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Research Article

Oral Health Status between Mothers and Their Children: Epidemiological Study in North Jakarta, Indonesia

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ABSTRACT

Background : Mother is an important figure in the family specially for children. Mother is primary caretaker of children and plays very important role in children's character building. Children under 5 years generally spend most their time with mother. Mother's life style and behavior more and less will influence their children. Therefore children's oral health status was assumed having correlation with their mother. **Objective :** The research's purpose is to investigate the correlation of oral health status between mother and their children. **Methods :** The study is conducted on 216 pairs of mothers and their children, aged between 3-5 years. Clinical examination is carried out on research's subject by 2 calibrated dentists. Oral health status is expressed as caries experience, plaque's index, plaque's pH, saliva's pH, and the presence of gingivitis. Plaque's index was estimated using Loe and Sillnes Index. Plaque's pH and saliva's pH was measured with Plaque check-pH and Dental saliva pH indicator. The data was statistically analyzed. **Results :** The result shows there is a significant correlation of caries experience, plaque's index, plaque's pH, saliva's pH and gingivitis status between mother and their children. **Conclusion :** Maternal factor influences on children's oral health. Mother's oral health status have significant correlation with their children's oral health status. Hence every attempt will be made to involve mother in oral health programs, for better children's oral health.

INTRODUCTION:

Oral health is an essential component of general health. It affects many aspects of human life, such as quality of life, self esteem, learning, mastication, speaking, and other routine activities. Oral diseases mainly dental caries and periodontal disease are major public health problem around the world. Oral disease could not cause death directly, but it could be a risk factor for other systemic disease, such as tonsillitis, pharyngitis, otitis media, bacteremia, toxemia, low birth weight, diabetes mellitus and heart disease.[1,2]

In developing country such as Indonesia, dental caries and periodontal disease are the most common oral disease. World Health Organization (WHO) global data (2000) showed 60-90% of student population in the industrialized countries have dental caries. Based on *Riskesdas* 2007, the prevalence of active caries in Indonesia's student population is 72.1%. Oral disease cause pain and suffering, and the treatment is expensive. Severe untreated oral disease will affect child development; quality of life such as cognitive development, body weight, and will affect to the family and community. Dental caries is one of the problems during a child's growth and development, besides malnutrition, obesity, and allergies.[3-5]

Mother is an important figure in the family especially for children. Mother is primary caregiver of children and plays very important role in children's character building. Generally children aged under 5 years are spending time with parents, especially mothers. This is the early years in which the social life like habits and behavior were adopted. Dietary habits, healthy behaviors, as norms or rules in the family, depending on the knowledge and attitudes of parents. Many studies have reported that the more positive the parents' attitudes towards oral health, their children's oral health status is better.[6-8] Mother provide support and role modelling to children, influencing children's oral health. There is the relationships between children's oral health behavior, and their mother's socio-economic status, health beliefs and oral health behaviour.[6,9,10]

Dental caries and mostly periodontal disease are preventable disease. The things mentioned above can be an important information that will improve children's oral health. The parents, generally unaware about the concept of oral disease in children, which is an infectious disease that is strongly influenced by parent's oral health status, especially mother. The identifications is an essential component to improve prevention strategy of oral disease in children. Mother's knowledge, positive behavior and attitude towards dental care are very important in preventive cycle.

MATERIAL AND METHODS

The cross sectional study was conducted in *PAUD* and *Posyandu*, Kelapa Gading, North Jakarta, Indonesia. The proportion of children with caries in mothers with caries more than 80%, the proportion of caries free children in caries free mothers 60%, and a ratio of 3, then obtained a sample of 216 pairs mother and children, aged between 3-5 years. The Human Ethical Research Committee of the Dentistry Faculty, Indonesia University approved the study protocol and written informed consent was obtained from each patient at the beginning of the study (protocol no. 07980915/2015). The inclusion criteria were as follows : children aged between 3-5 years, boys or girls, and mother as primary caregiver.

Oral health status was assessed through the following clinical examination by 2 calibrated dentists. Oral health status was expressed as caries experience, plaque's index, plaque's pH, saliva's pH, and the presence of gingivitis. Caries experience, was estimated by presence or no of dental caries in mother and children. Plaque index (PI) using the standard plaque index of Loe and Sillnes. Subjects are evaluated based on plaque index score as 0-3. Plaque's pH and saliva's pH were measured with GC Plaque check-pH and GC Dental saliva pH indicator. Gingivitis assessment using the presence of gingival inflammation. The saliva pH measurement, subjects were asked for spit into the cup, and asked not to eat and drink 1 hour earlier. Saliva collection was done in 8-10 in the morning. Collected data was statistically analyzed using Chi Square and Spearman test.[11,12.]

