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RELATIONSHIP BETWEEN ORAL HYGIENE AND DIETARY BEHAVIOUR AND DENTAL CARIES STATUS IN PRIMARY SCHOOL CHILDREN

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Abstract

Tooth decay can be caused by bacteria that live in the mouth. These bacteria feed on food leftovers in the teeth and produce acid. This acid destroys the enamel layer, dentine layer, and pulp. The purpose of this study is to analyze the risk factors of dental caries in primary school children. The subjects of this study were 77 students of SD Sendangmulyo 1 Semarang. We used questionnaires, diagnoses, and interviews for data collection. For data analysis, we used descriptive analysis method. The results showed that the most common dental caries risk factor in primary school children was sugar consumption. Up to 72% of children agreed to bring packed meal, 90.7% were used to have a breakfast, 80% used to clean their mouth every day, 70.7% clean their mouth after meals, 64% brush their teeth after eating candy, and 89.3 % brush their teeth before going to bed. There is a relationship between oral hygiene and dietary behavior and dental caries status of primary school children. In conclusion, there is a relationship between oral hygiene and dietary behavior and dental caries status of primary school children.

Introduction

Tooth decay can be caused by bacteria that live in the mouth. It can be apparent from the appearance of the teeth. These bacteria consume the food leftovers in the teeth and produce an acid (Bafti, 2015). Streptococcus mutant bacterial cells and other organisms live on tooth surface and form a complex biofilm commonly called "dental plaque". The continuous and repeated decay leads to cavitation and must be immediately treated. Tooth decay occurs when this plaque is not removed, the acid in the plaque dissolves the tooth enamel surface and make some cavities as a clinical manifestation of bacterial infection.

New cases of dental caries continue to occur. Although almost 55% of children ages 5-10 years old are caries-free, the remaining 45% have dental caries. By age 17, three of the four teenagers had experienced caries. In general, almost all children love snacks that taste sweet like chocolate, candy, ice cream, biscuits, cookies and chewing gum. This type of food is very cariogenic (Jazzalina, 2011). One type of tooth decay is bottle tooth baby. Caries that occur in early age children can destroy the enamel quickly. This type of damage can cause cavities in a matter of months (Colak, 2013).

Biologically, childhood is the stage between birth and puberty. Schaub (2015)

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and Fox (2013) stated that preventative care is absolutely necessary to protect children from tooth decay and cavities (Prakash, 2006). Dental caries is the most common contagious disease in the world. So we must educate our students and children about the causes of and how to protect themselves from dental caries (Ozdemir, 2014). Tandilangi (2016) stated that in Indonesia, dental and oral health problems are still dominated by caries and periodontal disease. Bad tooth hygiene behaviors play an important role in both diseases. Dentist's behavior and its members are key to influence the behavior of pediatric patients (Hall et al., 2007).

Dental caries can attack all levels of society with a majority in the Indonesian population. It reached 74.1% in the Semarang city. Data from Health Office of Semarang City in 2009 showed that mouth disease ranked 10th of the most common disease in Semarang City Health Office (DKK) working area. The incidence of dental caries also increases in all ages in many developing countries. Some parents expect that their children could examine their dental health regularly (eg, tranquilizing) still can not be realized, while the expectations of the dentists can lead a good child behavior can be realized (Baier, 2004).

Based on the background that mentioned above, we conducted a study to determine the relationship between oral hygiene and dietary behavior and dental caries status of children aged 7-9 years in SD Sendangmulyo, Semarang. The first reason for choosing Indonesian children as subjects is because some primary school children do not get sufficient information about dental caries and the severity of dental caries. The second is to understand the incidence of dental caries cases among children in primary school. The third is that children represent as an important segment of society, and the symptoms of tooth decay easily appear on them.

The purpose of this study was to analyze the risk factors of dental caries, the incidence of dental caries, and the relationship between oral hygiene and dietary behavior and the dental caries status of children in SD Sendangmulyo 1, Semarang.

Methods

We used observational analytical research design, in which we analyzed the relationship between variables. We used cross sectional approach, applying measurement or observational data from independent variable and dependent with only one measurement.

In this study, the number of children enrolled in SD Sendangmulyo 1 Semarang with age 7-11 years is 580 students. The population that include in this study was 7-9 years of ages, of which there were 330 students. They were divided into three groups, namely 7 year old children (123 students), 8 year old children (123 students), and 9 year old children (84 students). The eligible subject of this research is the students from class I-III SD Sendangmulyo (77 students). They are then divided into 3 group: 25 students from first grader, 26 students from second grader, and 26 students from third grader.

