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EFFECT OF CHLORHEXIDINE AND LABAN BARK MOUTHWASH ON GINGIVITIS IN DIABETIC PATIENTS

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ABSTRACT

Dental and oral health is a health problem that requires comprehensive treatment. Maintenance of dental and oral health can be done by using mouthwash. Mouthwash is a solution or liquid that is used to help clean the mouth from microorganisms that cause diseases in the oral cavity. Based on their composition, mouthwashes are divided into two types, namely chemical mouthwashes and herbal mouthwashes. Mouthwash has many benefits, including preventing gingivitis which often occurs in people with diabetes mellitus (DM). In DM patients, there is an increase in the number of bacteria in the oral cavity that causes abnormalities in periodontal tissues including gingiva. This type of research is a Quasi experiment with a pretest-posttest design, which was carried out at the Restu Bunda Lhoknga Clinic. The population in this study is 84 people. The sample in this study amounted to 30 people using the accidental sampling method. The results of this study showed a decrease in the mean value of gingivitis after the administration of chlorhexidine mouthwash by 1.50 from 11.70 to 10.20 at the posttest, and laban bark by 2.10 from 14.90 to 12.80 at the posttest. Data processing using the Paired Sample T-Test statistical test showed p = 0.000 ($p<0.05$). The conclusion of this study shows that there is an effect of mouthwash on gingivitis in patients with diabetes mellitus. The advice for people with diabetes mellitus is to gargle more often using mouthwash so that gingivitis does not get worse.

Keywords: *Bark Mouthwash, Gingivitis, Diabetic Patients*

INTRODUCTION

Dental and oral health is a health problem that requires comprehensive treatment, because dental problems are broad-dimensional and have an impact that includes physical, mental, and social factors for individuals suffering from dental diseases. One way to maintain dental and oral health is by using mouthwash (Sukarsih, 2019), (Kumar, 2023).

Mouthwash is a solution or liquid used to provide freshness to the oral cavity and clean the mouth from microorganisms that cause diseases in the

oral cavity (Mustaqimah, 2019). Based on its composition, mouthwashes are divided into t:wo types, namely chemical mouthwashes and herbal mouthwashes. Mouthwash has many benefits, including providing freshness of mouth and breath, eliminating bad breath (halitosis), inhibiting and reducing the formation of plaque bacteria, and preventing gingivitis (Oktanauli, 2017) .

Chlorhexidine is a gold standard mouthwash that can kill microorganisms that cause gingivitis, periodontitis, and caries. In the oral cavity, chlorhexidine is immediately absorbed into surfaces, including the surface of the teeth covered by the pelicule, and retains its antibacterial ability for approximately 12 hours. However, the use of mouthwashes that contain chemical substances has side effects such as staining on the teeth and disturbing the balance of the normal amount of flora in the oral cavity. Changes in normal flora can lead to the growth of various species of certain bacteria. Therefore, another alternative is needed, namely herbal mouthwashes (Mandalas, 2022).

One of the herbal plants that can be used as a mouthwash is laban bark, which is widely found in Aceh province, especially the city of Langsa. Laban bark (Vitex pubescens Vahl) is one of the medicinal plants trusted and used by the Dayak people in Central Kalimantan as a traditional medicine to heal wounds. In addition to being beneficial for the body, laban bark is also useful for treating oral diseases such as gingivitis (Septiawati, 2023).

Gingivitis is an inflammation that occurs in the gingiva without losing the attachment of the epithelial tissue and alveolar bone. The main cause of gingivitis is plaque accumulation, and the disease is reversible if the primary causative factor is removed. Clinically, the characteristics of gingivitis are redness (erythema) on the marginal gingiva and papilla bleeding (Papila Bleeding Index or PBI) which is an index to determine papillary bleeding and gingival inflammation (Brown, 2023)

In people with diabetes mellitus (DM), there is an increase in the number of bacteria in the oral cavity, causing abnormalities in the periodontal tissue including gingiva. Diabetes mellitus is a collection of symptoms that arise in a person due to increased blood sugar levels due to insulin deficiency. Diabetes mellitus is now a serious threat and has become the seventh leading cause of death in the world.

Diabetes mellitus according to its classification is divided into two types: type 1 DM, which is indicated by insulin levels below the normal line, and type 2 DM, which is caused by the body's failure to utilize insulin so that

it leads to weight gain and decreased physical activity (Nuraisyah, 2018). Type 2 diabetes is a global crisis that threatens the health and economy of the world. About 1 in every 11 adults suffer from type 2 DM globally, and about 75% of diabetic mellitus patients live in developing countries.

