

The Relationship between Mother's Oral Health Behavior and The Child's First Permanent Molar Caries Rate

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Abstract

A mother has a very important role in shaping the oral health behavior of her child because the mother tends to be the main caregiver in the family. The first permanent molars are susceptible to caries because these teeth are the first permanent teeth that erupt and many people do not know their location. The objective of this study was to analyze the relationship between a mother's oral behaviors with the caries rate of her child's first permanent molars. This study was done with an analytical descriptive cross-sectional design. The variables used were to correlate the mother's oral health behaviors with the caries rate of the child's first permanent molars. The questioner assessed the oral health behaviors of mothers through a knowledge, attitude, and practice (KAP) survey, and the caries assessments were done according to the World Health Organization (WHO). Oral health behaviors of the mothers were assessed from her oral health knowledge, attitude, and practice. Statistical analyses were performed with Mann Whitney and Kruskal-Wallis comparison tests, as well as Spearman correlation tests. Comparison tests between the mothers' and children's characteristics with the caries rate of the first permanent molars showed there was no significant difference ($p \geq 0.05$). A correlation test between oral health behaviors and caries rate of the first permanent molar showed a strong ($r \geq 0.66$) and significant ($p \leq 0.05$) correlation. A correlation test between mothers' oral health behaviors and their oral health knowledge, attitude, and practice showed a strong ($r \geq 0.66$) and significant ($p \leq 0.05$) correlation. It can be concluded that there was a significant correlation between oral health behaviors of the mothers and the caries rate of the children's first permanent molar. It can also be concluded that there was no correlation between the mothers' age, educational level, and employment status with the caries rate of the children's first permanent molar. There was a significant correlation between the mothers' behavior and the caries rate of the first permanent molar. There was also a correlation between the mothers' oral health behavior and their oral health knowledge, attitude, and practice.

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Introduction

With improvements in nutrition and greater access to dental care, previous research has focused on identifying the determinants of oral health in adults and children.¹ In addition to the substrate, microorganisms, host, and time,

there are several risk factors affecting the formation of caries.^{2,3} Caries risk factors include environmental factors, demographics, behaviors, and biological factors that are known to influence the occurrence of caries directly or indirectly.^{1,4,5} Parents are the primary decision makers on issues related to health and treatment of their children.^{5,6} The oral health of children is affected by parents' behaviors, particularly the mother's behavior.^{3,7-12} Childhood health behaviors are influenced by the mother's health behaviors because she is typically the primary caregiver in developing healthy expected behaviors.^{3,13,14} Mothers' knowledge concerning the first

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permanent molars remains low and, based on previous research, the first permanent molars are susceptible to caries.¹²

The first permanent molars can be a good basis to assess oral health status of children because these teeth are more susceptible to dental caries than others.^{2,8,12,15,16} The first permanent molar can experience caries in 1-2 years after eruption because of their morphological and functional characteristics.¹³ In addition, these teeth are growing when children consume high carbohydrate between meals, and still having poor oral hygiene habits and little knowledge about these teeth.^{12,13,16} Based on a previous study, 4.9 % of children 6 years of age has experienced caries in the first permanent molar, and that number increases with age.^{2,13,14} Another study stated that, of all tooth extraction that have done, 42% have involved the first permanent molar teeth.¹⁵⁻¹⁷ The purpose of this study was to analyze the relation between mother's oral behaviors and the caries rate of children's first permanent molar.

Materials and methods

This cross-sectional descriptive analytical research was conducted in May 2016 with 162 children and mothers of students in and elementary school in Jakarta, Indonesia, who are in grade 2 and 3 SD as subjects. This study was approved by the Ethics Committee of the Faculty of Dentistry, Universitas Indonesia, Jakarta, and received approval from the principal of the school concerned. The inclusion criteria for this study were children 8 to 9 years of age who were physically and mentally fit, and the child's mother signed an informed consent form and completed a questionnaire. The exclusion criteria were children who had systemic disorders, disabilities, developmental disorders, or an abnormal tooth structure. Another exclusion criteria was the refusal of the mother to participate in this study.

Mothers' behaviors were assessed using a modified knowledge, attitude, and practice (KAP) questionnaire containing questions about the first permanent molars of children. These items included the time of eruption, the location of the teeth, and the absence of a replacement tooth for the first permanent molar. The questionnaire also asked questions concerning the mother's oral health behaviors, such as her habits on visiting the dentist, her frequency of

brushing, and her frequency of consuming sweets. Questionnaires were completed by the mothers without assistance. From the responses, we obtained a total KAP score for the mother.

The first permanent molar teeth were examined clinically using a dental probe and proper lighting and lighting in the room. First, the tooth was isolated and dried using a cotton pellet, then the anatomy of the pit and fissure was visually inspected. The sonde halfmoon then passed through to identify caries. The first permanent molar teeth were categorized as having caries if the sonde stuck in the pit and fissure, and/or there were visible cavities. Caries rates were obtained by the sum of the teeth with caries divided by the teeth that were examined. Results of this study were obtained, then analyzed statistically using the Mann-Whitney comparison test, Kruskal-Wallis comparison test, and Spearman correlation test. The significance level used for this study was $p < 0.05$.