We used questionnaire for data collection. The data were collected using the method of diagnosis and personal interview to know the type of food consumed. The questionnaire was used to determine the level of dental caries incidence and the frequency of food consumption that can lead to dental caries.

The research procedure is as follows. First, we search and identify the target subject which is students from SD Sendangmulyo 1 Semarang. Second, we asked for permission with school principal to conduct the study. Third, we determine the sample size. Fourth, we develop a questionnaire according to the research objectives and test the validity of the instrument. Validity test is required to ensure that the data obtained using the instrument is valid. Instrument equivalence must be performed before it is used for data collection. The validity test conducted in this research is internal validity, which is the validity of the interview result about the subject's understanding in answering the question. Reliability is the degree of consistency or stability of the test, or the ability of the test to obtain the same score from the same respondent (under the same conditions). The next step is to improve and distribute the questionnaire. Diagnosis and personal interviews are used to determine the type of food consumed and questionnaire was used to determine the level of incidence of

dental caries in research subjects and eating frequency that can cause dental caries. The sixth step is creating a tabulation of data and analyzing the results of the questionnaire.

Descriptive and quantitative analysis was performed to determine caries proportion among all children and food intake that caused dental caries in children. Univariate analysis was performed to determine the frequency distribution of each independent variable (type of snack and frequency of cariogenic snack meal) and dependent variable (caries incidence). Bivariate analysis was performed to determine the relationship between variables, snack type, and frequency of snack eating with dental caries incidence by using chi-square statistical test.

Results and Discussion

The results of the reliability test for food intake were 0.868 (>0.05) and for dental treatment was 0.648 (>0.05) which means that the questionnaire was reliable. The risk factor for dental caries consists of factors related to dietary behavior both at school and at home.

Most children agreed often bringing food from home (72%) while others disagree (28%), as seen in Table 1. It means that most children agree that they bring food from home to make them healthier. Because foods from home contain less sugar, such as rice, chicken, and fruit that is healthier than food from the school cafeteria. When parents give money to their children to buy food from the school canteen, children do not care to buy healthy food. Usually, they will buy sweet foods, so the risk of caries is increased.

Beside, we can see that the most of children have breakfast before going to school (90.6%) while others did not (9.3%). It is a good habit to have healthy behaviors because eating from home is low in sugar as bread and milk and eggs do not contain sugar compared to school cafeteria meals.

Oral hygiene behavior as an effort to prevent caries risk factors in children aged 7-9 years, for example by cleaning the mouth after eating, and so forth.

Most children agreed that they clean their mouth daily (80%) while others disagree (20%). This is a good habit that students clean their mouths every day, because cleaning the teeth will help to have a great looking smile as the teeth looked whiter. It is an important part in preventing gum disease and reduces the risk

Table 1. Subject Characteristic

Risk Factor	**Percentage (%)**
Child Perception to Bring Packed Lunch from Home	
Agree	72.0
Disagree	28.0
Have Breakfast	
Yes	90.7
No	9.3
Clean Their Mouth Daily	
Yes	80.0
No	20.0
Clean Their Mouth After Meals	
- Agree	70.7
-Disagree	29.3
Brush Their Teeth After Eating Candy	
-Agree	64.0
-Disagree	36.0
Brush Their Teeth Before Bed	
-Agree	89.3
-Disagree	10.7

Source : Primary Data

of tooth loss and dental problems. Because cleaning the teeth will remove plaque from the teeth, the students will not face many dental caries problems.

Most of children agreed that they clean mouth after eating (76.7%) and others disagree (29.3%). It showed a good habit, as cleansing the mouth after having meal will remove the food particles attached to the teeth and form a plaque. When we consume food all day, food will stay on the tooth surface, and the bacteria will produce some acids on the food to form plaque. The plaque will stick to the teeth. If left untreated, plaque can cause cavities and gum disease. Up to 64% of children agreed that they brush their teeth after eating candy and others disagree (36%). This indicates that the majority of subjects brushed their teeth after consuming candy. It is also a good habit for oral hygiene that will prevent the onset of dental caries in children. Sugary or sugar foods stimulate the formation of some bacteria in the mouth that will attack the tooth enamel, at least twenty minutes after eating. Brush their teeth after eating will get rid of the bacteria before attacking on it.

