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Herbal Toothpaste Extracts (Betel Leaf, Lime, and Salt) to Reduce Plaque

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ABSTRACT

Data from the 2018 Riskesdas reported that 96.5% of the 10-14 years old group had good tooth brushing behavior, namely brushing their teeth every day. However, from this percentage, only 2.1% brushed their teeth at the right time. Plaque cannot be removed be simply rinsing and sprying water. Plaque can only be completely removed by mechanical means. Herbal toothpaste is toothpaste that contains natural ingredients such as extracts (betel leaf, lime and salt). The addition of herbs to toothpaste is expected to inhibit plaque growth. The aim of the study was to determine the effect of herbal toothpaste with betel leaf extract, lime juice and salt to reduce plaque in grade IV children at Pudak Payung 01 Elementary School.The type of research used was descriptive quantitative with a cross-sectional approach. Namely by examining the plaque directly into the oral cavity of children who are research respondents. The results showed that the herbal extract paste (betel leaf, lime, and salt) was more effective and most significant in reducing the dental plaque score, which decreased by 22.2 with an average decrease in score of 1.2. It is hoped that children at Pudak Payung 01 Elementary School can always maintain healthy teeth and mouth by using herbal extract tooth paste (betel leaf, lime and salt).

INTRODUCTION

The World Health Organization defines health as a state of being free from disease and disability. Health is the most basic right of every human being, without discriminating against race, religion, politics, and socio-economic conditions (Organization, 2015). Dental and oral health is part of overall body health. Dental and oral health can reflect the health of the body as a whole, including if there is a lack of nutrition and symptoms of other diseases in the body (RE et al., 2021). Dental and oral health problems can have a negative impact on daily life, including reducing general health, lowering the level of self-confidence, and interfering with performance and attendance at school or work (Purnama et al., 2020).

Dental and oral health is a state of health of the hard and soft tissues of the teeth and related elements in the oral cavity that allows individuals to eat, speak, interact socially, without dysfunction, aesthetic disturbances, and discomfort due to disease, occlusion deviation, and loss. teeth so that they can live productively socially and economically (Ramadhani et al., 2022).

The results of Basic Health Research in 2018 reported that 57.6% of Indonesia's population had dental and oral problems in the last 12 months. The proportion of dental problems in Indonesia is broken/cavities/sick teeth 45.3%. Meanwhile, oral health problems experienced by the majority of Indonesians are swollen gums and boils, which are 14%. Tooth brushing behavior based on the age group of 10-14 years in Indonesia in 2018, as many as 96.5% had good tooth brushing behavior, namely brushing their teeth every day. However, from this percentage, only 2.1% brushed their teeth at the right time, namely at least twice, after breakfast and before going to bed (Riskesdas, 2018).

Data from the Central Java Province report, the proportion of dental and oral health problems in Semarang City, the community has dental health problems as much as 48.38%. Meanwhile, based on the age group of 10-14 years, the number of tooth decay/cavities/sore problems was 37.38%. Meanwhile, the proportion of scaling actions aged ≥3 years in Semarang City was 2.95%. Tartar is caused by plaque buildup on teeth that is not removed. This means that dental scaling in the community in Semarang City is still low.

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Based on data from SDN Pudak Payung 01 regarding oral health in students at SDN Pudak Payung 01, the average score for dental and oral health was 3 (poor). For this reason, the researchers wanted to conduct research at that location because no research had ever been conducted on extract herbal toothpaste (betel leaf, lime and salt) with the target sample used being class IV children. Because it was found that grade IV children had the highest average poor score, namely 3.2.

Toothpaste is an auxiliary material used to clean teeth mechanically from food residue, remove plaque and bad odor in the mouth. Toothpaste is made with the aim of helping to maintain oral health (Puspitasari et al., 2018). Herbal toothpaste, namely toothpaste that predominantly contains natural ingredients such as betel leaf extract, lime and salt. The addition of herbs to toothpaste is expected to inhibit plaque growth. Because it comes from nature, this toothpaste is safe to use. Herbal toothpaste in its packaging is listed as containing a type of plant extract (D. D. A. Putra et al., 2015).

Betel leaf and lime are plants that are often added and used as active ingredients in toothpaste. This is because betel leaves contain antibacterial properties against gram-positive and gram-negative bacteria, especially against Staphylococcus bacteria (D. D. A. Putra et al., 2015).

