ORIGINAL ARTICLE

The Influence of Parental Behavior on the Dental Caries Status and Saliva Acid Level of Children Aged 6-7 Years in Malang City Elementary Schools, Indonesia.

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ABSTRACT

Introduction: Dental caries exhibited an 88.8% DMFT index of 7.1, from the 2018 National Indonesia Research study. The age group 6–12 years had the highest of dental caries, caused by multifactors, individual, parental behavior and role, and school. The aim of this study to determine parental conduct affected student's saliva acid levels and dental caries. **Methods:** 90 elementary school children, and their parents from three Malang City schools participated in the quasi-experimental study design using purposive sampling. Informed consent was obtained, parents were given questionnaires of parent's oral health behavior, and 6 variable based on TPB and students were assessed for dental caries DMFT WHO Index and acid level instrument to measure saliva acid levels. Parental behavior was independent variable, saliva acid level and dental caries status were dependent variables and analyzed with multiple linear regression **Results:** the saliva acid level had a value of 5.6 - 7.8, and their average DMFT was high. Only two variables significantly correlated between parent's conduct and student DMFT: the outcome evaluation variable. The clinical evaluation parental conduct and DMFT significantly correlated by Pearson analysis, a sig value of less than 0.05 for both. The outcome demonstrated a significant (sig value <0.05) between saliva acid level and motivation to comply. **Conclusion:** the average saliva acid level was alkaline, for parent's behavior significant between the motivation to comply variable and saliva acid level, only outcome evaluation variable and the parent behavior variable were significantly correlated between parent's conduct and student DMFT.
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INTRODUCTION

Dental and oral health problems, especially dental caries, are a problem experienced by almost half of the world's population (3.5 billion people). Dental and oral problems are often encountered, especially in low and middle income countries. According to WHO (World Health Organization) (1), in 2016 the incidence of childhood caries was 60-90%. This shows the large number of dental and oral problems on a world scale, especially dental caries. According to National Riskesdas data in 2018 (2), dental caries in Indonesia occupy the highest percentage of dental problems, 88.8% with a DMFT index of 7.1. The proportion of dental caries in East Java province is 42.44%, with the highest percentage of decayed, cavities and missing teeth in the 5-9 year age group, was 49.88%. Data in Malang City, based on data from the East Java provincial health profile in 2021(3), the percentage of dental and oral health services for elementary school children is only 31.3%, meaning that not all elementary school children are served or do not receive treatment at health service centers.

The cause of the high prevalence of dental caries, especially the prevalence of dental caries in the elementary school age group (6-12 years) is caused

by multi-factorial factors, including individual child factors (clinical and behavioral), the behavior and role of parents, and the role of the school also plays a role. important for improving children's dental and oral health. There is significantly influence between parental behavior and knowledge and caries in children 5-6 years old.

In terms of clinical factors, there are four factors that influence dental caries (4): host/tooth factors, substrate factors (fermentation results from carbohydrates/food) which cause the saliva acid level of the oral cavity to become acidic and enamel demineralization occurs, bacteria, and time. Clinically, according to WHO, dental caries can be measured using the dental caries index, one of which is DMF-T (permanent teeth) and dmft (primary teeth).

Another causal factor was behavior, behavior is the most dominant thing that influences dental and oral health status (5). Dental health behavior includes several factors, knowledge, attitudes and practice/ actions related to the concept of dental health as well as efforts to prevent them. According to Ramadhan (6), knowledge was a very important factor in maintaining oral and dental health. Dental health knowledge was something that will later underlie attitudes which will then influence a person's behavior in maintaining oral hygiene. Knowledge about dental health can be assessed through several components, it was knowledge about healthy teeth, the consequences of dental health problems and the correct way to care for teeth (7).

Researchers Ulfah and Utami (8) have studied how parental behavior and knowledge affect kindergarteners' oral health and caries prevention. The sample size for this study consisted of sixty kids between the ages of five and six. The study's findings revealed that parents' behavior toward their children's dental caries was $p<0.05$ and that their understanding of the condition was 0.000 ($p=0.000$), with a significance level of 5% (0.05), so that $p<0.05$ and parents' behavior with children's dental caries.

Dental caries in children is significantly influenced by parental conduct. Parental conduct needed to change in order to promote the dental health of their children. In terms of the fourth phase of the theory (the educational phase), the proceed-precede theory describes three factors that affect changes in an individual's behavior: predisposing factors (knowledge, attitude, belief, personal perception, and self-efficacy), enabling factors (health service facilities), and reinforcing factors (social support, economics, empathy of doctors, nurses).

