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EFFECTIVENESS OF BREADFRUIT *(Artocarpus altilis)* LEAF GARGLING ON SALIVARY PH AND PLAQUE SCORES IN OUTPATIENT POLYCLINIC STAFF AT KERINJING COMMUNITY HEALTH CENTER, OGAN ILIR DISTRICT, 2024

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ABSTRACT

Background: *One of the main causes of dental caries is the accumulation of dental plaque, a soft, thin biofilm that adheres to tooth surfaces and the gingival margin. Plaque comprises a polysaccharide matrix, microorganisms, enzymes, inorganic substances, epithelial cells, leukocytes, and macrophages. Mechanical and chemical methods, such as using antiseptic mouthwash, can help reduce plaque. Breadfruit (Artocarpus altilis) leaves contain antibacterial properties and have potential as a natural mouthwash.*
Method: *This quasi-experimental study involved 30 participants selected through purposive sampling. Data were collected via direct clinical examinations, and statistical analysis was conducted using the Paired T-Test.*
Result: *The average salivary pH before gargling was 6.173, increasing to 6.487 after using boiled breadfruit leaf solution, showing a mean increase of 0.313. The mean dental plaque score before gargling was 2.957, which significantly decreased to 1.513 after the intervention—a reduction of 1.443. Statistical tests indicated significant differences between pre- and post-gargling salivary pH (p = 0.027) and plaque scores (p = 0.000).*
Conclusion: *Gargling with a boiled breadfruit leaf solution significantly reduced plaque scores and moderately increased salivary pH. The intervention proved more effective in lowering plaque levels than altering salivary pH, suggesting that breadfruit leaf mouthwash may be a promising natural alternative for oral hygiene maintenance, particularly among staff at the Kerinjing Health Center, Ogan Ilir Regency.*

Keywords: *breadfruit leaves; saliva Ph; plaque score*

INTRODUCTION

According to the Regulation of the Minister of Health Number 89 of 2015 concerning dental and oral health efforts. Dental and oral health is a healthy state of hard and soft tissues of teeth and related elements in the oral cavity that allows individuals to eat, speak and interact socially without dysfunction, aesthetic disorders and discomfort due to occlusion deviation disease and tooth loss so that they are able to live productively socially and economically (Ministry of Health, 2015).

Based on SKI data in 2023, as many as 57% of the population aged ≥ 3 years experienced dental and oral problems within 1 year after the incident. When compared nationally with the 2018 Riskesdas data, there was a decrease in dental and oral problems by 0.5%. The population with dental and oral problems in the province of South Sumatra was 56.2%. The Indonesian population reached a prevalence rate of dental caries at the age of >3 years of 82.8% (Ministry of Health, 2023).

Saliva is one of the factors that influence the caries process, because saliva always wets the teeth so that it affects the environment in the oral cavity. has different compositions and concentrations, which may affect the condition of the salivary glands and cause the oral cavity in each individual. Factors that affect the composition and concentration of saliva include saliva flow rate, volume, pH, and saliva buffer capacity. Increased saliva flow causes a low caries risk, conversely slow saliva flow causes a high caries risk because it reduces the saliva

buffer capacity which can lower saliva pH so that it becomes one of the factors causing an increased risk of caries development. In addition, low saliva can cause the increase in saliva pH to last longer. The longer the saliva pH is in a low condition, the more tooth demineralization can occur, resulting in caries (Senawa et al., 2015).

Based on the high prevalence of dental caries, efforts are needed to control dental plaque. Efforts to remove dental plaque can be done mechanically, for example by brushing teeth or chemically, namely by using mouthwash containing antiseptics (Nurmeida, 2020).

The use of plants as traditional medicine has long been used by the Indonesian people, some are still based on hereditary experiences and some have been developed through scientific research. Since the past until now, people have used plants processed according to traditional ancestral recipes to cure diseases. Many plants spread across Indonesia make some people not yet aware that around them there are many plants that are efficacious as medicines, for example breadfruit leaves and betel leaves that can be used as mouthwash to eliminate bacteria in the mouth (Bempa et al., 2016).

Based on a preliminary study conducted on Outpatient Staff at the Kerinjing Health Center, it was found that most of the Outpatient Staff of the Health Center had poor dental and oral hygiene. This condition was evident from the results of dental observations that showed a lot of plaque buildup on the surface of the teeth. Based on a preliminary study, it was obtained that not all Outpatient Staff of the Kerinjing Health Center could maintain good dental and oral hygiene and the staff often asked for alternative mouthwashes other than using non-herbal mouthwashes. This happened because of a lack of knowledge, attitudes and behaviors related to the concept of health and toothache and prevention efforts.

METHODS

This research design is a quasi-experimental study that uses a control group but the control group cannot fully function to control the ias (external) variables that can influence it. The implementation in this study is the Non-Equivalent Control Group Design which is almost the same as the pretest posttest control group design where in this design observations are carried out twice, namely before the treatment called the pre-test and after the treatment called the post-test (Tukatman et al., 2023).

RESULT AND DISCUSSION

Research on the effectiveness of gargling with boiled breadfruit leaves on saliva pH and plaque scores on staff of the Kerinjing Health Center Outpatient Clinic in 2024, which was conducted on January 31, 2025, with a sample size of 30 people obtained as follows.