The addition of herbs to toothpaste is expected to clean debris or plaque deposits on the surface of the teeth and gums so that they can prevent dental and oral diseases. This is related to the herbal ingredients used, namely types of herbs that are able to inhibit microbial growth. Herbal toothpaste derived from plants is definitely safe and natural. Herbal toothpaste on the packaging is listed as containing types of plant extracts including betel leaf, lime, and salt which are useful as anti-germs to keep teeth and mouth healthy, and inhibit plaque growth (F. S. Putra & Mintjelungan, 2017). Essential oils from betel leaf and lime have greater antibacterial activity against Streptococcus mutans than flour. Essential oils have benefits as an antibacterial against several bacteria, namely: Stapylococcus aureus, Bacillus cureis, Salmonella typi, and Cadinda albicans group (Oroh et al., 2015). Meanwhile, a salt content of 10% can inhibit the growth of Streptococcus mutans bacteria (Rahmadina & Marlindayanti, 2020).

METHOD

The type of research used is descriptive quantitative with a cross-sectional approach, namely collecting data at the same time. The aim was to determine the effectiveness of herbal extract toothpaste (betel leaf, lime and salt) to reduce plaque. The location of this research was Pudak Payung 01 Public Elementary School. The research was conducted in February 2023. The population in this study was 40 children. The sample in this study were 40 graders at SDN Pudak Payung 01. The research instruments used were examination sheets and checklists. The data collection mechanism is carried out in the following stages:

Preparation Stage

1. Introducing the researcher to the respondents/grade IV children at Pudak Payung 01
2. Selected samples in class IV children who are willing to be respondents and have filled out informed consent.
3. Divide the respondents into two groups, each group consists of 20 children

Implementation Stage

1. The first day of the study was carried out in a group of ordinary toothpaste users
2. Examine the plaque using a disclosing solution to determine the initial plaque index score
3. Brush your teeth together using regular toothpaste
4. Examine the plaque using a disclosing solution to determine the final plaque index score
5. Fill in the checklist provided by the researcher
6. On the second day, the plaque was examined using disclosing solution in the herbal extract toothpaste user group (betel leaf, lime, and salt) to determine the initial plaque index score
7. Brush teeth together using herbal extract toothpaste (betel leaf, lime and salt) that has been provided by the researcher
8. Plaque examination using disclosing solution to determine the final plaque score
9. Fill in the checklist that has been provided by the researcher

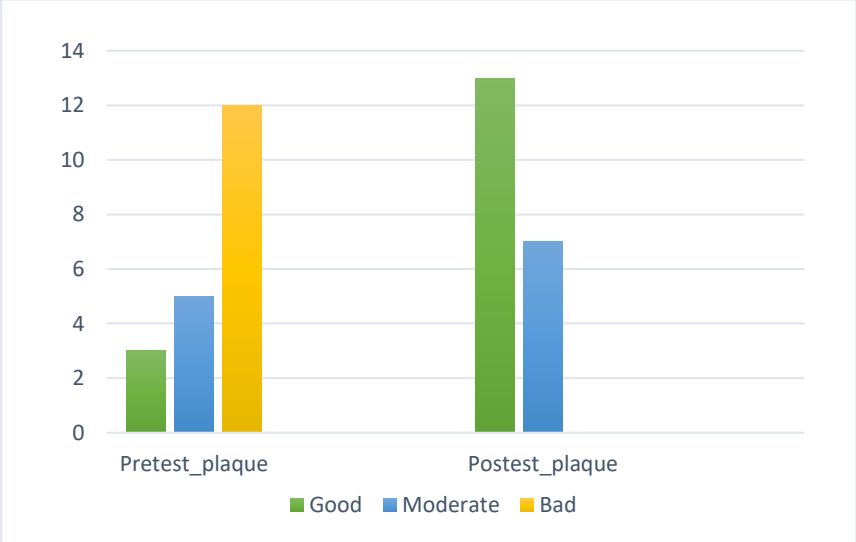
The data analysis used in this study was carried out manually, namely the researcher examined the plaque directly in the respondent's oral cavity. The data obtained from the plaque examination results were then entered and presented in the form of a frequency distribution diagram.

RESULT

The data was collected from the results of plaque examination regarding Extract Herbal Toothpaste (Betel Leaf, Lime, and Salt) in Class IV Children at SDN Pudak Payung 01. Data collection was carried out by direct examination into the oral cavity of the respondents who were the research samples. From the results of the examination, the data is presented in graphical form as follows.