Other research related to Fisher-Owens' multifactorial theory, research by Szymaczek et al (9) which examined the clinical status of 7 year old children with PUFA index (individual level) and parental education, area of residence, socio-economic factors. status, parental opinion, number of family members, and barriers to visiting the dentist in Poland (family level), the results showed that parental education and economic status influence oral health behavior and dental services utilization. According to Lei Dou, et al (10), caries risk assessment using a cariogram model without a saliva test does not significantly reduce caries-predictive ability in children and young adults. Even so, saliva testing is used in the majority of caries risk evaluations for clinical caries examinations, one of the causes of dental caries is host salivary factors and the anatomical shape of the teeth.

School level is also a factor to consider, children spend most of their time at school. Therefore, preventive dental health education programs can be implemented in schools with the aim of promoting dental and oral health, increasing awareness of dental and oral health, and preventing dental and oral diseases.

Research on the impact of parental behavior on the clinical condition of primary school-aged children (DMFT and saliva acid level) was interest to research due to issues gleaned from secondary data and studies pertaining to children's dental caries. Based on problems obtained from secondary data and research related to children's dental caries, researcher were interested to had research about the influence of parental behavior on the clinical condition of elementary school age children (DMFT and Saliva acid level).

MATERIALS AND METHODS

Ethical clearance

This research had an ethical test from the health research ethics committee of the Ministry of Health's health polytechnic (State Polytechnic of Health Malang), with a description of ethical approval Reg.No: 629/KEPK-POLKESMA/2022.

Study participants

The participants or respondents in this research were 90 students of grade 1 elementary school (aged 6-7 years) and the parents of 90 students, they were from three elementary school (Al Yalu private elementary school, Landungsari 1 state elementary school, and Tunjungsekar 2 state elementary school) in Malang City, East Java, Indonesia. Inclusion criteria of respondent were age 6-7 years, parent had signed informed concent .

Students were clinically examined for dental caries with DMFT (Decay Missing Filling Teeth for adult teeth), while parents were given questionnaires about oral health knowledge and behavior adopted from the theory of behavior change/Planned Behavior Theory. The questionnaires asked about parent’s oral health behavior (knowledge and attitudes), and 6 variable based on TPB: outcome evaluation (avoid serious dental

diseases by having regular check-up to dentist/OE1, take the child for routine check-up to the dentist and brush teeth routinely according to time and frequency/OE2), motivation to comply (Cares about what other people (such as doctors, nurses or family) think about what should be done for dental health /MC), behavioral beliefs (Can develop self-discipline due to routine check-ups at the dentist,/BB1, Has healthy teeth due to regular check-ups at the dentist/BB2), control beliefs (Feel lazy and bored to carry out for routine check-ups at the dentist/ CB1, How often do you go to the dentist for routine check-ups/CB2), poer of control factors (When you are lazy and bored, it becomes more difficult to carry out routine visits to the dentist,/PCF1, If you ever failed to carry out routine check-ups at the dentist, this will make you lazy to carry out re-checks /PCF2) and normative belief (Other people (doctors, nurss, or family) think that I should have regular check-up at the dentist/NB).

Dental examination (DMFT and saliva acid level)

This study used the WHO DMFT dental caries status sheet for permanent teeth. We used mirror mouth, probe WHO and head lamp to checked dental caries of students. We checked decay (teeth caries), missing (missing teeth or teeth that should be extracted) and filling (teeth filling, temporary or permanent), and then we add up D,M, F. We checked saliva level acid by saliva acid level instrument, students were asked to spit saliva in a small container and then we checked saliva with saliva acid level instrument.

Behavior study of parents

The TPB/ Theory of Planned Behavior is widely used in research on changes in dental health behavior from theory Ajzen (13) examined this theory to determine the relationship between three dependent variables, namely healthy diet, oral hygiene, and visits to the dentist, with four independent variables, attitude , subjective norms, perceived behavior control and intention.We used questionnaire based on TPB theory for parents to obtained the data.The dependent variable in this study was parental behavior of dental health, and the independent variable was the student's clinical condition, the child's dental caries status (DMFT) and saliva acid level of the students..

Statistical Analysis

Descriptive analysis to describe the characteristics of respondents: age, gender and parental education. Apart from that, descriptive analysis was used to describe parental behavior (knowledge, attitudes) regarding dental health. Descriptive analysis was also to describe students' clinical teeth with DMFT (Decay Missing Filling Teeth). Pearson correlation was used to describe the linear relationship between the six variables, while multiple linear regression analysis was used to evaluate predictions from the dependent variable, outcome evaluation, motivation to comply, behavioral beliefs, control beliefs, power of control factors, and normative beliefs.

