the movement of their toothbrush. Children learn to brush their teeth with the help of their mother from behind using a child's toothbrush. Children are taught to rinse their mouth by imitating their mother gargling with boiled water. When the child is 2 years old, all the primary teeth have started to grow, the child is expected to start brushing his own teeth with parental supervision. Brushing teeth 3 times a day after breakfast, after lunch and before going to bed at night. After eating make it a habit to rinse your mouth with water. After the child is able to communicate with their parents smoothly, around the age of 3 years, the child is expected to be able to brush his own teeth with toothpaste containing fluoride and then rinse his mouth

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with water and the parents accustom the child not to consume foods containing sweeteners, dyes, and preservatives. Preservatives that can trigger dental caries, for example, since children aged 2 years, parents introduce a variety of fruits and vegetables. Mother's knowledge is the basis for the formation of positive behavior in children to maintain dental and oral health with good and correct care. Parents, especially mothers, need to know, teach and train their children from an early age to take care of their own teeth because at this age mothers must be able to follow their children's intellectual development so that children easily understand and learn.

### **METHOD**

The design used in this study is a quantitative study with a survey method using a Cross Sectional approach. The study was carried out at Early Childhood Education Programs Mandiri Sooko I Mojokerto in October 2021. The population used in this study were all mothers of children aged 3-5 years in Early Childhood Education Programs Mandiri Sooko I Mojokerto as many as 38 people. The independent variables in this study were cariogenic food consumption patterns, tooth brushing habits. The dependent variable in this study was dental caries. Collecting data obtained from primary data obtained from the results of questionnaires and checklists that have been filled out by respondents. Secondary data were obtained from data from Early Childhood Education Programs Mandiri Sooko I, a list of mother's names and a list of names of children. Primary data collection (data on cariogenic food consumption habits and tooth brushing in children in this study were obtained using the questionnaire and checklist provided. Given this study aims to determine the relationship between 2 variables where the independent variable is ordinal scale and the dependent variable is nominal scale, then the test is The correlation used is using Linear Regression Test.

**RESULTS**

Based on the research, the results obtained :

Table 1 Distribution of Research Results Frequency Table

Number.	Variable	Total	
		N	%
<b>1</b>	<b>Toddler Age</b>		
	3 Years Old	14	36,8
	4 Years Old	18	47,4
	5 Years Old	6	15,8
	Total	38	100
<b>2</b>	<b>Sex</b>		
	Male	18	47,3
	Female	20	52,7
	Total	38	100
<b>3</b>	<b>Cariogenic Food Consumption Pattern</b>		
	Often	10	26,3
	Sometimes	19	50
	Rarely	7	18,4
	Never	2	5,3
	Total	38	100
<b>4</b>	<b>Teeth Brushing Habits</b>		
	Often	12	31,5
	Sometimes	20	52,7
	Rarely	6	15,8
	Never	0	0
Total	15	100	
<b>5</b>	<b>Dental Caries Incident</b>		
	Dental Caries	28	73,6
	None Dental Caries	10	26,4
	Total	38	100

Table 2. Cross Tabulation of the Relationship between Cariogenic Food Consumption Patterns and the Incidence of Dental Caries at PAUD Sooko Mandiri I Mojokerto

Consumption Pattern	Dental Caries Incident				Total	%
	None Caries		Caries			
	Total	%	Total	%		
Often	2	5,28%	6	15,8%	8	21,0%
Sometimes	7	18,48%	18	47,3%	25	65,8%
Rarely	1	2,64%	3	7,8%	4	10,6%
Never	0	0%	1	2,7%	1	2,6%
Total	10	25,9%	28	74,1%	38	100%

Table 3. Cross Tabulation of the Relationship between Teeth Brushing Habits and Dental Caries Incidence of PAUD Sooko Mandiri I Mojokerto

Brushing teeth pattern	Dental Caries Incident				Total	%
	None Caries		Caries			
	Total	%	Total	%		
Often	4	10,6%	4	10,5%	8	21,0%
Sometimes	5	13,2%	22	57,9%	27	71,0%
Rarely	1	2,6%	2	5,2%	3	7,8%
Never	0	0%	0	0%	0	0%
Total	10	26,4%	28	73,6%	38	100%

Based on the table above using the Linear Regression test, it shows that  $F 0.56$  and  $p 0.573$  where  $p > 0.05$  means the formula obtained is not significant, namely there is no relationship between Cariogenic Food Consumption Patterns and Dental Brushing Habits Patterns with Dental Caries Incidence.

## DISCUSSION

### Cariogenic Food Consumption Pattern

Based on the tabulation results of the data from the table above, it was found that most of the children had a cariogenic food consumption pattern, which was sometimes as many as 19 children or 50%, while a small proportion had a cariogenic food consumption pattern, which was never 2 children or 5.3%.