Graph 1. Plaque Score Distribution before and after the Ordinary Toothpaste Group

The graph above shows that the plaque index scores before and after using ordinary toothpaste from 20 respondents were, as many as 0 respondents for good criteria, 5 respondents for moderate criteria with a total plaque index of 8.3, and 15 respondents for bad criteria with a total plaque index 40,1. The total plaque index score after using ordinary toothpaste from 20 respondents was, as many as 3 respondents for good criteria with a total plaque index of 2.4, 17 respondents for moderate criteria with a total plaque index of 27.2, and 0 respondents for bad criteria. The average plaque index score before was 2.4 and the average after was 1.4, which decreased by 1.

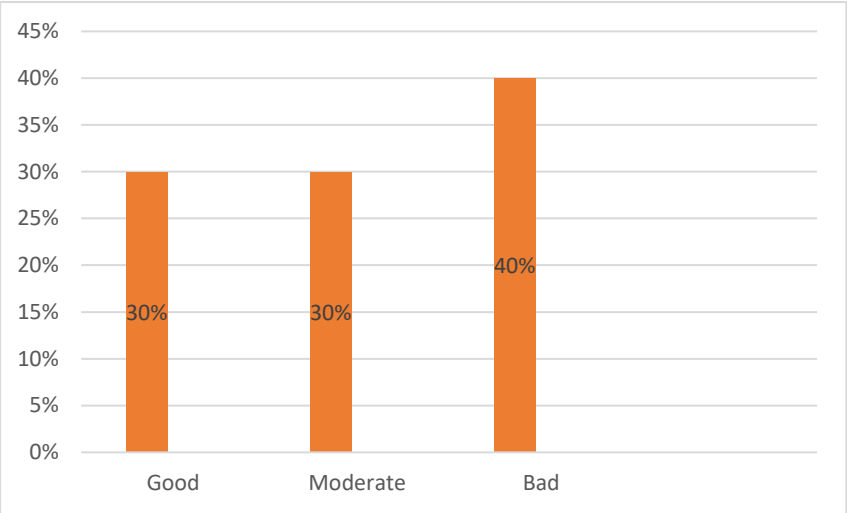


Graph 2. Plaque Score Distribution before and after the Extract Herbal Toothpaste Group (Betel Leaf, Lime, and Salt)

The graph above shows that the plaque index scores before and after using extract herbal toothpaste (betel leaf, lime and salt) from 20 respondents were, as many as 3 respondents for good criteria with a total plaque index of 2.1, as many as 5 respondents for criteria moderate with a plaque index of 7.7, and 12 respondents for bad criteria with a plaque index of 28.2. Total score

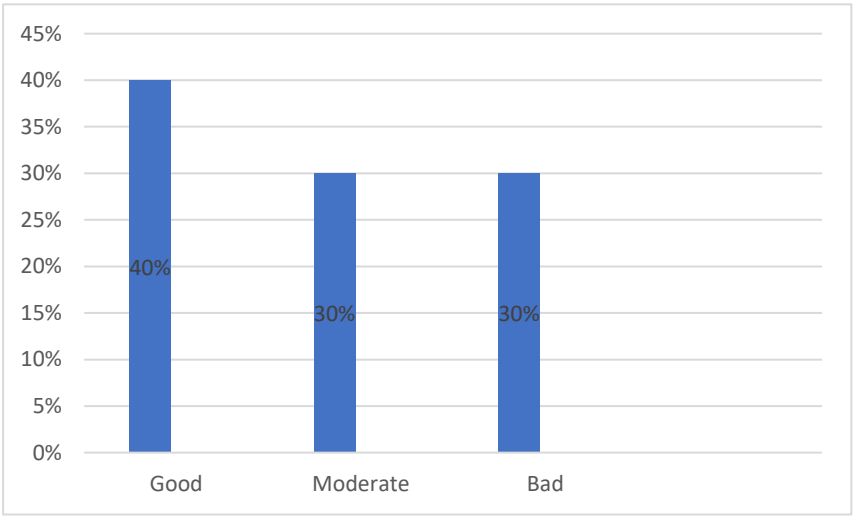
plaque index after using herbal extract toothpaste (betel leaf, lime, and salt) from 20 respondents, as many as 13 respondents for good criteria with a total plaque index of 5.8, as many as 7 respondents for

moderate criteria with a total plaque index of 10 and 0 respondents for bad criteria. The average plaque index score before was 1.9 and the average after was 0.7, decreased by 1.2



Graph 3. Distribution of Plaque Scores before and after in Users of Herbal Extract Toothpaste (Betel Leaf, Lime, and Salt) Regular Toothpaste Users Group

The graph above shows that the use of herbal toothpaste with betel leaf extract, lime, and salt in the group of ordinary toothpaste users was 6 respondents for good criteria with a percentage of 30%, then 6 respondents for sufficient criteria with a percentage of 30%, and 8 respondents for less criteria with a percentage of 40%.