A Likert scale with a score range of 1 to 7 (very good, quite good, somewhat good, neutral, rather bad, quite bad, and very bad: 1 for very good, 7 for very poor) is used to answer the 16 questions on knowledge and attitudes regarding dental health (P1-P16). The questionnaire also includes interval data. Based on the TPB behavior change theory, the behavior change questionnaire assigns a score of 1 to 7, with 7 denoting a poor response and 1 representing a positive response. The two questionnaires have previously undergone validity and reliability tests in various areas.

RESULT

Respondent characteristics

Based on the results of the analysis on Table I, it can be seen that the characteristics of the respondents were: We had two group respondents, students and parent of the students. Most of parent's respondents were aged 31-40 years, 51 people (56.7%), respondents aged 21-30 years were 22 people (24.4%) and the remainder were aged 41-50 years, 17 people (18 .9%).

Table I. Distribution analysis of respondent characteristic

Character-istic	Description	Frequen-cy	Percentage (%)
Age	21-30 year	22	24,4
	31-40 year	51	56,7
	41-50 year	17	18,9
Gender	Male	17	18,9
	Female	73	81,1
Education	Diplo-ma degree	4	4,4
	Bachelor degree	29	32,2
	Master degree	8	8,9
	Elementary school	6	6,7
	Middle School	12	13,3
	High school	31	34,4
Number of Children	1 child	22	24,4
	2 children	42	46,7
	3 children	23	25,6
	4 children	2	2,2
	6 children	1	1,1
Total		90	100

Most of the respondents' gender was female, namely 73 people (81.1%) while the remaining 17 people were male (18.9%).

The highest number of respondents' education was high school degree, they were 31 people (34.4%) and the next highest was bachelor degree were 29 people (32.2%) while the least was undergraduate, 4 people (4.4%).

The largest number of respondents with 2 children, 42 people (46.7%), the second most respondents with 3 children are 23 people (25.6%) and the third most have 3 children, namely 22 people (24 .4%) while the fewest respondents had 6 children, namely 1 person (1.1%).

Student's respondent were aged 6-7 years. Totally student 's respondents were 90 students, 75 students aged 7 years and 15 students aged 6 years. The gender of the respondents, 86 were girls and 15 boys. Respondents came from 3 elementary schools in Malang City, namely Landungsari 1 State Elementary School, Tunjungsekar 2 State Elementary School, and Al Integrated Elementary School. Ya'lu in the Malang City area, East Java.

Descriptive analysis

Based on of the descriptive analysis Figure 1 it can be seen that the highest average answer value is for item number p6 (for the question : Most of my friends demand that I go on diet to avoid dental caries) which is 4.18, close to number 4, meaning that the majority of respondents answered neutrally on this item. The lowest average answer value was in item p14 (I demand that my child brush his teeth twice a day and have regular dental check-ups) which was 1.69, close to 2, meaning that the majority of respondents answered quite appropriately on this item. The average value of the parental dental health behavior variable was 2.52, which is close to 3, which means that most respondents answered somewhat appropriately.

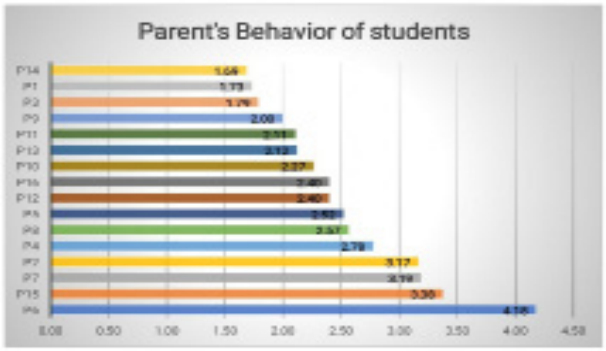

Figure 1. Bar diagram of dental health behavior of parents of students.

Based on the descriptive analysis, Figure 2, it can be seen that the highest average answer value was in item PCF1 (When you are lazy and bored, it becomes more difficult to carry out routine checks at the dentist) which is 3.99, close to 4, meaning that the majority of respondents answered neutral on the item. The lowest average answer value was found in item OE2 (Bringing children for routine check-ups to the dentist and brushing teeth regularly according to time and frequency), namely 1.40, close to 1, meaning that the majority of respondents answered very well on this item. The highest average answer value based on variables is in the PCF (Power of control factors) variable, it was 3.78, close to number 4, meaning that the majority of respondents answered neutral on this item. The lowest average answer value based on the variable is the OE (outcome evaluation) variable, namely 1.47, close to 1, meaning that the majority of respondents answered very well on this item.