RESULT

A statistical description of the 216 pairs mothers and children base on caries experience, plaque's index, gingivitis, plaque's pH and saliva's pH. Overall, among the subjects which is more prevalent are caries compare with caries free, plaque index 1, negative gingivitis compare with positive gingivitis, plaque's pH > 6.3 and saliva's pH ≥ 6. The descriptions are presented in table 1.

Table 1. Subject's description

Variable		Mother		Children	
		N	%	N	%
Caries experience	Caries	199	92.1	117	81.9
	Caries free	17	7.9	39	18.1
Plaque's index	Plaque's index 3	9	4.2	2	0.9
	Plaque's index 2	60	27.8	24	11.1
	Plaque's index 1	130	60.2	162	75
	Plaque's index 0	17	7.9	28	13
Gingivitis	Positive	101	46.8	79	36.6
	Negative	115	53.2	137	63.4
Plaque's pH	≤ 6.3	78	36.1	60	27.8
	> 6.3	138	63.9	156	72.2
Saliva's pH	< 6	102	47.2	98	45.4
	≥ 6	114	52.8	118	54.6

Statistical analysis of caries experience, gingivitis, plaque's index between mother and children shows a significant relationship caries experience ($p<0.05$), gingivitis ($p< 0.001$), and plaque's index ($p<0.05$). The result is provide in table 2 and table 3.

Caries experience and gingivitis

Table 2. Statistical analysis of caries experience and gingivitis between mother and children

Variable		Children's caries			Children's gingivitis		
		Caries	Caries free	p*	Positive	Negative	p**
Mother's caries	Caries	167 (83.9)	32(16.1)	0.018			
	Caries free	10 (58.8)					
Mother's gingivitis	Positive				153 (79.7)	39 (20.3)	<0.001
	Negative				17 (14.3)		

*Chi Square Test *Significancy $p < 0.05$ **Significancy $p < 0.001$

Plaque's index

Table 3. Statistical analysis of plaque's index between mother and children

		Children's plaque's index				
		Plaque's index 3	Plaque's index 2	Plaque's index 1	Plaque's index 0	p
Mother's plaque index	Plaque's index 3	0 (0.0)	2 (22.2)	7 (77.8)	0 (0.0)	0.043*
	Plaque's index 2	0 (0.0)	7 (11.7)	50 (83.3)	3 (5.0)	
	Plaque's index 1	2 (1.5)	12 (9.2)	96 (73.8)	20 (15.4)	
	Plaque's index 0	0 (0.0)	3 (17.6)	9 (52.9)	5 (29.4)	

*Chi Square Test, Linier by linier association *Significancy $p < 0.05$

The research's result also provide that plaque's pH and saliva's pH between mother and children, has a significant relationship, and correlation coefficient of Spearman Test (r) which plaque's pH $r = 0.330$ and saliva's pH $r = 0.329$ (table 4).

Plaque's pH and saliva's pH

Table 4. Statistical analysis of correlation and significancy of plaque's pH and saliva's pH between mother and children

	Children's plaque's pH	Children's saliva's pH
Mother's plaque's pH	$r = 0.330$ $p < 0.001$* $n = 216$	
Mother's saliva's pH		$r = 0.329$ $p < 0.00$* $n = 216$

*Spearman Test. *Significancy $p < 0.001$

DISCUSSION

Oral health is an integral part of general health, further oral cavity is the port of entry of the body. Oral health is a determining factor for human quality of life. WHO state that political, social, economic, cultural, environmental, behavioral, and biological factors may improve or impair oral health.[13]In the context of the mother-child relationship, it is known already that the behavior of the parents, especially the mother, will affect the health of their children.

Some literature states that there is a relationship between the oral health behavior of children with oral health status, socio-economic status, health beliefs and oral health behaviors of their mother. For children, parents are the main source of information about oral health. Parents should be aware that they are role models for their children and should be motivated to improve their children's oral health.[9,14-17]The result of this study provides significant correlation between oral health status of mother and their children. Oral health status is expressed as caries experience, plaque's index, plaque's pH, saliva's pH, and the presence of gingivitis (Table 2,3,4). Analysis of correlation shows a significant relationship of caries experience between mother and children (Table 2). According to the American Academy of Pediatric Dentistry (AAPD) which mentioned that infants and children who have mothers with high levels of Streptococcus mutans, it will be at high risk to get the transmission of these organisms than children whose mothers had a low level S. mutans. Microbiological studies correlate mother's salivary levels of S. mutans with caries experience in her children. Another factors that will determine are transmission time, the child's age, composition and flow of child's saliva.[6]