Sugar which is a source of carbohydrates is a beneficial food for children as a source of calories. These calories are needed for preschool-aged children who are growing and need adequate nutrition. Of course it must still be consumed in the amount that is needed. Preschool-aged children usually have brought food supplies to take to their playgroup. To reduce dependence on sweet foods, you should not provide children with sweet foods such as sweet breads, brownies, or any snacks that have a high enough sugar content.

Instead, it is better to provide children with healthy and nutritious foods, preparing calcium and iron-rich foods such as a piece of cheese on bread, eclairs filled with vegetables, or nougat made of peanut milk, chicken sausage, boiled egg, or beef. Do not forget to tuck fresh fruit in the lunch bag, especially oranges or bananas. All these food supplies should be made yourself at home so that cleanliness is more guaranteed than when buying outside of school. For the type of food, you should choose a nutritious <sup>5</sup>.

Meanwhile milk, both formula milk, cow's milk and also mother's milk contain sugar called lactose, so milk is not included in the category of sweet drinks. On the other hand, milk is an important drink for children because milk contains calcium which is needed for bone health and provides nutrition for the growth and development process of children <sup>6</sup>. It's better to choose plain milk, because flavored milk contains more sugar in it.

The taste for sweetness is generally influenced by the environment. That is, experience and habituation make a huge contribution in this regard. When growing up, a person's taste will be determined by what they have learned through their eating experiences and their eating habits. Generally, children can never refuse carbohydrates as a source of nutrients that give a sweet taste. Especially simple carbohydrates, such as sugar, honey, and sugar in fruit <sup>7</sup>. Children are very easy to arouse appetite just by adding 1-2 teaspoons of granulated sugar to milk or other foods. On the other hand, children do not like bitter taste. It is understandable that they usually also don't like vegetables because they have a bitter taste in them. Apart from going through the family menu, intensive introduction of preschoolers to sweet tastes generally cannot be separated from their socialization. For example, cakes and biscuits containing flour and sugar, honey, chocolate grains, chocolate spread, fruit

juice, sweetened condensed milk and so on. Likewise, drinks that include types of syrup and soft drinks. Even though children like these types of food, parents shouldn't spoil them by giving them food that actually has a bad effect. Even if you can't refuse, just occasionally. Because even though they are a source of calories, sugar and carbohydrates that are consumed in excess will only cause health problems in the future, such as dental caries.

The results of this study indicate that children's enjoyment of something sweet begins to be formed from a very early age in a child's life. From an early age children are introduced to sweet foods so that they become used to it. Changing your child's eating habits, especially those who are still toddlers, will only eat the food that is given, so avoiding them from drinks and sweet foods and starting to get used to their parents is very necessary. If your child already likes sweet foods and drinks, reducing portions and getting them used to consuming plain water is a good first step for toddlers. Although at first they will feel annoyed, but over time they will get used to the healthy eating and drinking patterns that you provide. As a parent, you can only limit the frequency of consuming sweet foods so that children are able to control themselves not to eat sweet foods often. However, if the parents' knowledge is lacking in this matter, then as a health worker they can help provide counseling or IEC about the consumption pattern of sweet foods and the factors that influence it and how to prevent children from eating sweet foods often <sup>8</sup>.

### **Teeth Brushing Habits**

Based on the tabulation results of the data from the table above, it was found that most of the children had a habit of brushing their teeth, that is, sometimes as many as 20 children or 57.2%, while none of the children had a habit of not brushing their teeth, which was never as many as 0 children or 0%.

Brushing teeth is a routine activity that we always do every day, at least 2 times a day we brush our teeth. Oral health cannot be separated from the etiology with plaque as a co-factor for caries. It is important to realize that plaque is basically formed continuously <sup>9</sup>.

Awareness of brushing teeth since childhood will be carried over until the child becomes an adult. Thus, children's dental health is greatly influenced by how parents instill awareness or do not force the importance of personal hygiene since childhood. Giving understanding to children will have a very different approach from providing counseling to adults. So, patience remains important in teaching children every day until the things that are taught are embedded in the child.

Dentists advise children to brush their teeth for at least two minutes each time they brush their teeth. For children who do not like to brush their teeth, this is certainly a challenge for parents. Even though they like to play in water, take long baths, but not all children want to brush their teeth and are easy to direct. The key is to make brushing your teeth a fun activity. If parents are smart, this routine will not be boring for them.

The results of this study indicate that children who are not trained by their families early in cleaning their teeth can cause tooth decay. The habit of brushing teeth needs to be done because the food

residue that sticks to the surface of the teeth every time we eat will be a good medium for bacterial growth<sup>10</sup>. And will look like a thin layer of yellowish white and sticky. So as parents, since childhood, children are taught to practice brushing their own teeth. From the education provided by parents and schools, children will be able to get used to living clean and healthy.