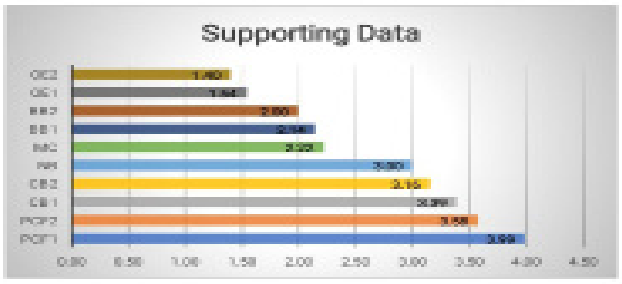

Figure 2. Bar Diagram of Supporting Data Variables

The Result of descriptive analysis, it was known that the saliva acid level variable had a minimum value of 5.6 and a maximum value of 7.8. The average and standard deviation of saliva acid level is 7.0654 ± 0.36796.

The DMFT variable was known to have a minimum value of 0 and a maximum value of 16. The average and standard deviation of the DMFT variable was 5.3778 ± 4.34619.

Correlation analysis

Based on the results of the Pearson correlation analysis, it can be seen that the parental behavior variable and the outcome evaluation variable had a significant relationship with DMFT because both had a sig value <0.05. Each of them had a correlation coefficient value of 0.290 and 0.208, which means that each had a positive relationship with DMFT, the result was the better the parent's behavior, the higher the DMFT value, the lower the parent's behavior, the lower the DMFT value.

Based on the results of the Pearson correlation analysis, it can be seen that the motivation to comply variable had a significant relationship with saliva acid level because it had a sig value <0.05. The correlation coefficient value between motivation to comply and saliva acid level is -0.329, which means it had a negative relationship with saliva acid level, the result was the better the motivation to comply, the lower the saliva acid level value and vice versa, the lower the motivation to comply, the higher saliva acid level value.

DISCUSSION

Parents' age, gender, money, and educational attainment all had an impact on their children's subjective norms and how much pressure there is from society to engage in certain behaviors. A person's approach to learning and information seeking will be influenced by their level of education. The degree of schooling affects how information is translated, leading to variations in the information (knowledge) that is acquired (14) and

Ramadhan (6) said in his research knowledge was a very important factor in maintaining oral and dental health. An individual's conduct in maintaining oral hygiene is influenced by their attitudes, which in turn are shaped by their understanding of dental health. There are various ways to evaluate someone's knowledge about dental health, including their understanding of good oral hygiene, the effects of dental health issues, and how to take proper care of their teeth (7).

Table II. Correlation Analysis between Parental Health Behavior and Supporting Data with DMFT

Variable	Correlation Analysis between Parental Health Behavior and Supporting Data with DMFT			Correlation analysis between parents' health behavior and supporting data with salivary PH		
	r calculated	Sig	Description	r calculated	Sig	Description
Parent's Behavior	0,290	**0,006**	**Significant ***	0,024	0,822	No Significant
Outcome Evaluation	0,208	**0,049**	Significant *	-0,017	0,875	No Significant
Motivation to Comply	0,090	0,401	No significant	-0,329	0,002	**Significant ***
Behavioral Beliefs	0,188	0,076	No significant	0,096	0,369	No Significant
Control beliefs	-0,179	0,091	No significant	-0,149	0,161	No Significant
Power of control factors	-0,110	0,301	No significant	-0,131	0,217	No Significant
Normative Belief	-0,057	0,596	No significant	-0,140	0,187	No Significant
	*significant=parent's behavior and outcome evaluation			*Significant = motivation to comply		

The results of the descriptive analysis of students' parents regarding their parents' attitudes towards dental and oral health was in Table I and II, the lowest answer is item p14 (I demand that my child brush his teeth twice a day and have routine dental check-ups) which is 1.69 , meaning that parents were less likely to demand that their children brush their teeth twice a day after breakfast and before going to bed at night, and also less likely to encourage them to go to the dentist for routine check-ups.

On the other hand, item p6 (Most of my friends insist that I go on a diet) had the highest average answer value, 4.18, which is quite near to 4. This indicates that most respondents answered neutrally on this item, indicating that parents still heed the advice and opinions of friends and family. about the foods, beverages, and diet that can impact oral and dental health. The TPB (Theory of Planned Behavior) behavior theory in Ajren (13) states that knowledge, personality, and social demographic characteristics all have an impact on an individual's normative ideas. One can acquire information from the media, experience, and knowledge. When it comes to health, information and expertise should be gathered from professionals in the relevant field. Three dimensions comprise behavior: knowledge, attitude, and practice.