Results

We found 46 pairs of mothers and children, aged 8 to 9 years, who met the inclusion criteria. Of the 46 children assessed, there were 14 caries-free children and 32 children with caries. There was no significant association ($p > 0.05$) between the age, education, and employment status of the mothers with the caries rate of the children's first permanent molars (Table 1).

Mother's characteristics		Caries rate of the first permanent molars in children		
		n	Mean±SD	p value
Mother's age	≤ 34	11	2.36±0.67	0.19
	35-42	29	1.90±0.90	
	≥ 43	5	2.00±0.63	
Educational Level	Elementary & Middle	11	2±1.50	0.14
	High School	26	1.65±1.57	
	Diploma/Bachelor	9	1.22±1.30	
Employment Status	Not Working	36	1.67±1.47	0.63
	Working	10	2.00±1.83	

Table 1. Comparisons between age, education level, and employment status of the mothers with the caries rate of the first permanent molars in children.

The KAP questionnaire consisted of 11 questions about knowledge, 11 questions about attitude, and 10 questions about practice. Based

on the validity test, r values = 0.482 were obtained, so the questionnaire was considered valid. Reliability tests obtained a Cronbach alpha score of 0.621 for the questionnaire about knowledge, a score of 0.912 for attitude, and a score of 0.68 for practice. Therefore, the questionnaire was considered reliable. Results of correlation tests between mothers' oral health knowledge and the caries rate of the first permanent molars in children was a strong and significant negative correlation ($r = 0.453$; $p = 0.002$). A weak but significant negative correlation ($r = -0.337$; $p = 0.022$) was found between mothers' oral health attitudes and the caries rate. There was also a strong and significant correlation ($r = -0.509$; $p = 0.001$) between the mothers' oral health practice and the caries rate (Table 2). Table 3 shows a strong significant correlation ($p < 0.001$) between mothers' oral health behavior and knowledge ($r = 0.8$), attitude ($r = 0.766$), and practice ($r = 0.753$) of mothers' oral health behaviors.

Characteristics	Caries rate of the first permanent molars in children	
	r	p
Knowledge	-0.45	0.002
Attitude	-0.31	0.037
Practice	-0.51	0.001

Table 2. Correlation tests between knowledge, attitude, and practice of mothers' oral health and the caries rate of the first permanent molars in children.

Characteristics	Behaviors	
	r	p
Knowledge	0.8	< 0.001
Attitude	0.766	< 0.001
Practice	0.753	< 0.001

Table 3. Correlation tests between knowledge, attitude, practice, and behavior of mothers' oral health.

Discussion

This research was conducted with a cross-sectional descriptive analytical design. The authors chose this design because cross-sectional descriptive analytical studies are easy, inexpensive, and the results are obtained quickly because observations and variables are measured only once. This study design can also be used to examine many variables at once, but there are some shortcomings of this study

design. Numerous samples are required for analytical research with a cross-sectional design, but this method of research is unable to describe the course of a disease or the prognosis.¹⁸ In this study, mothers' behaviors were associated with the caries rate of first permanent molars in children. A mother is considered an important figure because she is typically the primary caregiver in the child's life and has an important role in helping her child develop expected oral health behavior patterns. Other studies have also correlated mothers' oral health behaviors with the prevalence and severity of children's dental caries. Based on this previous research, mothers who had a more positive attitude had children with better oral hygiene and a lower caries rate.^{1,3,9-11,14}

Teeth examined in this study included only the first permanent molars. Reasons for choosing the first permanent molar teeth were because these teeth are the most susceptible to dental caries. Susceptibility of these teeth to caries is due to the morphological and functional characteristics of the first permanent molar teeth and dental conditions that exist around these teeth that recently erupted. Pits and fissures in the tooth may cause food retention, so caries can easily occur at these sites compared to other smooth surfaces. Another reason the first permanent molar teeth are prone to dental caries is because they are the first permanent teeth that erupt in the arch. The first permanent molar teeth are important in the dental arch because it serves as a masticatory load barrier, they maintain the arch integrity, and they form a functional occlusion. Loss of teeth can cause the malposition of other teeth, a midline shift, and skeletal asymmetry.^{2,13,15,17} Based on the mothers' ages, our results found that mothers aged 35-42 years had an average score of 1.90 for caries rates of the first permanent molars. However, mothers aged less than 34 years had a mean of 2.36, and mothers over 43 years had an average of 2.00 for caries rates of the first permanent molars. Previous research has stated that the age when the mother was pregnant has some influence on her child's oral health. Younger mothers had children with a higher caries rate than those mothers who were older. The reason for the higher number of caries was because younger mothers may be less concerned with their child's oral health. Inexperience coupled with an inability of the

mother to understand and relate to the importance of her child's health is probably why younger mothers are less concerned about their child's oral health.^{1,14}