The International Diabetes Federation reports that the prevalence of diabetes mellitus in the world's population with an age range of 20-79 years is estimated at 8.8% in 2017 and 9.3% in 2019, and is predicted to increase to 10.9% by 2045. The countries with the highest number of people with diabetes mellitus in 2019 are in Asia and the Americas, namely China, India, the United States, Pakistan, Brazil, Mexico, and Indonesia. DM disease in Indonesia is ranked 7th with 10.7 million people and is expected to increase every year. Almost all provinces showed an increase in prevalence in 2013-2018, including Aceh province which had a prevalence of 2.4%. Banda Aceh is the city with the highest incidence of diabetes in Aceh, as much as 2.3% (RISKESDAS., 2018), (Harahap, 2023). In 2020, there were 7,365 individuals suffering from type II diabetes mellitus in Banda Aceh. Likewise with one of the clinics in Lhoknga, the Restu Bunda Clinic, with the number of visits for diabetes patients as many as 1,502 people in 2022, which increased to 1,618 people in 2023.

Gingivitis is one of the common diseases that can occur in patients with diabetes mellitus with a clinical appearance of gingival bleeding. Based on the Third National Epidemiological Survey on Oral Health in China (2008), 14.5% of the population in the age group of 35-44 years have a healthy periodontal, and around 77.3% have gingival hemorrhage. In the age group of 65–74 years, 14.1% did not show periodontal disease, and 68% had gingival hemorrhage. From the results of the initial examination conducted on 10 patients with diabetes mellitus at the Restu Bunda Clinic, 6 of them had gingivitis.

Based on the above background, the researcher is interested in conducting a study entitled "The Effect of Taking Chlorhexidine and Laban Bark Mouthwash on Gingivitis in Type II DM Patients at the Baiturrahman Health Center."

METHODS

This type of research is a *Quasi experiment* with a pretest-postest design, This design was carried out to determine the effectiveness of gargling with chlorhexidine mouthwash and laban bark for gingivitis patients in type II diabetes mellitus patients at the Restu Bunda Lhonga clinic. The population

taken in this study is the number of people with gingivitis in diabetic patients who visited in the last 3 months, namely October-December, totaling 84 respondents at the Restu Bunda Lhoknga Aceh Besar Clinic. In this study, sampling was conducted using *the accidental sampling* method, in diabetics who experienced gingivitis who visited the Restu Bunda clinic as many as 30 respondents for 2 weeks.This research was carried out at the Restu Bunda Clinic in Lambagoh village, Kec, Lhoknga, Aceh Besar Regency. This research was conducted from May 11 to 25, 2024. This research instrument is by conducting a Gingivitis examination using a periodontal probe, diagnostic set and KSP. Bivariate analysis was to see the effect of gargling using chlorhexidine and laban bark on gingivitis, using a statistically paired test of T-Test samples.

RESULTS AND DISCUSSION

The data collected are the results of a study on patients with type II diabetes mellitus to determine the effectiveness of chlorixidine, laban bark, and mineral water for gingivitis. This study was conducted from May 11 to 25, 2024 at the Lhoknga Mother Blessing Clinic with a sample of 30 type II diabetic patients, which were divided into 3 groups of 10 people each, data collection was obtained from gingival indexes examination before and after gargling using chlorixidine, laban bark, and mineral water.

Based on the results of research that has been carried out on patients with type II diabetes mellitus at the Restu Bunda Lhoknga clinic, the following results were obtained:

Table 1.
Frequency distribution based on age in patients with type II diabetes mellitus at Restu Bunda Lhoknga clinic

No	Age	Sum	Percentage (%)
1	41- 47	12	40 %
2	48 -51	11	36,7 %
3	53 - 59	7	23,3 %
Sum		30	100 %

Based on Table 1, it is known that the dominant age of respondents in the age category of 41-47 years is 12 respondents (40%).

Tabel 2.
Frequency Distribution Based on Gender in Patients with Type II Diabetes Mellitus Clinic Restu Bunda Lhoknga

No	Gender	Sum	Percentage (%)
1	Legal Law	15	50 %
2	Woman	15	50 %
Sum		30	100 %

Based on Table 3, it is known that the gender of the Respondents has the same number of 15 males and 15 females.