The average value of the parental dental health behavior variable was 2.52, which is close to 3, which means that most respondents answered somewhat appropriately. The results of behavioral research in the practical domain of students' parents regarding dental and oral health were on the item power of control factors/PCF1 (When you are lazy and bored, it becomes more difficult to carry out routine check-ups at the dentist) which was 3.99, close to number 4, meaning that parents of students rarely go to the dentist for routine check-ups because they were lazy or bored. and also if you ever fail to carry out routine controls, it makes you lazy to carry out controls again (PCF2). Dental caries in children is significantly influenced by parental conduct.

Parental conduct needs to change in order to promote the dental health of their children. In terms of the fourth phase of the theory (the educational phase), the proceed-precede theory states that there are three factors that influence changes in a person's behavior: predisposing factors (knowledge, attitude, belief, personal perception, and self-efficacy), enabling factors (health service facilities), and reinforcing factors (social support, economics, empathy of doctors, nurses).

The average result was low on the outcome evaluation (OE) items, the lowest average answer value was found on item OE2 (Bringing the child for routine control to the dentist and brushing teeth regularly according to time and frequency) which was 1.40, close to 1 meaning that the majority of respondents answered very well on this item.

Clinical examination of students, permanent tooth caries (DMFT/decay missing filling teeth) and saliva acidity level, showed that the saliva acid level variable had a minimum value of 5.6 and a maximum value of 7.8. The average and standard deviation of saliva acid level is 7.0654 ± 0.36796. The DMFT variable is known to have a minimum value of 0 and a maximum value of 16. The average and standard deviation of the dmft variable is 5.3778 ± 4.34619.

Normal saliva acid level ranges from 6.8 -7, if it is below 6.8, including acid level, it had the potential to cause enamel demineralization, causing tooth caries/cavities. The results of research on elementary school students aged 6-7 years showed that the average saliva acid level was 7 .8 means the average pH was alkaline which did not cause dental caries. This was in accordance with research from Dou L et al (10), which concluded that the cariogram model for caries risk assessment (CRA)

without a saliva test did not significantly influence the reduction in the ability to predict a child's caries history, this CRA model could be a useful tool. potential for measuring dental caries in a population.

Only two variables were found to be significant in the Pearson correlation study between parent conduct and student DMFT: the outcome evaluation variable and the parent behavior variable. Visit the dentist for your child's regular checkups, and remember to brush your teeth on a time-and frequency-based basis. The results indicated a positive association between the two variables in the correlation analysis: the higher the DMFT value, the better the parents' behavior, and the lower the DMFT value, the worse the parents' behavior. This went against the TPB theory (13) which stated that attitudes toward behavior, perceived behavior control, and subjective norms all have an impact on intention, which in turn influences conduct.

The results of the Pearson correlation analysis, correlation analysis between parent behavior and student DMFT, it can be seen that only 2 variables were significant, the parent behavior variable and the outcome evaluation variable. take your child for routine check-ups to the dentist and brush your teeth regularly according to time and frequency. It showed that the correlation analysis had a positive relationship with DMFT, meaning that the better the parents' behavior, the higher the DMFT value and vice versa, the lower the parents' behavior, the lower the DMFTvalue. This was not in accordance with the TPB theory (13), which said that behavior is influenced by intention, intention is influenced by subjective norms, perceived behavior control, and attitudes towards and behavior. The child's dental caries/DMFT will be low if the parents practiced good oral health behavior, not the other way around. All three of these elements are controlled by information factors, social factors, and personal factors—in this case, The results of the Pearson correlation analysis showed in Table II, that the motivation to comply variable had a significant relationship with saliva acid level because it had a sig value <0.05. The correlation coefficient value between motivation to comply and saliva acid level is -0.329, which means it had a negative relationship with saliva acid level, meaning that the better the motivation to comply/care about what other people (such as doctors, nurses or family) think about what should be done, the lower the saliva acid level value and vice versa, the lower the motivation to comply, the higher the saliva acid level value.

CONCLUSION

The PsEPE's major active compound possess promising anti-inflammatory properties suitable for orabase formulations due to their effective inhibition of COX-2. Moreover, they are anticipated to have favorable topical distribution in orabase within the oral cavity. As an orabase topical medication compound, the PsEPE's major active compound (GA, EA, Cat) studied in this research showed the ability to penetrate into oral mucosa membrane. In addition, the PsEPE's major active compound may better maintain the strength and binding position with the target protein, hence indicating stability in inhibiting inflammation. Consequently, further investigations encompassing in vitro and in vivo analyses are recommended to precisely elucidate the anti-inflammatory potential of PsEPE's major active compound, leveraging insights gleaned from this research.

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