This study showed no significant differences between either the mother's education level or employment status with the average caries rates for first permanent molars. Mothers with a junior school education level (SMP) had an average caries rate for first permanent molars of 2.00, while mothers with a high school education (SMA) had an average score of 1.65, and mothers with a diploma/Bachelor's degree had an average of 1.22. The literature suggests that socioeconomic status and a mother's education level are associated with caries incidence in children. Families with low incomes or below average education levels tend to meet dental treatment needs only when symptoms appear. The education level achieved by mothers increase knowledge about oral health behaviors. This is followed by improvements in monitoring children's oral health practices, such as the use of toothpaste and the toothbrush, the right time to brush, and sweet consumption patterns.^{1,3,6-8,10,15,19,20} Based on the mother's employment status, non-working mothers had a mean of 1.67 for the caries rate for first permanent molars, while working mothers had a mean of 2.00. Based on previous research, a higher income promotes better living conditions and enables payments for health services. A previous study shows that in Indonesia, utilization of healthcare is more dependent on socioeconomic status rather than the need for dental care.²¹ However, other studies have reported that children whose mothers worked were more likely to consume sweets between meals. Moreover, sugar consumption patterns are strongly associated with dental caries and dental pain.^{1,3,10,14}

In this study, the mothers' behaviors were assessed through a questionnaire containing 11 questions regarding knowledge, 11 attitude questions, and 10 questions related to the practice of oral health care and first permanent molars. The questionnaire was completed by the mothers without help from the researcher. A disadvantage of this technique is the possibility of providing invalid information. Mothers who completed the questionnaire might not have understood the questions and provided answers they thought were expected by the researcher.

Completing questionnaires through the personal interview technique is more valid than self-completed questionnaires.²²⁻²⁴

Before being used as a measuring tool, the questionnaire in this study was evaluated with a validity and reliability test. A valid research instrument means that it can measure the variables meant to be measured, while reliability indicates it can produce consistent results. The validity of the questionnaire was measured by testing the correlation of each item with the total score of the questionnaire. The results of the correlation test for all items in this study indicated the questions were valid with $r \geq 0.482$. Reliability of the questionnaire in this study was measured with Cronbach's alpha, suggesting that the questions were reliable.^{18,24} In this study, mothers' behavior scores were obtained by summing the scores for knowledge, attitude, and practice. One study has stated that the formation of behaviors is influenced by knowledge, intelligence, perception, emotion, motivation, socioeconomics, and cultural factors.²⁵ Other studies have also suggested that knowledge, attitude, and practice of parents' oral health would shape the behaviors of their children's oral health.^{5,6} This study's results answered the hypothesis in showing there were significant correlations ($p < 0.05$) between knowledge, attitude, practice, and behavior of the mothers and children's caries rates for the first permanent molars. Statistical tests obtained negative correlation values for knowledge ($r = 0.45$), attitude ($r = -0.31$), practice ($r = -0.51$), and behavior ($r = -0.53$). Thus, it can be concluded that, if scores for knowledge, attitude, practice, and behaviors of mothers are good, then children's caries rates for first permanent molars will be low.

The results of this study were in accordance with previous research stating that good oral health knowledge is associated with better oral hygiene practices. People with a more positive attitude toward oral health had a better knowledge of their dental treatment. However, a good knowledge alone did not produce good oral health behaviors, because the mother's knowledge should also be supported by the mother's good attitude towards oral health. A positive attitude, which was associated with the mother's oral health, led to better oral hygiene, such as brushing twice daily.^{5,6,9-11,14} Studies have shown a significant ($p < 0.001$) and strong

correlation ($r \geq 0.7$) between mothers' oral health behaviors with knowledge, attitude, and practice of mothers' oral health in both children with and without caries. The results of this research answered the hypothesis that oral health behavior was influenced by knowledge, attitudes, and oral health practices. Knowledge, attitudes, and good oral health practices result in good oral behavior.^{5,6} Our findings were consistent with previous studies stating that good behaviors are based on knowledge. With appropriate oral health education, good oral dental health practices can be formed. Other studies have also suggested that mothers with a good understanding of oral health would have a positive influence on their children's oral health behavior.^{5,11} The measurement of attitude shows one's feelings toward issues and ideas one has. Our results were consistent with previous research claiming that mothers who had a positive perception towards oral health were better able to maintain their children's oral hygiene, so that children had better teeth and gingival health.^{6,11,21} This study showed that good oral health practices of mothers had a significant correlation with mothers' oral health behaviors. Practices that support oral health, such as dental visits and routine brushing, could be important determinants for oral health behavior. Parents should give instructions and monitor their children's brushing habits.^{10,11,14,25,26}

Conclusion

From this study, we conclude there was no significant difference between mothers' age, educational level, and status of employment with the caries rates for first permanent molars in children. However, there was a correlation between mothers' oral behaviors and caries rates. This study also found significant correlations between knowledge, attitude, practice, and behavior of mothers' oral health in children with or without caries. There must be effective education and simulation to improve knowledge, attitude, and practice of mothers' and children's oral health. In addition, further research needs to be done to produce an effective educational tool and simulation, including videos, photos, figure books, among other, to improve knowledge, attitude, and practice of mothers' and children's oral health.

Declaration of Interest

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