Other studies show an association between maternal caries experience and children caries experience. This indicates that the mother's caries is a good predictor of the caries' risk in children. Caries in children is closely linked to his mother. Besides bacterial transmission, the pattern of habits and attitudes to children. The correlation between oral health status of mothers and children is also characterized by a high caries prevalence of children with significant tooth loss in the mother.[7,14] Meanwhile, connecting to research by Laksmiastuti and Budiardjo (2015), noted that the incidence of caries in children can be predicted through the mother caries incidence. Mother's plaque pH despite having a strong correlation with children's plaque pH, but statistical analyzing prove that can not be used as a predictor of caries in children.[18]This study similar with research conducted by Bozorghmer et al (2013), that there was a significant correlation between the history of having dental problems in parents and dmft index in their children. Parallel with Retnakumari and Gibi (2012) study in Kerala India, mention that mother's DMFS score and caries severity in their children are statistical significant.[7]

Table 3 and 4 show a significant correlation of plaque's index, plaque's pH and saliva's pH between mother and children. Dental caries initiated by fermentation. The process will produce strong organic acids such as lactate acid and pyruvate acid. Many bacteria in dental plaque can ferment carbohydrates. Fermentation will cause rapid pH decrease within 4-5 minutes. Estimated 1 mm^3 dental plaque weight equivalent about 1 mg, will contain over 200 million bacteria. The plaque index showed that the patients already failed to clean the oral cavity effectively. Dental plaque cariogenicity determined by acid production of bacteria. S. mutans and lactobacilli proportion in the supra-gingival plaques have a direct correlation with the pathogenicity of dental plaque.[19,20]

Saliva affect the incidence of dental caries through mechanism : agent of mechanical cleansing of accumulated plaque, reducing demineralization by contain of calcium, phosphate and fluoride, as a buffer and neutralize the acid produced of microorganism, as an antibacterial. The quality and level of adequate saliva secretion is important for oral health. Zhou et al (2007) in his research showed that the pH of saliva in caries-free children was statistically higher than children with early childhood caries. Regarding to Animireddy et al (2014) mention in their study that the pH, buffer capacity, viscosity and flow rate of saliva has a definite association with the caries activity in children.[20-22]

The study presents a significant relationship of the presence of gingivitis between mother and children (Table 2). Gingivitis defines as an inflammation involving only the gingival tissues surrounding the tooth. Marginal gingivitis is the most common form of periodontal disease. Clinical features of gingivitis are gingival bleeding, gingiva's color changes, changes of consistency and surface texture of gingiva. Oral hygiene and gingivitis are closely related. Okada et al (2008) research conclude mother's periodontal health had a significant direct relationship to the oral health status of their children. Mother's behavior about oral hygiene contribute in incidence of periodontal disease in their children. Maternal support is essential for prevention of dental caries and gingivitis in children. By establishment of excellent oral hygiene habits in children, the risk of periodontal disease is lowered.[9,11,22]

Many maternal factors are assumed have a correlation with the oral health status of children, such as mother's age, mother's education level, mother's attitudes, knowledge, behavior, and maternal anxiety. Nourijelyani et al (2014) in their

research state that sex, family income, mother's education level, mother's DMFT score, mother's CPI (Community Periodontal Index) have an association with the oral health status of children.[7,24] Children of younger mother are said have a higher incidence of caries, because the mother pay less attention to their children's dental health. Mothers with low education levels are often associated with poor oral health in children. Previous research showed that women with higher educational qualifications are reported have children with better oral health. Maternal anxiety is one of the important factors affecting children's oral health. This is apparent from their poor oral hygiene habits and irregular visits to the dentist.[7,25]

Mothers are responsible for the lifestyle, behavior, habits of their children and they are main source of oral health information. Good understanding, knowledge and attitude of parents are essential to improve their children oral health.[8,26] An effort should be made, i.e. the anticipatory guidance which is proactive counseling for parents and patients about the developmental changes that may occur in the interval visits. This matter include information about specifics care every day for the next phase. Some of it are a prenatal counseling, peri natal oral health and oral hygiene, diet, nutrition and food choices, fluoride, interviewing for motivation, antimicrobials, and medicine. Preventive dentistry will be more successful by applying anticipatory guidance, and is expected to reduce the incidence of dental caries.[27,28]

Basic oral health education should be performed in children during the first year (0-12 months). Plaque control starts when the first tooth erupts. According to the American Academy of Pediatric Dentistry (AAPD), poor mother oral health has high risk of infecting her children with cariogenic bacteria and it can increase the risk of early childhood caries. AAPD suggest to the mother to maintain oral hygiene both of mother and children by dietary control, using fluoride toothpaste, and using mouth rinse. Recent studies provide a new paradigm to prevent oral disease in children that is the integration of the family's component ; particular parental psychosocial factors. Traditional methods of health promotion, which just the emphasis on changing oral health behavior through dental health education, it is considered ineffective for the long term.[28,29]

CONCLUSION

Mother is an important figure in the family specially for children and plays important role in children's character building. The behavior of parents especially mothers, affect their children's health, particular oral health. From the research has been done there is a significant correlation between oral health status such as caries experience, plaque's index, plaque's pH, saliva's pH, and gingivitis of mother and their children.

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