THE RELATION BETWEEN THE CONSUMPTION OF SUGARY FOOD AND TOOTHBRUSHING BEHAVIOR WITH THE INCIDENCE OF DENTAL CARIES AT CHILDREN AGED 24-59 MONTH IN MRANGGEN POLOKARTO SUKOHARJO

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ABSTRACT

Caries is a disease or disorder that occurs in hard tissue of teeth due to demineralization of dental hard tissue. The prevalence of dental caries in Polokarto Sukoharjo was 28.4 % and Mranggen had the highest prevalence of dental caries (76.7%) in January 2015. The consumption of sugary food and rarely brushing teeth were two factors that could grow bacteria inside mouth and cause dental caries. This study aimed to determine the correlation between consumption of sugary food and tooth brushing behavior with the incidence of dental caries. We performed a cross sectional study. The samples were 81 children aged 24-59 months and 63% were male. The respondents of the study were the children's mother. The data of sugary food consumption were collected by using Semi Quantitative Food Frequency Questionnaire (FFQ) while the data of tooth brushing behavior was collected using a comprehensive questionnaire. The processing of tooth brushing questionnaire data was conducted by using Likerd Scale. The correlation between variables was tested using chi-square. The result showed that 64.2% of children under five suffered from dental caries, children with excessive consumption of sugary food were 72 % and children with good tooth brushing behavior were 56.8%. The p-value of correlation test between consumption of sugary foods and tooth brushing behavior with dental caries incidence were 0.007 (OR = 4.46, CI 95 % = 1.603± 12.4) and 0.01 (OR = 0.27, CI 95 % = 0.099± 0.75) , respectively. There was a correlation between consumption of sugary food and tooth brushing behavior with the incidence of dental caries in toddlers at Mranggen Polokarto Sukoharjo. Sugary food consumption had 4.46% risk factor of dental caries while tooth brushing behavior was not a risk factor of dental caries.

Keywords: sugary food, tooth brushing behavior, dental caries

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BACKGROUND

One of the largest dental health problems experienced by young children is dental caries. Basic Health Research (*Riskesdas*) Ministry of Health in 2013 showed 74.1% of the population experiencing dental caries and 68.9% were not treated. Dental caries is not just a problem in Indonesia, but also a problem that is still unsolved completely in the world. The prevalence of dental caries increases every year. Children under five years old are vulnerable to dental caries because they are less able to care for and maintain good oral health and hygiene and their teeth.

There are many factors that contribute to the development of dental caries but diet plays an important role [1] and the most cause of dental caries is consumption of sugars [2] . Processed starches have cariogenic potential when accompanying sucrose. In another study of among marginalized children 6-15 years in Addis Ababa, it showed that the majority of children consumed sugary food despite knowing its relation with dental decay. Seventy four percent had dental caries and 78% did not clean their teeth and were more likely to consume sugary food[3].

Based on data from Public Health Office (*Dinas Kesehatan*) of Sukoharjo 2014, the prevalence of dental caries in Community Health Centers (*Puskesmas*) Polokarto was 28.4 % or which reached 87 cases. Based on the preliminary results of the survey conducted at 4 posyandu in Mranggen Polokato Sukoharjo, from 133 children, there were 102 children who experienced dental caries. Therefore, the prevalence of dental caries incidence in Mranggen village amounted to 76.69 %. As for the behavior of brushing teeth in toddlers, there were 13 infants who did brushing teeth 2-3 times a day and 12.6 % of them had bad tooth brushing behavior.

METHOD

This research was observational with cross sectional study. The populations in this study were children aged 24 to 59 months who lived in the village Mranggen Polokarto District of Sukoharjo, which amounted to 733 children. The samples were 81 children who were chosen by proportional random sampling. The inspection methods to determine whether children under five were suffering from dental caries were done by using the form of health service conducted by the team of dentist from the Faculty of Dentistry UMS totaling two people. The method to determine the consumption of sugary foods was conducted by using semi quantitative FFQ form. The questionnaire consisted of some questions bout type of sugary food, frequency of consumption and the amount of consumption. On the other hand, the data of tooth brushing behavior were collected by comprehensive questionnaire. The questionnaire included questions about frequency of tooth brushing in a day, the frequency of using toothpaste a day, the time of tooth brushing, replacement of toothbrush and the monitoring of tooth brushing by the mother of the children. These questionnaires were directed to the mother's children.

Semi Quantitative FFQ was used to count the amount of sugary consumption for a day. There were two categories for sugary consumption: sufficient and excessive. It was categorized as sufficient when the consumption of sugary food ≤ 60% from total energy need; and it was categorized as excessive when the consumption of sugary food > 60% from total energy need. On the other hand, the score for tooth brushing behavior was calculated by using a Likert scale. The score of Likert scale was from one to three. The category of tooth brushing behavior was based on total score of comprehensive questionnaire. If the score was

more or similar than 9.23 (mean score of tooth brushing behavior), it was considered good but if the score was less than 9.23, it was considered as bad. Chi - Square test was used to know the correlation between variables. The data were collected on May through September 2015 and conducted in fifteen *posyandu* in the Mranggen village.

