



Research Article

**Determinant of Dental Caries in Pre-School Children
at TK Permata Hati Bangkalan**

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ABSTRACT

Dental caries is one of the problems that often occurs in pre-school age children (3-6 years) as a result of unfavorable habits of children in maintaining dietary and brushing habits. The purpose of this study was to analyze the factors associated with the occurrence of dental caries in pre-school children. The type of research was observational analytic with cross sectional design. The samples were 81 children by using simple random sampling technique. The analysis of the data used univariate and bivariate using the Chi Square statistical test. The results showed that the factors associated with the occurrence of dental caries in pre-school children were the habit of eating cariogenic food ($p = <0.001$), the habit of drinking milk with a dot bottle ($p = <0.001$), the frequency of brushing ($p = 0.004$), and brushing time (<0.001). From 81 children which had been observed, 49 (60.5%) had dental caries, while 32 (39.5%) did not have caries. Therefore, serious efforts were needed to prevent dental caries in pre-school children by increasing the knowledge of mothers and pre-school children about proper and correct brushing procedures and encouraging mothers to have regular dental check-ups every 6 months, so that the problems related to oral health can be detected early.

Keywords: Dental caries, Pre-school children, Dietary habit, Brushing teeth habit

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INTRODUCTION

Dental caries is an infectious disease that destroys tooth structure. This disease causes cavities, blackening, and shrinking. Dental caries is one of problems that often occurs in pre-school age children (3-6 years) as a result of unfavorable habits of children in maintaining diet and brushing habits. Symptoms that are often experienced by patients with dental caries in pre-school age are pain or toothache which causes the child to lack appetite, so this can affect the child's growth and development and thought processes in school.

Indonesia occupies the 4th position which has the highest occurrence of dental caries in Southeast Asia. The risk of suffering dental caries in Indonesia is 12.70% of the total population

(Silveira Moreira, 2012). World Health Organization (WHO), health survey in 2017 states that the occurrence of dental caries in pre-school children is around 60-90%. In Indonesia, the prevalence of dental caries according to their age group is in children aged 3 years 60%, 4 years old is 85% and 5 years old is 86.4% (Katli, 2018). This shows that the prevalence of dental caries in pre-school children is still quite high. (Norfai & Rahman, 2017)

The prevalence of dental caries in Indonesia is still relatively high, based on data from the Indonesian Basic Health Research in 2013 stating that the index of tooth decay in Indonesia is 4.6 which means that the tooth decay of Indonesia's population is 460 teeth per 100 people (Kemenkes RI, 2013). According to data from Riskesdas in 2013 there was an increase in the prevalence of active caries in the Indonesian population compared to 2007, from 43.4% to 53.2% (Kemenkes RI, 2014).

The proportion of dental and oral health problems in East Java Province is 55%, while that health workers is only 9.5%. If seen from the habit of brushing teeth, 94% of East Javanese population aged ≥ 3 years do routine toothbrushes every day, but unfortunately only 1.9% brush their teeth properly (Kemenkes RI, 2018). When conducting a research at Tk Permata Hati Bangkalan on May 29, 2019, it found that out of 10 (ten) students examined, there were 8 students (eight) who had dental caries.

Pre-school age children are an age group that is very at risk of suffering dental caries, because the initial process of the occurrence of dental caries begins in pre-school age children and if this is not treated immediately, it will continue to get worse as the child ages (Widita, Pamardiningsih, & Vega, 2017). The main factors that cause dental caries in children aged 3-5 years are cariogenic dietary habits and lack of oral hygiene (Tang et al., 2014). Meanwhile, according to Dwi and Isroin et al, the factors causing dental caries are diet, drinking milk with dot bottle, the amount of saliva, and oral hygiene (Dwi, 2011; Isro'in & Andarmoyo, 2012).

Dental caries is a disease in the oral cavity caused by the activity of bacterial destruction of hard tooth tissue (enamel, dentin and cementum). If this damage is not treated immediately, it will spread and spread. If it is unchecked, it will cause pain, tooth loss, and infection. Caries that occur in the child's teeth can cause pain or toothache, then the child will lose his appetite and sometimes a fever can occur and the process of chewing food will be disrupted, so the child becomes lazy to eat and eventually becomes thin. Indirectly, dental caries in pre-school children will affect the process of growth and development of permanent teeth. One of the factors that influence the occurrence of dental caries is the lifestyle (host), where the choice of dietary patterns and habits of brushing that are not started early. In the pediatric period, dental caries often occurs as a result of poor dietary habits and bad toothbrushing habits.

Therefore, the aim of this study was to analyze the factors associated with the occurrence of dental caries in pre-school children.

METHODS

This type of research was observational analytic research. This study used a cross sectional design. The population in this study were all mothers who had pre-school age children (3-6 years) at TK Permata Hati Bangkalan, they are 103 people, while the study sample taken was 81 people who were randomly drawn using simple random sampling. Data collection techniques in this study were carried out by examining children teeth by using the observation sheet, then proceeding with interviews to the child's mother by using a questionnaire related to habits in maintaining oral health of their children. This research was conducted in August 2019.

