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The Effect of Gargling with Turmeric Solution on the Gingival Index in Patients with Gingivitis

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ABSTRACT

Women are generally more susceptible to dental and oral diseases, one of which is gum inflammation (gingivitis), caused by bacterial plaque infection. Untreated gingivitis in adolescents can lead to further complications in the periodontal tissues. Gingivitis treatment can be carried out by gargling with traditional ingredients that are safe for adolescents and do not cause harmful side effects. One natural traditional ingredient that can be used is a turmeric solution mouthwash, which contains antibacterial, anti-inflammatory, and antioxidant properties. This study aims to determine the changes in the gingival index of respondents suffering from gingivitis after gargling with turmeric solution at the Department of Dental Health, Poltekkes Kemenkes Padang. The research employed a quasi-experimental method by administering a turmeric solution gargle to respondents with gingivitis, and then examining their gingival index after three days of use. The study population consisted of all students at the Department of Dental Health, Poltekkes Kemenkes Padang. The sample was taken from students in the department using a judgement sampling technique. Data were analysed using a paired t-test. The results showed that before gargling with turmeric solution, the most common gingival index categories among respondents were moderate and severe (each 44.4%), whereas after gargling, the majority fell into the mild category (55.5%). The paired t-test yielded a p-value of 0.001. In conclusion, there is a significant effect of gargling turmeric solution on gingival index in patients with gingivitis. It is recommended for further research to research the optimal formulation and concentration of turmeric solution, as well as the safety of its long-term use for adolescents and other age groups.

Keywords: Turmeric Solution, Gingival Index, Gingivitis.

ABSTRAK

Wanita mengalami sifat yang rentan terhadap penyakit gigi dan mulut, salah satunya yaitu peradangan gusi (gingivitis) yang disebabkan karena infeksi bakteri plak. Kondisi gingivitis pada remaja yang tidak dirawat dapat mengakibatkan akibat lanjut pada jaringan periodontal. Pengobatan radang gusi dapat dilakukan dengan berkumur menggunakan bahan tradisional yang aman untuk digunakan bagi remaja karena tidak memberikan efek samping yang merugikan, Salah satu bahan tradisional dari alam yang dapat digunakan adalah obat kumur larutan kunyit yang mengandung bahan anti bakteri, anti inflamasi dan anti oksidan. Penelitian ini bertujuan untuk mengetahui perubahan indeks gingiva responden yang menderita gingivitis setelah berkumur dengan larutan kunyit di Jurusan Kesehatan Gigi Poltekkes Kemenkes Padang. Metode penelitian menggunakan quasi eksperiment dengan memberi perlakuan berkumur larutan kunyit pada responden yang menderita gingivitis, kemudian diperiksa indeks gingiva responden setelah tiga hari berkumur. Populasi penelitian seluruh mahasiswa yang ada di Jurusan Kesehatan Gigi Poltekkes Kemenkes Padang, dengan sampel mahasiswa di Jurusan Kesehatan Gigi yang diambil dengan teknik judgement sampling. Data dianalisis dengan uji data berpasangan (paired t-test). Hasil penelitian menunjukkan indeks gingiva responden yang menderita gingivitis sebelum berkumur dengan larutan kunyit yang terbanyak adalah dengan kriteria sedang dan berat (masing-masing 44,4%) sedangkan indeks gingiva sesudah berkumur larutan kunyit yang terbanyak adalah pada kriteria ringan (55,5%). Hasil uji paired t-test diperoleh p value = 0,001. Kesimpulannya ada pengaruh yang signifikan berkumur larutan kunyit terhadap indeks gingiva pada penderita gingivitis. Disarankan untuk penelitian selanjutnya Meneliti formulasi dan konsentrasi larutan kunyit yang optimal, serta keamanan penggunaannya dalam jangka panjang bagi remaja maupun kelompok usia lainnya.

Kata kunci: Larutan Kunyit, Indeks Gingiva, Gingivitis.

INTRODUCTION

Dental and oral health problems such as tooth decay and gingivitis are prevalent in the community, often caused by poor oral hygiene and unhealthy dietary patterns. These issues are particularly common among vulnerable groups such as toddlers, adolescents, and pregnant women. Pregnancy is frequently accompanied by complaints like cravings, nausea, vomiting, and oral symptoms including toothache, gum enlargement, redness, swelling, and bleeding gums (Tyas et al., 2016).