Tabel 3.
Distribution of Gingival Index Frequency before and after gargling chlorixidine in patients with type II diabetes mellitus at Restu Bunda Lhoknga Clinic

No	Criterion	Before		After	
		f	%	f	%
1	Good	2	20	5	50
2	Keep	8	80	5	50
3	Bad	0	0	0	0
Total		10	100	10	100

Based on table 3, The frequency of Gingivitis before gargling chlorixidine with the highest criterion was at the moderate criterion of 8 people (80%). Meanwhile, after gargling chlorixidine was obtained, the highest criteria were in the balanced criteria of both 5 people (50%) and medium 5 people (50%).

Tabel 4.
Distribution of Gingival Index Frequency before and after gargling Laban bark in patients with type II diabetes mellitus at Restu Bunda Lhoknga Clinic

No	Criterion	Before		After	
		f	%	f	%
1	Good	2	20	3	30
2	Keep	6	60	7	70
3	Bad	2	20	0	0
Total		10	100	10	100

Based on table 4, the frequency of Gingivitis before gargling Laban bark with the highest criterion was at the moderate criterion of 6 people

(60%). Meanwhile, after gargling the bark of laban, the highest criterion was in the medium criterion of 7 people (70%).

Table 6.
Distribution of Gingival Index Frequency before and after Gargling Mineral Water in Patients With Type II Diabetes Mellitus At the Restu Bunda Lhoknga Clinic

No	Criterion	Before		After	
		f	%	f	%
1	Good	3	30	3	30
2	Keep	7	70	7	70
3	Bad	0	0	0	0
Total		10	100	10	100

Based on table 6, the frequency of Gingivitis before gargling with mineral water with the highest criterion was at the moderate criterion of 7 people (70%). Meanwhile, after gargling mineral water, the highest criterion was in the medium criterion of 7 people (70%).

Table 7
Distribution of Gingivitis Frequency in People With Type II Diabetes Mellitus Before and After Using Mouthwash At the Restu Bunda Lhoknga Clinic

Gingivitis Examination	Mean	SD
Exit *Pretest* Chlorixidine	11,70	3498
Nilai *postest* Chlorixidine	10,20	3910
Laban Bark *Pretest* Value	14,90	4040
Laban Bark *postest* value	12,80	3910
Mineral *Pretest* Value	13,20	5574
Postest Mineral Value	13,60	4695

Based on table 7 Above shows a decrease in *the mean* value of gingivitis after the administration of chlorixidine mouthwash by 1.50 from pretest 11.70 to 10.20 at the posttest, and laban bark by 2.1 from pretest 14.90 to 12.80 at the posttest.

Table 8
Normality Test of Mouthwash Influence Value Data Pretest and Posttest

Variable	Normality Test (*Shapiro-wilk*)	Information
Exit *Pretest* Chlorixidine	0.142	Normal
Nilai *postest* Chlorixidine	0.374	Normal
Laban Bark *Pretest* Value	0.397	Normal
Laban Bark *postest* value	0.555	Normal
Mineral *Pretest* Value	0.278	Normal
Postest Mineral Value	0.328	Normal

The normality test using the help of *computer software* (SPSS) and the results of the normality test (Table 8) can be summarized that all the data in this study, both the pretest and posttest values of gingivitis examination, are normally distributed (sig. >0.05) with a significance level of 95%.

Table 9
Results of Chlorixidine and Bark Mouthwash Effect Test Laban in Patients With Type II Diabetes Mellitus

Variable	Mean	P Value
Gingivitis examination value before gargling chlorixidine and gingivitis value after gargling chlorixidine	0.1500	0.043
Gingivitis examination value before gargling laban bark and gingivitis value after gargling laban bark	0.2100	0.012
Gingivitis examination value before mineral gargling and gingivitis value after mineral gargling	-0.0400	0.843

Table 9 shows the significant value of chlorixidine p=0.043 (p<0.05), the significant value of laban bark p=0.012 (p<0.05) and the significant value of mineral water p=0.843 (p>0.05). This shows that there is an effect of chlorixidine mouthwash and laban bark on gingivitis in patients with type II diabetes mellitus and there is no effect of mineral water on gingivitis in patients with type II diabetes mellitus.

CONCLUSION

Based on the results of a study conducted on gingivitis patients in type II diabetes mellitus patients at the Restu Bunda Lhoknga Clinic, this study involved 30 respondents who were divided into three treatment groups, namely gargling chlorixidine, laban bark, and mineral water.