Table 1 it is also showed that most children agreed to brush their teeth before bed (83.9%) while others disagree (10.7%). This is a good habit because brushing your teeth will prevent the occurrence of dental caries and can help remove bacteria from the teeth. Bacteria can eat food particles left in the teeth and produce substances that corrode enamel from time to time, which can cause tooth decay.

Table 2. Correlation Analysis between Cariogenic Food Consumption with the Incidence of Dental Caries in Children

		X	Y
X	Pearson Correlation	1	.0272*
	Sig. (2-tailed)		.018
	N	75	75
Y	Pearson Correlation	.0272*	1
	Sig. (2-tailed)	.018	
	N	75	75

The value of significance is 0.018 (<0.05), which mean the hypothesis is accepted. Thus, there is a relationship between the consumption of cariogenic foods with the incidence of dental caries in children. This suggests that the consumption of good cariogenic foods will affect the incidence of dental caries in children.

Dental caries or tooth decay is one of the most common chronic diseases in humans. Dental caries is caused by bacteria present on the tooth surface and produces sufficient acid. Different types of bacteria are usually present in the mouth. Bacteria change all foods as sugar and starch to acid. Carbohydrates increase the risk of dental caries. Non sticky foods are less dangerous than sticky foods because they do not linger on the tooth surface. The results of this study was supported by Widayati (2014) who stated that there is a strong correlation between the habit of consuming sticky food, and drinking milk with the incidence of dental caries in children aged 4-6 years. So, to prevent the severity of dental caries, they are counseled about the effect of sweet and sticky foods on dental caries.

The study conducted by Permatasari and Andhini (2014) showed a bad pattern of children's snack consumption that tends to be high (93%). This pattern affect the incidence of dental caries, it could be worsened by the following: level of children knowledge in brushing teeth (59%), unsupportive attitude of the children in brushing teeth (61%), the way the children brush their teeth are still not good (55%). From X2 test, there is a significant relationship between the behavior of brushing teeth in children with dental caries incidence, ($p < 0.05$). There is a tendency of children to ignore brushing their teeth because the child has not felt the problem before exposure to dental caries. Usually, they will feel there is a problem with their teeth when there is a pain due to dental caries that interfere with child activity.

Most children like to eat sweet foods. A study by Ernawati (2011) in TK Pertiwi 37 Gunungpati Semarang showed that children brush their teeth poorly. Most of the children in TK Pertiwi 37 Gunungpati Semarang have dental caries. There is correlation between behavior of sweet food consumption and dental caries incidence in child of TK Pertiwi 37 Gunungpati Semarang ($p = 0.007$). There is correlation between tooth brushing behavior

and dental caries occurrence in children of TK Pertiwi 37 Gunungpati Semarang (p = 0.001). Based on the observation, it is known that TK Pertiwi students prefer to choose sugar containing food/snacks like candy. After eating sweet foods, they did clean their mouth or brush their teeth. On the other hand, there is no information that can be found in the canteen or in the school environment about health/dental care promotion.

Dental caries is a dental disease characterized by the demineralization of inorganic parts and the destruction of organic substances. The prevalence of preschool teeth caries is still high due to the child's poor teeth brushing habit and their hobby of eating cariogenic foods. Maulidta *et al*., (2010) conducted a study that aims to determine the relationship between the habit of brushing teeth and the consumption of cariogenic snack foods with the incidence of dental caries in preschool children at Pondok Beringin Park in Semarang and its risk factors. The results showed that the habit of brushing the child's teeth has been classified into the less good category (40%), the consumption of cariogenic snack foods were classified into the high category (88.3%), and dental caries prevalence obtained was 85%, while the oral hygiene examination was 41.67% that classified into the less category. The result of statistical test showed that there is a significant correlation between tooth brushing habit (p=0.035) and cariogenic food consumption (p=0.007) with caries where the most influential factor is cariogenic food expenditure (exp (B)=5.731). Several research results above researchers concluded that parents can reduce or restrict snack foods to children who contain cariogenic ingredients as one of the efforts to prevent dental caries. In addition, the behavior of a good and regular tooth brushing can prevent dental caries.

Conclusion

We concluded that dietary behavior is a risk factor for dental caries in children aged 7-9 years in SD Sendangmulyo 1, Semarang. Up to 72% of children agreed to bring food from home, 90.7% used to have breakfast, 80% used to clean their mouth daily, 70.7% agreed to clean mouth after meals, 64% agreed to brush their teeth after eating candy, and 89.3 % agree to brush your teeth before going to bed. There is correlation between oral hygiene and eating behavior with child dental caries status in SD Sendangmulyo 1 Semarang, with significance value 0.018.

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