### **Dental caries incident**

Based on the tabulation results of the data from the table above, it was found that children who experienced dental caries were 28 respondents or 73.6% while children who did not experience dental caries were 10 respondents or 26.4%. Teeth are the hardest tissue in the body. The multi-layered structure starts from the very hard enamel, dentin, in the pulp, which contains blood vessels, nerves, and other parts that hold the teeth together. However, teeth are body tissues that are easily damaged. This occurs when teeth do not receive proper care.

The process of tooth decay begins with a hole in the tooth or also known as caries. Caries is damage that is limited to tooth tissue starting from the tooth enamel to spread to the dentin. The structure of the enamel determines the caries process<sup>9</sup>. It should be noted that the outer enamel surface is more resistant to caries than the underlying layer because it is denser and harder. To maintain this hardness, enamel is in dire need of a chemical ion called fluorine. The spread of caries first occurs in the email. If not cleaned immediately and not immediately filled, caries will spread down to the pulp chamber which contains nerves and blood vessels, causing pain and eventually the tooth can die.

From the results of this study indicate that children aged under five are very vulnerable to the presence of cavities because at the age of toddlers they experience tooth growth. Because toddlers have been introduced to sweet foods and are used to sweet foods and lack of brushing their teeth can also cause caries. Because the pH in the mouth has decreased so that the teeth have plaque which can cause dental caries. On the other hand, children who often brush their teeth and rarely eat sweet foods can also cause dental caries because there are other factors such as the age of the child, the gender of the child, and the lack of knowledge, attitudes and behavior of parents in providing education to children about dental caries and maintaining dental health. There is no other most effective way to teach children to brush their teeth other than by setting the right example, by letting children see their parents brushing their teeth every night before going to bed, this is very meaningful in instilling good dental care habits<sup>11</sup>.

### **Relationship of Cariogenic Food Consumption Pattern with Dental Caries Incidence**

Based on the cross tabulation, it was found that the p value was 0.35 ( $p < 0.05$ ) or there was no relationship between the frequency of eating cariogenic foods and the incidence of dental caries with a close relationship of 0.35, which means that there is no moderate relationship between the frequency of eating cariogenic foods. with the incidence of dental caries. Many people think of chocolate as a cause of dental caries. Not infrequently many parents forbid their children to consume chocolate. In fact, when compared to granulated sugar, chocolate is actually safer for teeth. Dental caries is a loss that begins at a certain location on the tooth and is followed by a rapid process of tooth decay or decay. Dental caries begins with the erosion of minerals on the surface or tooth enamel by organic acids fermented from food

carbohydrates (especially sugar and starch) and between teeth by lactic acid bacteria. In general, the reason that the occurrence of dental caries is the result of wrong eating habits is acceptable, especially because of the frequent consumption of foods containing sucrose. Sugar or sucrose as one of the main causes of dental caries has been proven in animal experiments. The good news about chocolate is that the tannins in chocolate may help prevent dental caries by reducing plaque growth. Acidic bacteria from food residue and saliva combine to form a sticky material called plaque, which sticks to the teeth and is mostly found on the back molars. The results of this study indicate that not all sweet foods can cause dental caries such as chocolate<sup>12</sup>. Even chocolate can reduce the occurrence of dental caries. Likewise eating fruit, after the child eats sweet foods it is better to give him fresh fruit or water. Because after eating sweet foods, bacteria take 2-3 minutes to form plaque. Before that happens, parents must understand by inviting their children to rinse their mouths, drink water and even eat fresh fruit.

However, in contrast to the results of Rosidi and Adimayanti's research, it showed that there was a significant relationship between the consumption of cariogenic foods and the incidence of caries at school age. 12 Research conducted by Meishi P.R.L stated that there was a significant relationship between the consumption of cariogenic foods and Adimayanti. The incidence of dental caries at Muhammadiyah 08 Medan Private Elementary School with p-value = 0.000.13 There is no significant relationship between the consumption pattern of cariogenic food and caries, it can be interpreted from the results of the study that respondents who consume low cariogenic foods have a lower risk of dental caries, on the contrary it is inversely proportional in the results found, respondents with high cariogenic food consumption were protected against dental caries. Meanwhile, the ambiguity that can be determined as a result of cause, respondents who have experienced caries will reduce the amount of cariogenic food consumption, before the respondent is known to have caries, the respondent has a high food consumption pattern and after the respondent experiences dental caries the respondent will reduce the amount of cariogenic food. Research that uses cross sectional to look at the factors - factors associated with the incidence of caries, the limitation that is often found in cross sectional research is the existence of temporal ambiguity (cannot explain the order of cause and effect). Although this study uses a cross sectional design, as a temporality variable, the dependent and independent relationships are guaranteed, this is because the variables already existed before the results occurred. In addition, the independent variable is likely not to change due to the influence of the dependent variable (caries)<sup>13</sup>.