Chlorixidine Gargle Effects

Based on Table 4.3, before gargling chlorixidine, the most dominant categories of gingivitis were moderate (80%) and good (20%). After gargling, there was a decrease in the value of gingivitis with good categories by 50% and medium by 50%. This decrease indicates that chlorixidine is effective in reducing the severity of gingivitis.

Effects of Laban Bark Gargling

According to Table 4.4, before gargling with laban bark, the most dominant categories of gingivitis were moderate (60%), good (20%), and bad (20%). After gargling, there was a decrease in the value of gingivitis with a moderate category of 70% and a good 30%. This shows that laban bark is also effective in reducing the severity of gingivitis.

Analisis Paired T-Test

Table 6 shows a decrease in the mean value of gingivitis after administration of chlorixidine mouthwash by 15.0 from pretest 11.70 to 10.20 on the posttest, and laban bark by 2.1 from pretest 14.90 to 12.80 on the posttest. The results of the Paired T-Test showed that the two treatments had a significant difference in the 95% confidence level:

1. Chlorixidine: $p = 0.043$ ($p < 0.05$)
2. Laban bark: $p = 0.012$ ($p < 0.05$).

Normality Test

Table 4.7 shows the results of normality tests with Shapiro-Wilk for all three groups (chlorixidine, laban bark, and mineral water). The values obtained show that the data are normally distributed (sig. > 0.05).

Significance Analysis

Table 4.8 shows the significance values for each group:

1. Chlorixidine: $p = 0.043$ ($p < 0.05$)
2. Laban bark: $p = 0.012$ ($p < 0.05$)

3. Air mineral: $p = 0.843$ ($p > 0.05$)

These results showed that gargling with chlorixidine and laban bark had a significant effect in lowering gingivitis in patients with type II diabetes mellitus, while mineral water had no significant effect. This is similar to the study of Saaya Matayoshi et al. (2024) which showed that gargling with mouthwash reduced the number of red complex species and normalized hyperglycemia in type II diabetic patients. According to research that has been conducted by Osaka University (2024), the results show that gargling with mouthwash can reduce bad bacteria in the mouths of type II diabetes mellitus patients.

Effectiveness of Laban Bark

Based on the results of the study, gargling with laban bark solution was more influential in reducing the value of gingivitis compared to gargling chlorixidine. Laban bark contains compounds such as alkaloids, flavonoids, saponins, sterpenoids, and tannins that have antibacterial, antioxidant, and anti-inflammatory activities, which are believed to play a role in inhibiting bacteria that cause gingivitis, such as S. mutans which form plaque biofilms According to the research of Cresentia Rahma et al. (n.d.), laban bark ethanol extract is known to contain metabolite compounds such as alkaloids, flavonoids, tannins, and saponins, most of which have antioxidant, antimicrobial, and anti-inflammatory activities. The active compounds in laban bark remain active after being processed into mouthwashes, and this liquid form can reach and neutralize bacteria throughout the oral cavity. The use of laban bark-based mouthwash is also safe for daily use without causing significant side effects (Nuraskin, 2022).

CONCLUSION

From the results of this study, it can be found that there is a significant influence of the use of mouthwash on the reduction of gingivitis in patients with type II diabetes mellitus. A more detailed explanation of the results of this study is as follows:

Average Value of Gingivitis Before and After Chlorixidine MouthwashingThe results showed that the average value of gingivitis before gargling chlorixidine was 1.11 with a moderate category. After gargling chlorixidine, there was a decrease to 1.02 with the mild category.

Average Value of Gingivitis Before and After Gargling Laban BarkBefore gargling Laban bark, the average value of gingivitis was 1.25

with the moderate category. After gargling the bark of laban, this value decreased to 1.02 in the light category. This shows the effectiveness of laban bark in reducing the severity of gingivitis.

Paired T-Test ResultsThe results of the Paired T-Test show the difference in gingivitis values before and after gargling as follows:
Mur of chlorixidine: 0,1500
Gargle the bark: 0.2100
Mineral water gargle: -0.0400

ACKNOWLEDGEMENT

It is expected to gargle more often using mouthwash so that gingivitis does not get worse, especially for people with diabetes mellitus. It is hoped that it can develop methods that have been used in order to obtain new knowledge to reduce the value of gingivitis in patients with type II diabetes mellitus. Health workers can encourage diabetic mellitus patients to use mouthwash more often after brushing their teeth so that the condition of the patient's gums is maintained.

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