The variables analyzed were cariogenic dietary habits, milk drinking habits using dot bottle, the frequency of brushing teeth, and the time of brushing with dental caries. Data analysis was performed univariately and bivariately using the Chi Square statistical test with the help of the IBM SPSS Statistics 22 significance application $\alpha = 0.05$.

RESULTS AND DISCUSSION

Table 1. Univariate Analysis of Research Subject Characteristics

No.	Characteristics	N	(%)
1	Mother's Age		
	<30 years	61	75,3
	≥ 30 years	20	24,7
2	Number of Children		
	<3 children	68	84,0
	≥ 3 children	13	16,0
3	Children's Age		
	3 years	28	34,6
	4 years	32	39,5
4	Mother's Education		
	Low (<SMA)	25	30,9
	High (\geq SMA)	56	69,1
5	Mother's job		
	Housewife	43	53,1
6	Family income		
	Low (<UMR)	31	38,3
	High (\geq UMR)	50	61,7
7	A history of toothache in the past 3 months		
	Yes	8	9,9
	No	73	90,1
8	Dental Check every 6 months		
	Yes	13	16,0
	No	68	84,0

*Note: UMR of Bangkalan city in 2019 Rp. 1.801.406,09

Source: Data Primer, 2019

Based on the data obtained from the characteristics of the study respondents in table 1, it was found that the majority of mothers aged <30 years were 61 people (75.3%). Based on the number of children in the family, almost all mothers have children <3, they are 68 people (84.0%). In this study, it was found that almost half of pre-school children aged 4 years which were 32 children (39.5%). The results show that nearly half of mothers have low education (<high school), they are 25 people (30.5%). Most of the mothers do not work or become housewives, they are 43 people (53.1%). Based on the family income that is obtained every month, the results show that there are 50 people (61.7%) that have an income above the Bangkalan City UMR.

Based on the data obtained through interviews with mothers in Table 1, the results showed that there are 8 children (9.9%) experienced signs and symptoms of toothache in the last 3 months, while 73 children (90.1%) did not experience signs and symptoms toothache in the last 3 months. From 81 children, there are 13 children (16.0%) who do routine dental check every 6 months, while there are 68 other children do not have regular dental check every 6 months in health care facilities.

Table 2. Univariate Analysis of Research Variables

No	Variable	Category	N	%
1	Kariogenik dietary habits	Often	46	56,8
		Rare	35	43,2
2	The habit of drinking milk with a dot bottle	Yes	50	61,7
		No	31	38,3
3	Frequency of brushing teeth	<2 x/day	15	18,5
		≥2 x/day	66	81,5
4	Brushing teeth time	No	50	61,7
		Right time	31	38,3
5	Dental caries	Caries	49	60,5
		No	32	39,5

Source: Data Primer, 2019

The results of the univariate analysis of the research variables contained in table 2 show that there are 46 children (56.8%) often eat cariogenic food, meanwhile, 35 children (43.2%) rarely eat cariogenic foods which can stimulate caries. 50 children (61.7%) still use a dot to drink milk, while 66 children (81.5%) have no longer used a dot when drinking milk. Based on the frequency of brushing teeth, it shows that 15 children (18.5%) brush their teeth <2 x / day, while 66 children (81.5%) brush their teeth 2x or more a day. However, children tend to brush their teeth at the wrong time, they are 50 children (61.7%), while only 31 children (38.3%) who brush their teeth at the right time. From 81 children, 49 (60.5%) had dental caries, while 32 (39.5%) had no caries.

The results of the chi-square statistical test analysis in Table 3 show that there is a significant relationship between cariogenic dietary habits and the occurrence of dental caries ($p = <0.001$). Similarly, the habit of drinking milk with a dot showed a significant relationship to the occurrence of dental caries ($p = <0.001$). Based on the habit of brushing teeth, there is a significant correlation

between the frequency of brushing ($p = 0.004$) and the time of brushing ($p = <0.001$) with the occurrence of dental caries.

Table 3. Bivariate Analysis of Factors Related to the Occurrence of Dental Caries

Variable	Dental Caries Occurrence		p	OR (CI 95%)
	Yes	No		
Kariogenik dietary habits				
Often	37	9	<0,001	7,88 (2,87-21,61)
Rare	12	23		
The habit of drinking milk with a dot bottle				
Yes	39	11	<0,001	7,44 (2,72-20,39)
No	10	21		
Frequency of brushing teeth				
<2 x/day	14	1	0,004	12,40 (1,00-99,81)
≥ 2 x/day	35	31		
Brushing teeth time				
No	42	8	<0,001	18,00 (5,81-55,81)
Right	7	24		

Source: Data Primer, 2019

Eating cariogenic foods can cause dental caries in children. Cariogenic food is a food that contain lots of sugar and carbohydrates, which is sticky and easily destroyed. The more often children eat cariogenic foods, the more risk they will experience dental caries. Children who often eat cariogenic foods have a 7.88 times greater risk of dental caries compared to children who rarely eat cariogenic foods. Pre-school children often consume cariogenic foods at school or at home, this shows that the frequency of consumption of cariogenic foods is included in the frequent category, in an average day, pre-school children eat sweet foods 2 times a day. The frequency of eating cariogenic foods more often has a greater effect on children to experience caries when compared to eating cariogenic foods in large quantities in a rare frequency.