Proper dental and oral hygiene is essential to support optimal chewing function, which aids digestion and prevents various oral disorders. Hormonal imbalances, particularly during pregnancy, can lead to gum swelling (Indiarto, 2022). Gingivitis is a commonly reported condition, with 5–10% of sufferers experiencing swollen gums (Soulissa, 2014). The main cause of gingivitis is dental plaque, which forms due to inadequate oral cleaning, allowing plaque to accumulate at the gum line and in the spaces between teeth and gums.

Infected gums become red, swollen, shiny, and bleed easily, especially during brushing or flossing. This pain and bleeding often discourage individuals from maintaining oral hygiene, worsening the condition. Contributing factors to gingivitis include poor oral care, puberty, diabetes, and pregnancy (Soulissa, 2014). If left untreated, gingivitis can progress to a more severe form involving pus, bacteria, and dead tissue, especially in individuals who neglect oral hygiene. Women are particularly sensitive to oral health issues and must therefore prioritise personal oral care (Ircham, 2012).

When oral hygiene is neglected, gum inflammation can become severe, leading to bleeding and impaired chewing function. If not treated, bacteria from inflamed gums may enter the bloodstream. Plaque-trapped bacteria can penetrate gum tissue and cause systemic infections. Traditional medicines are widely used in society, often favoured for their natural origin and minimal side effects (Christyana, Supartinah, & Rantinah, 2013). These remedies, derived from animal, plant, or mineral sources, are processed simply and have long been used in local healing practices.

Natural ingredients are a safer long-term alternative to chemical products due to their antimicrobial properties. One commonly used herbal remedy for oral conditions is turmeric, which contains essential oils and curcumin with antibacterial, anti-inflammatory, and antioxidant effects (Soulissa, 2014). The rhizome of turmeric is widely used in traditional medicine, especially for treating swollen gums (Razavi, 2021; Wojtyłko, et al., 2023). It is considered safe for pregnant and breastfeeding women (Sara, 2021). A study in the *Journal of Indian Society of Periodontology* also found turmeric mouthwash effective in reducing plaque and gingivitis, comparable to chlorhexidine (Mali, Behal, & Gilda, 2012). Turmeric's curcumin compound is toxic to harmful bacteria such as *Staphylococcus aureus*, *Micrococcus pyogenes var. aureus*, and *Micrococcus pyogenes* (Augustina, 2020). This study aims to examine the effect of gargling turmeric solution on the gingival index in patients with gingivitis.

RESEARCH METHODS

This study employed an experimental method with a pre- and post-test design. The population consisted of all students enrolled in the Department of Dental Health at the Health Polytechnic of the Ministry of Health in Padang. The sample comprised students from the same department, selected using a judgment sampling technique, based on specific criteria: those diagnosed with gingivitis and willing to participate as respondents.

The intervention used a 10% turmeric solution, with each respondent instructed to gargle 10 ml of the solution for 30 seconds. This gargling procedure was performed three times a day for three consecutive days. Data collection began with an initial gingival index examination conducted prior to the gargling intervention to establish baseline measurements.

Respondents were then instructed to gargle the turmeric solution according to the set schedule. After gargling for 30 seconds, they were asked to rinse their mouths with plain water and brush their teeth to remove any residual turmeric stain from the teeth and oral cavity. The gargling sessions were conducted under the supervision of the researcher and enumerators to ensure consistency and compliance.

After the three-day intervention, a follow-up examination of the gingival index was carried out to measure any changes. Data were analysed using univariate and bivariate methods. The bivariate analysis was conducted to assess the effect of turmeric gargling on the gingival index, using a paired t-test with a significance level of $p < 0.05$.

RESULTS

Table 1. Frequency Distribution of Gingival Index of Gingivitis Patients Before Gargling Turmeric Solution.

Gingival index criteria	Before Gargling the Turmeric Solution	
	F	%
Healthy	-	-
Mild	1	11.2
Medium	4	44.4
Severe	4	44.4
Total	9	100

Table 1 shows that the gingival index of respondents before gargling turmeric solution was mostly in the moderate and severe criteria, 44.4% each, while the mild criteria were only 11.2%.

Table 2. Frequency Distribution of Gingival Index of Gingivitis Patients After Gargling Turmeric Solution.

Gingival index criteria	After Gargling the Turmeric Solution	
	F	%
Healthy	1	11.2
Mild	5	55.5
Medium	3	33.3
Severe	-	-
Total	9	100

Table 2 shows that the gingival index of respondents after gargling turmeric solution is mostly in the mild criteria as much as 55.5% and the least in the healthy criteria as much as 11.2%.

Table 3. Frequency Distribution of Respondents' Gingival Index Before and After Gargling Turmeric Solution.