Table 1. Difference in saliva pH before and after gargling with breadfruit leaf decoction

Variable	N	Pretest	Post Test	Difference	p-value
pH of Saliva		6,173 (±0,7348)	6,487 (±0,5686)	0,3133 (±0,7361)	0,027
Plaque score		2,957 (±0,5853)	1,513 (±0,6553)	1,4433 (±0,5211)	0,000

The results of the study showed that the pH of Saliva of the outpatient polyclinic staff of Kerinjing Health Center before gargling with boiled breadfruit leaves had an average pH of 6.173 while after gargling with boiled breadfruit leaves had an average pH of 6.487. This can be seen in table 4.3 that respondents before gargling (Pretest) with an average value of 6.173 were 22 respondents (73.3%) while after gargling (Posttest) showed an increase in salivary pH where some respondents had salivary pH conditions with an average value of 6.487 as many as 27 respondents (90%).

From these results, the pH of saliva before and after gargling with boiled breadfruit

leaves increased with an average value of 0.3133. The results of this study were also confirmed in a study conducted by Abraham Yandri Samoy (2020) There is an effect of breadfruit leaf extract as a mouthwash on saliva pH in dental nursing dormitory students as evidenced by a significant value of p = 0.000. The acidity level of saliva before gargling breadfruit leaf extract, the acid criteria is 70%. The acidity level of saliva after gargling breadfruit leaf extract, the neutral criteria are 55%. There is a significant difference between the pH before and after gargling breadfruit leaf extract. From the results of the saliva pH examination on 30 staff of the Kerinjing Health Center outpatient clinic regarding the results of the examination after only a few staff had changes in acidic saliva pH after gargling with boiled breadfruit leaves. Saliva is one of the factors that influences the process of caries, because saliva always wets the teeth so that it affects the environment in the oral cavity. Saliva also has a different composition and concentration, so it can affect the condition of saliva secretion which causes the oral cavity environment of each individual to be different.

Factors that affect the composition and concentration of saliva include saliva flow rate, volume, pH, and saliva buffer capacity. Increased saliva flow causes a low caries risk, conversely slow saliva flow causes a high caries risk because it reduces the saliva buffer capacity which can lower saliva pH so that it becomes one of the factors causing an increased risk of caries development. In addition, low saliva can cause the time of increasing saliva pH to last longer. The longer the saliva pH is in a low condition, the more tooth demineralization can occur, resulting in caries (Senawa et al., 2015).

Difference in plaque score before and after gargling with breadfruit leaf decoction

The results of the study showed that the plaque score of the staff of the Kerinjing Health Center outpatient clinic before gargling with boiled breadfruit leaves had an average score of 2.957 while after gargling with boiled breadfruit leaves with an average score of 1.513. This can be seen in table 4.4 that respondents before gargling (Pretest) with an average value of 2.957 were 20 (66.7%) respondents while after gargling (posttest) showed a decrease in plaque score where most respondents had an average plaque score of 1.513 as many as 22 (73.3%) From these results, the plaque score before and after gargling with boiled breadfruit leaves decreased with an average value of 1.4433.

The results of this study were also confirmed in a study conducted by Tera Aprielsi (2021) showing changes in plaque scores where after gargling with boiled breadfruit leaves, most respondents had plaque scores with good criteria. The results of the Statistical Test obtained p = 0.000 significance value which can be interpreted that Ho is rejected and Ha is accepted, namely there is a meaningful and significant difference in plaque scores before and after gargling with boiled breadfruit leaves

From the results of the plaque score examination on 30 staff of the Kerinjing Health Center outpatient clinic regarding the results of the examination after only a few staff had moderate plaque score changes after gargling with boiled breadfruit leaves. Meanwhile, breadfruit leaves are effective as antimicrobials that function to kill or inhibit the growth of microorganisms. Breadfruit leaf extract has inhibitory power against Streptococcus Mutans bacteria, because there are compounds that function as antimicrobials against Streptococcus Mutans bacteria so that in the future breadfruit leaves can be developed and processed as a mouthwash preparation or toothpaste ingredient (Bempa et al., 2016) so that it can help reduce the dental plaque index.

Effectiveness of Gargling with Breadfruit Leaf Decoction on Salivary pH and Plaque Score

The results of statistical tests showed that the average pH value before gargling with

boiled breadfruit leaves was 6.173 and the average saliva pH value after gargling with boiled breadfruit leaves was 6.487, there was a difference between saliva pH before and after with an increase in the average saliva pH value of 0.3133 with a standard deviation of 0.7361 and a p-Value of 0.027 (<0.05) meaning that there was a significant difference between the measurement of Saliva pH before and after.

In the plaque score, the average value before gargling with boiled breadfruit leaves was 2.957 and the average value after gargling with boiled breadfruit leaves was 1.513, there was a difference between plaque scores before and after with a decrease in the average plaque score of 1.4433 with a standard deviation of 0.5211 and a p-Value of 0.000 (<0.05) meaning that there was a significant difference between plaque score measurements before and after.

Research conducted on the staff of the Kerinjing Health Center outpatient clinic to determine the effectiveness of gargling with boiled breadfruit leaves on saliva pH and plaque scores, showed that the p-value of both had an effect after gargling with boiled breadfruit leaves, but when compared which one was more effective in inhibiting the caries demineralization process, where the plaque score had a smaller p-value than saliva pH, it can be concluded that the plaque score is more effective in inhibiting the caries process.

CONCLUSION

Gargling with breadfruit leaf decoction is effective in improving oral health indicators. The intervention significantly increased salivary pH (mean increase of 0.313, $p = 0.027$) and significantly reduced plaque score (mean decrease of 1.443, $p = 0.000$). These findings indicate that breadfruit leaf decoction has a potential role as a natural oral hygiene agent to reduce plaque accumulation and support a healthier oral environment.

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