Graph 4. Distribution of Plaque Scores before and after in Use of Herbal Extract Toothpaste (Betel Leaf, Lime, and Salt) Group of Herbal Extract Toothpaste (Betel Leaf, Lime, and Salt)

The graph above shows that the use of herbal extract toothpaste (betel leaf, lime, and salt) in the herbal extract toothpaste user group (betel leaf, lime, and salt) is as many as 8 respondents for good criteria with a percentage of 40%, then 6 respondents for sufficient criteria with a percentage of 30%, and 6 respondents for less criteria with a percentage of 30%.

DISCUSSION

Based on the results of research conducted at Pudak Payung 01 Elementary School, it can be seen that the non-herbal extract toothpaste users (betel leaf, lime and salt) or ordinary toothpaste users have an average initial plaque index score of 2.4 with the criteria bad. Meanwhile, the group using herbal extract toothpaste (betel leaf, lime and salt) had an average initial plaque index score of 1.9 with moderate criteria.

Based on Basic Health Research in 2018, Tooth brushing behavior based on the age group 10-14 years in Indonesia is 96.5% having good tooth brushing behavior, namely brushing their teeth every day. However, only 2.1% of these behaviors brush their teeth at the right time. While plaque control is carried out mechanically, namely controlling plaque by brushing your teeth, and chemically, namely rinsing your mouth with an antibacterial solution. However, this is influenced by several factors including the use of tools, methods of how to brush your teeth, frequency of brushing your teeth, and time to brush your teeth (Himawati, 2021).

The average final plaque index score after using regular toothpaste was 1.4 with moderate criteria. Experienced a decrease in the average plaque index score by 1. And the average final plaque index score after using herbal extract toothpaste (betel leaf, lime, and salt) was 0.7 experienced a decrease in the average plaque index score by 1 ,2. Plaque control can be carried out in the simplest way, namely brushing teeth, and success can be determined by individual ability to use a toothbrush, use toothpaste, frequency of brushing teeth, and the right duration of brushing teeth.

The use of herbal extract toothpaste (betel leaf, lime, and salt) in this study showed the most significant reduction in the plaque index score. This is related to the additional ingredients for herbal toothpaste, namely betel leaf, lime, and salt. The results of this study were strengthened by the results of previous research by (Nabillah, 2019) with the title Description of Using Toothpaste Containing Lemon Essence and Sea Salt with Ordinary Toothpaste on Decreasing Plaque Index in Grade IV Students at SDN 026559 Binjai, Kec. West Bank. with the results before use having moderate criteria with a percentage of 53.3% and after use with toothpaste containing lemon essence and sea salt it becomes good with a percentage of 100%.

It was also proven in the Journal of Clinical Trials on the Use of Herbal Toothpaste on Reducing the Oral Cavity Plaque Index, that betel leaf has the largest component in suppressing plaque formation, flavonoid compounds which are acidic in nature can kill plaque-forming cells. Apart from betel leaf, lime also has several types of components including: Citrate, Calcium, Phosphorus, Iron, Vitamins, Sinerfin, H-methyltiramine, Flavonoids, Ponsirin, Herperidin, Rhoifdia, and Narinin. The chemical components of lime that cause a decrease in plaque are flavonoids (D. D. A. Putra et al., 2015).

Whereas in the journal the effectiveness of gargling with 10% salt solution on reducing plaque scores in (Rahmadina & Marlindayanti, 2020) that salt has an effect on Streptoccocus mutans bacteria, and high salt solutions can kill bacteria and are effective in reducing plaque scores.

From the results of the above research regarding the use of herbal extract toothpaste (betel leaf, lime, and salt) it shows that education about the use of toothpaste in children is still not good. Children aged 8-10 years still need parental guidance in using a brush, toothpaste, and how to brush their teeth. So that the role of parents greatly affects the dental health of children. It is categorized as good if the child is able to answer questions correctly as many as >6 questions, it is considered sufficient if the child is able to answer questions correctly as many as =6 questions, and it is considered poor if the child is able to answer questions correctly as many as <6 questions.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that there is the herbal extract toothpaste (betel leaf, lime and salt) is more effective and the most significant in reducing the dental plaque index score.

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