This is in line with research conducted by Chen, et al (2019) and Azizi (2014) which states that the frequency of cariogenic food consumption is related to the occurrence of dental caries because cariogenic food consumed can cause caries-causing bacteria that cause acid in the teeth and if this continue to be carried out, it will trigger caries events more quickly.

The habit of drinking milk with a dot is still often practiced by pre-school children, especially before going to bed at night. This habit turns out to affect the dental health of children, the results of this study indicate that children who are accustomed to drinking milk with dot bottles are 7.44 more likely to suffer dental caries compared to children who do not drink milk with dot bottles. This result was also statistically influential with the significance of $p = <0.001$. The habit of drinking milk using a dot can cause dental caries in children because even if the child does not suck the milk, milk liquid will enter by itself from the bottle and can stagnate for a long time in the child's mouth when sleeping, this can cause a lot of plaque growth and bacteria that cause caries. In

addition, this is worsened if the child goes to sleep directly with a dot without brushing his teeth before going to sleep.

Research conducted by Ghaita, et al (2017) also shows the similar result that the dental caries index in children consuming milk with a dot is included in the high category (5.3) with a value of $p = 0.032$. Research by Yani, et al (2014) showed significant results ($p = 0,000$) regarding the effect of bottle-drinking habits on the occurrence of dental caries. Zahara and Andriani (2018) also mentioned that bottle feeding was associated with the occurrence of dental caries in children, because parents tend not to rinse the mouth of children such as gargling or brushing their teeth after feeding using a dot bottle.

Pre-school children who brush their teeth less than 2 times a day have a 12.4 times greater risk of developing dental caries compared to pre-school children who brush their teeth twice or more a day. The more often children brush their teeth, the risk is also reduced to suffer dental caries, because children who often brush their teeth will reduce plaque, bacteria, and food scraps that cause dental caries so it does not accumulate too long on the teeth. From 81 respondents in this study, most of the mothers interviewed (69.1%) had higher education (\geq SMA), this affected the behavior of mothers towards the dental and oral hygiene of their children. Mothers who are highly educated will be more alert to things related to the habit of brushing teeth. This study is also in line with research conducted by Aprinta, et al (2018), Inggit, et al (2018), Agostini, et al (2014), Quadri, et al (2018), and Hamasha, et al (20119) who states that the frequency of brushing teeth significantly influences the dental caries in children.

In addition to the frequency of brushing teeth, one important factor that is also related to the dental caries in pre-school children is the time to brush their teeth. Even though the child has brushed his teeth regularly $\geq 2x$ / day, if the mother does not pay attention to the right time to brush her child, then the remnants of food that can cause bacteria and plaque that cause caries is not wasted and stuck in between teeth. In accordance with the recommendations of PDGI 2016 (Indonesian Dental Association) which states that the right time to brush teeth is at least $2x$ / day after breakfast and before going to bed (Kemenkes RI, 2012). From 81 respondents in this study, only 31 children (38.3%) did the toothbrush at the right time after eating and before going to bed, while the other 50 children (61.7%) tended to brush their teeth just before breakfast and did not brush their teeth before going to sleep, even many children who fall asleep while sucking milk through a dot bottle. This might occur due to lack of mother's knowledge about the procedures in doing a good toothbrush.

The results of this study are in line with research conducted by Agung, et al (2015) which states that children who do not brush their teeth in a right time when experience caries in 2 teeth or more. Research conducted by Efendi, et al (2013) also shows the same result, that although the

average mother has brushed her teeth in the right way and frequency, the majority of these mothers do not brush their teeth at the right time .

CONCLUSION

The results showed that there was a significant relationship between dietary habits of cariogenic foods ($p = <0.001$), drinking habits with a dot bottle ($p = <0.001$), frequency of brushing ($p = 0.004$), and the time of brushing teeth with dental caries events (<0.001). This study also concluded that the occurrence of dental caries in pre-school children is still high, while the awareness of mothers to conduct routine dental check is relatively low. Therefore, a serious effort is needed to prevent dental caries in pre-school children. Some ways that can be done are by increasing the pre-school knowledge of mothers and children about good and right teeth brushing procedures and encouraging mothers to have regular dental check-ups every 6 months so that the problems related to oral and dental health can be detected early.

LIMITATION

The limitation in this study is this study only has a small subjects due to limited research resource and time before submitting the final report.

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Conflict of interest: Authors declare no conflict of interest.

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