### **Relationship of Cariogenic Food Consumption Pattern with Dental Caries Incidence**

Based on the cross tabulation, it was found that the p value was 0.72 ( $p < 0.05$ ) or there was no relationship between the habitual pattern of brushing teeth and the incidence of dental caries with a close relationship of 0.72, which means that there is no moderate relationship between the habitual pattern of brushing teeth. with the incidence of dental caries.

Brushing teeth is a routine activity that must be done after eating sweet foods. Brushing your teeth frequently and not following the rules can lead to caries due to several factors such as not using the right toothbrush or opening your jaw large enough to let the handle of the brush into your mouth, it



could be that the toothbrush is too big. The handle should be comfortable to grip, the sensation should be as comfortable as holding a fork while eating. The more comfortable the toothbrush, the more often the child will use it correctly. Choosing the wrong bristles or type of bristles is not very important and has no effect. What is more important is the cleaning technique than the shape of the brush. However, dentists also recommend choosing a soft or stiff brush because it can damage the gums. Less often or for less time or when brushing teeth are too far apart, bacterial plaque will build up, which can lead to gingivitis and other problems in the mouth. It is recommended to brush your teeth for at least 2 minutes at a time, preferably 3 minutes<sup>14</sup>. Brushing your teeth too often or too hard, for example 4 times a day, can irritate the roots of the teeth and hurt the gums. Brushing too hard can also damage the enamel (the top layer of your teeth). It is best to brush your teeth slowly and gently for 2-3 minutes. Not brushing your teeth the right way. Always start in the same place Ignoring the inside of the teeth or most parents often forget to tell their children to clean the inside of the teeth, the part that comes into contact with the tongue. Hidden plaque is just as important to clean as visible plaque. The point that is most often forgotten to clean is on the inside of the front teeth. Not rinsing clean or bacteria can grow on toothbrushes that you forget to clean. If this happens, the bacteria can grow and return to the mouth. Leaving a wet toothbrush or a wet and damp toothbrush will become a favorite place for bacteria. Not only that, a damp toothbrush will damage the bristles if left alone. It would be better if the toothbrush is stored closed in a dry state. Not changing toothbrush often enough or replace the toothbrush after 3-4 months of use or replace it immediately when the bristles start to look damaged.

From the results of this study, it can be concluded that brushing teeth is very necessary for the dental health of children, especially toddlers because it is very influential on tooth growth and child development. However, brushing your teeth too often and not according to the rules that have been set can cause tooth decay, especially dental caries. Parental knowledge is also very influential because every child will follow the ways that parents do when brushing their teeth. If parents do not understand the right way, then the way the child brushes his teeth is also not right.

### **Relationship Between Cariogenic Food Consumption Patterns and Dental Brushing Habits with Dental Caries Incidence**

Based on the calculation of linear regression, it was found that the p value was 0.57 ( $p < 0.05$ ), which means that there is no relationship between the consumption pattern of cariogenic food and the pattern of brushing teeth with the incidence of dental caries.

According to Rizal, in his study with children aged 3-5 years as research subjects, using bottled milk as a lullaby increases the risk of SKB 1.03 times greater than those who do not use it as a bedtimer. The frequency of drinking bottled milk twice or more per day will also increase the risk of SKB occurrence 2.27 times<sup>15</sup>. Meanwhile, drinking breast milk (ASI) was found to provide protection from the syndrome. Dr. research Fahlevi Rizal was strengthened by research conducted by Drg. Anita Purwanti (2010) that most mothers do not realize the cause of caries is that the incidence of caries is

often referred to as bottle caries, early childhood caries, or baby bottle caries. This pattern of dental caries is closely related to prolonged bottle feeding or other sweet liquids. Moreover, if the child is accustomed to drinking bottled milk before going to bed, and often the milk bottle is still in the child's mouth while sleeping. Parental behavior is also a contributing factor to this problem, especially because of the lack of parental knowledge about proper dental health.

From the results of this study, it can be concluded that it is not only the consumption of cariogenic food and tooth brushing that can cause dental caries, but the bottle caries syndrome factor has more influence than the cariogenic food consumption pattern due to the more frequent frequency and longer time of bottle use formula milk.

### CONCLUSIONS

Most children have a cariogenic food consumption pattern with a sometimes frequency. Most children have a habit of brushing their teeth with sometimes frequency. Most children have dental caries. There is no relationship between cariogenic food consumption patterns and the incidence of dental caries in Early Childhood Education Programs Mandiri Sooko I in 2021

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