Frequency Distribution	Indeks Gingiva				Total
	Healthy	Mild	Medium	Severe	
Before	0	1	4	4	9
After	1	5	3	0	9
Total	1	6	7	4	18

Table 3 shows that, changes in the gingival index of respondents suffering from gingivitis displayed in the form of cross tabulation are before gargling turmeric solution the most are with moderate and severe criteria (8 people), while after gargling turmeric solution the most are with mild criteria (5 people).

Table 4. Paired t-test Results of the Effect of Gargling Turmeric Solution on Gingival Index in Students with Gingivitis.

Gingival index before gargling -	Mean	Standar devisi	T	Signifikan
after gargling	1.111	601	5.547	.001

Based on table 4, it can be seen that t count is 5.547, while the value of t table is 2.31, meaning t count> t table, and significant output $p = 0.001$ (<0.05), this means there is a change in gingival index in respondents who suffer from gingivitis after gargling with turmeric solution.

DISCUSSION

The results of this study on the effect of gargling turmeric solution on the gingival index in patients with gingivitis showed that, prior to the intervention, the highest gingival index scores were in the moderate and severe categories. After gargling with the turmeric solution, the majority

of respondents' gingival indices fell into the mild category. This indicates a decrease in gingival index scores after the use of turmeric solution among students with gingivitis. The reduction in gingival inflammation may be attributed to the anti-inflammatory properties of turmeric, which make it a promising alternative treatment for gingival swelling (Augustina, 2020).

Turmeric rhizome is a medicinal plant widely used in traditional remedies (Kumar et al., 2020; Akaberi, Sahebkar, & Emami, 2021; Jyotirmayee & Mahalik, 2022). It has been utilised to treat swollen gums, wounds, stomach aches, and various other ailments (Indriaty, Firmansyah, & Rodiah, 2020; Rahmawati & Rohmawati, 2024). Its pharmacological activities include anti-inflammatory, immunomodulatory, antiviral, antibacterial, antifungal, antioxidant, anticancer, and anti-infective effects (Pratiwi, 2022). Specifically, turmeric has the potential to reduce gingival inflammation and combat bacterial infections (Hosdurga, 2013). The antioxidant and antibacterial properties of turmeric help relieve inflammation in the gums and also alleviate pain caused by such conditions. The anti-inflammatory effect of curcumin helps reduce pain and swelling (Peng et al., 2021; Boarescu et al., 2022). Curcumin works by lowering TNF-α expression in tissues and suppressing inflammation through the cyclooxygenase pathway (Peng et al., 2021).

The active compounds in turmeric rhizome responsible for its antibacterial effect are curcumin, essential oils, and small amounts of flavonoids (Arisonya, 2014). This aligns with other findings that the essential oil and curcumin components of turmeric are beneficial in treating gingivitis. The antibacterial mechanism of the essential oil involves damaging bacterial cell membranes, leading to lysis or inhibition of cell growth (Nadifah, 2018; Apriliantisyah, 2022).

Turmeric contains bioactive compounds with medicinal properties, notably curcumin and essential oils, which have anti-inflammatory and anti-infective capabilities. These phenolic compounds function by neutralising bacteria. Turmeric demonstrates antibacterial activity against *Streptococcus viridans* and *Staphylococcus aureus*, both of which are isolated from dental plaque. Curcumin effectively reduces plaque accumulation, pain, swelling, and inflammation in the gums, while also lowering bacterial activity to prevent further infection.

A major virulence factor of *Porphyromonas gingivalis*, a key pathogen in gingival inflammation, is lipopolysaccharide (LPS), which damages periodontal tissues. The principal curcuminoid in turmeric, curcumin, acts as an anti-inflammatory agent by inhibiting the transcription factor NF-κB. This inhibition is expected to reduce the expression of pro-inflammatory mediators that contribute to damage in gingival epithelial defences during gingivitis. Several studies have demonstrated curcumin's antioxidant, anti-inflammatory, and anticancer properties. In fact, the use of 1% curcumin for subgingival irrigation has been shown to significantly reduce gingival inflammation (Terby et al., 2021).

The study limitations employed a short intervention period of only three days. While significant changes in the gingival index were observed, longer-term studies are necessary to assess the sustained effects of turmeric mouthwash and its potential in preventing gingivitis recurrence. Moreover, no control group or placebo was included, which limits the ability to attribute the observed changes solely to the turmeric solution and not to other external factors such as improved oral hygiene due to increased attention or the Hawthorne effect.

CONCLUSION

In conclusion, there is a significant effect of gargling turmeric solution on gingival index in patients with gingivitis. It is recommended for further research to research the optimal formulation and concentration of turmeric solution, as well as the safety of its long-term use for adolescents and other age groups.

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