RESULTS AND DISCUSSION

Characteristics of children and mother's children

The subjects consisted of children aged 24-59 months and children's mother as respondents. The characteristics of the subject were described on the Table 1 below

Table 1. The characteristics of children and mother's children (n=81)

Children	n	%
Age		
24-36 month	42	51.9
37-59 month	39	48.1
Sex		
Male	51	63
Female	30	37
Mother's Children		
Level of education	n	%
Elementary school	23	28.4
Junior high school	32	39.5
Senior high school	17	21
University	9	11.1
Mother activity		
Housewife	35	43.2
Trader	30	37
employee	16	19.8

Table 1 described from the sample that the highest number of children was from the age range of 24-36 months old. The number of male infants was 23% greater than the number of female infants. It was known that in the village of the Mranggen Polokarto District, the number of male children was higher than the number of female children.

The numbers of children's mother in this study were 81 people. Most of the children's mother graduated from elementary school and junior high school. The age of children's mother was between 18 until 45 years old and majority of them were a housewife.

Distribution of sugary food consumption

Table 2. The distribution of sugary food consumption (n=81)

Sugary food consumption	n	%
sufficient (≤ 60 % E)	23	28
excessive (> 60 % E)	58	72

The results showed that most of the research subjects had an excessive habit of consuming sugary foods (72%) or as many as 58 children. The children who were 1 to 3 years start to know everything about environment including the habit of eating snacks. Most of the research samples consumed a lot of candy, sweet drinks, UHT milk and sweet snacks. In excessive children, it was showed that they ate candy ≥ 4 times/week, sweet snacks ≥ 3 times/day and drink sweet or UHT milk ≥ 2 times/week. The majority of the subjects consumed sugary food more than 2 times a day. The result of this study was almost similar to a study conducted in Malaysia in 2010, which found that the majority of subject consumed sugary food 2 times a day [4].

Distribution of Tooth brushing Behavior

The data from behavioral picture brushing teeth of 81 infants in the Mranggen Village, Polokarto District of could be seen in Table 3 below.

Table 3. The distribution of tooth brushing behavior (n=81)

Category	n	%
Good *(≤ 9.23)*	46	56,8
Bad *(> 9.23)*	35	43,2

Based on the above data it was known that 56.8 % children had good behavior more than bad behavior of brushing teeth. "A clean tooth will not decay," stated J Leon Williams (1852–931), the first president of the American Dental Association. He suggested that oral hygiene was sufficiently effective to prevent dental caries. Diet and oral health can be described as a synergistic relationship. Diet has a local effect on oral health, primarily on the integrity of the teeth, pH, and composition of the saliva and plaque [5,6]. Dental caries cannot occur without the substrate component of sugar. It can be from sweet snacks, sweet drink or candy especially sucrose that was considered to be more cariogenic than others sugar [1].

Distribution of Dental Caries

Most of the samples suffered from dental caries with more than 50%. The percentage of dental caries was seen on table 4 below:

Table 4. The distribution of dental caries (n=81)

Category	N	%
Caries	52	64,2
Not caries	29	36,8

The frequency distribution of the study subjects according to the incidence of dental caries in children aged 24-59 months in the village Mranggen was known that children with dental caries was 64.2%. The high incidence of dental caries was caused by the role of food that could cause dental caries, in which, consuming sweet foods excessively without showing dental health.

The correlation between consumption of sugary food and tooth brushing behavior with dental caries

The correlation between the consumption of sugary food with dental caries was described on the table 5 below

Table 5. Correlation between sugary food consumption and tooth brushing behaviour with dental caries (n=81)

Sugary food consumption	Dental caries				P*	OR	CI95%
	Caries		Not Caries				
	n	%	n	%			
Sufficient	9	39.1	14	60.9	0.007	4.46	
excessive	43	74.1	15	25.9			1.603±12.404
Behavior tootbrushing	Dental caries				p*	OR	CI95%
	Caries		Not Caries				
	n	%	n	%			
Good	24	52.2	22	47.8	0.01	0.273	
Bad	28	80	7	20			0.099±0.749

chi square test

Based on analysis of the relationship between habitual consumption of sugary foods to the incidence of dental caries using Chi-Square test showed that the p value of the data above was 0.007 (H0 <0.05), it meant that there was a significant correlation between the consumption of sugary foods with the incidence of dental caries. Carbohydrate (e.g., sweet snacks, candy, etc.), sweetened beverages and bad oral hygiene were the strongest risk factors for children [7]. The results of the Risk Estimate or risk factors known that OR (odds ratio) of the relation test sites generate 95% CI, that was between 1.603 ± 12.404, which meant that the consumption of sugary foods was a risk factor for dental caries because the value of the lower limit (lower) CI 95% already exceeded score 1. In other study, it was reported that there was a linear relation of caries to sugar intakes from 0% E to 10% E, and there was relation between eating sweets before bedtime [8,9,10].

Based on the table 7, it was also known that there was a relation between the behavior of brushing teeth with the incidence of dental caries (p < 0.05). However, tooth brushing behavior was not a risk factor of dental caries in this study. The value of OR obtained that 95% CI showed the number of 0.099 ± 0.749, which meant that the behavior tooth brushing was not a risk factor for dental caries. The subject with excessive consumption of sugary food could influence craniofacial development and oral mucosal and dental diseases including dental caries, enamel defects and periodontal disease [11,12].

In this study, subject consumed sugary food like sweet candy, sweet snack, chocolate and UHT milk was more than 4 times a week although their had good tooth brushing behavior. The plaque from sugary food can cover tooth surface after someone eat sugary food. Whereas, the subjects who did not brush their teeth could have plaque and induce bacteria in their enamel teeth [13,14]

CONCLUSION

Our findings in this study concluded that subjects with excessive consumption of sugary food habits were four times more at risk compared to subjects who had sufficient consumption of sugary food.

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