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The Effect of Clove Essential Oil (*Syzygium aromaticum*) Therapy on Reducing Gout Pain among Community Members in Negeri Rumahsoal, Taniwel District

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Abstract

Background: Gout is an inflammatory joint disease caused by the deposition of monosodium urate crystals due to elevated uric acid levels in the blood. This condition often results in severe joint pain, swelling, and reduced physical function, which can interfere with daily activities and quality of life. Pain management in gout patients can be carried out through pharmacological and non-pharmacological approaches. One complementary therapy that has potential benefits is clove essential oil (Syzygium aromaticum), which contains eugenol known for its analgesic and anti-inflammatory properties. **Objective:** This study aimed to determine the effect of clove essential oil therapy on reducing the gout pain scale among community members in Negeri Rumahsoal, Taniwel District. **Methods:** This study employed a quasi-experimental design using a one-group pretest–posttest approach. A total of 27 respondents were selected using a total sampling technique. Pain intensity was measured using the Numeric Rating Scale (NRS). The intervention consisted of applying clove essential oil therapy three times a week for two weeks. Data analysis was conducted using the Wilcoxon Signed Rank Test to examine differences in pain scores before and after the intervention. **Results:** Prior to the intervention, the majority of respondents experienced severe pain (88.9%). After receiving clove essential oil therapy, most respondents showed a reduction in pain intensity, with 85.2% reporting mild pain. Statistical analysis demonstrated a significant decrease in pain scores after the intervention ($p = 0.000$; $p < 0.05$). **Discussion:** The reduction in pain intensity is associated with the eugenol content in clove essential oil, which exerts analgesic and anti-inflammatory effects by inhibiting inflammatory mediators, reducing prostaglandin synthesis, and promoting local vasodilation and muscle relaxation. **Conclusion:** Clove essential oil therapy is effective in reducing gout pain and can be considered a complementary non-pharmacological intervention for pain management in community settings.

Keywords: community health, complementary therapy, clove essential oil, gout, pain scale

INTRODUCTION

Gout is an inflammatory joint disease caused by the deposition of uric acid crystals in the joints [1]. Gout was first described by Hippocrates in the fifth century BC and was referred to as the "Disease of Kings" [2]. It is considered a degenerative disease in which the body fails to regulate uric acid levels properly, leading to the accumulation of uric acid that causes pain in the bones and joints [3, 4].

This disease occurs due to a disorder in purine metabolism [5]. Purines are proteins that are metabolized in the body into uric acid [6]. Excessive consumption of purine-rich foods can make it difficult for the kidneys to excrete uric acid efficiently, resulting in its accumulation in the joints [7]. This condition can lead to the formation of sodium urate crystals, which may

cause chronic nodular deformities (joint damage) and kidney damage [8]. The accumulation of these crystals triggers joint pain, tenderness, and inflammation [9].

Gout also has a hereditary tendency and is more commonly found in adult men than in women [10]. This difference is partly attributed to lifestyle factors, including alcohol consumption, which can reduce the excretion of uric acid through urine [11]. As a result, uric acid remains in the bloodstream and accumulates in the joints [12].

According to data from the World Health Organization (WHO) in 2023, the number of people suffering from gout has reached approximately 335 million worldwide [13]. This indicates that joint pain related to gout may affect about one in six individuals, and the prevalence is expected to continue increasing until 2025. Data from Riskesdas (2023) reported that the prevalence of gout in Indonesia based on diagnoses by health professionals is 12.9%, while prevalence based on diagnosis or symptoms reaches 25.7%. The prevalence is highest among individuals aged ≥75 years (54.8%). In addition, female sufferers (8.5%) slightly outnumber male sufferers (6.2%) [14].

Maluku Province is one of the regions with a relatively high prevalence of gout compared to the national average [15]. The prevalence based on diagnosis has increased to 8.9%, while the prevalence based on diagnosis and symptoms has reached 18.8% [16].

Gout is characterized by recurrent pain caused by the accumulation of monosodium urate crystals in the joints due to elevated levels of uric acid in the blood. The peak of pain usually occurs within 6–12 hours and may persist throughout the day, often accompanied by symptoms such as fever and chills. Gout attacks commonly affect a single joint but may also involve other joints, particularly the feet, ankles, hands, wrists, knees, and elbows [17].

According to Dian [18], gout can be managed through both pharmacological and non-pharmacological therapies. Pharmacological therapy includes the administration of non-steroidal anti-inflammatory drugs (NSAIDs), colchicine, corticosteroids, probenecid, allopurinol, and uricosuric agents. Non-pharmacological therapies include herbal treatments, relaxation techniques, and essential oil therapies such as clove oil therapy.

In elderly patients, pharmacological therapy alone is sometimes insufficient to control pain due to comorbidities and potential drug interactions resulting from the use of multiple medications. Therefore, affordable, safe, and easily applicable complementary therapies are needed to help control pain. One such approach is the use of clove essential oil combined with massage therapy. Massage therapy using clove essential oil has been reported to provide positive effects in reducing pain and improving physical comfort [19].

METHOD

This study employed a quasi-experimental research design using a one-group pretest–posttest approach to examine the effect of clove essential oil (*Syzygium aromaticum*) therapy on reducing the pain scale in individuals with gout. In this design, pain levels were measured before and after the administration of the intervention to determine its effectiveness.

The study was conducted from June 17 to July 17, 2025, in Rumahsoal Village, Taniwel District. The population consisted of community members experiencing gout-related pain. A total of 27 respondents were included in the study using a total sampling technique, in which all eligible participants were selected as research subjects.

Pain intensity was measured using the Numeric Rating Scale (NRS), which ranges from 0 to 10, where higher scores indicate greater pain intensity. Prior to the intervention, respondents' pain levels were assessed as the pretest measurement. The intervention consisted of the application of clove essential oil therapy, which was administered three times per week for two weeks. After the intervention period, respondents' pain levels were measured again as the post-test assessment.

Data analysis was conducted using both descriptive and inferential statistical methods. Descriptive statistics were used to present the characteristics of respondents, including age, gender, and occupation. Before conducting the hypothesis test, the normality of the data was examined using the Shapiro–Wilk test. Because the data were not normally distributed, the Wilcoxon Signed Rank Test was applied to determine the difference in pain scores before and after the intervention. A significance level of $p < 0.05$ was used to determine statistical significance.

RESULTS AND DISCUSSION

This study examined the effect of clove essential oil *(Syzygium aromaticum)* therapy on reducing gout pain in the Rumahsoal community. Twenty-seven respondents participated in the study, and the intervention was administered three times a week for two weeks. Before the intervention, the respondents' pain scores were measured using the Numeric Rating Scale (NRS), and then again after the intervention.

Table 1. Respondent Characteristics

Respondent Characteristics	Frequency (n)	Percentage (%)
Age		
45 - 59 Year: (Middle adulthood)	6	22.2
60 - 74 Year: (Early elderly)	19	70.4
85 -95 Year: (Very old)	2	7.4
Gender		
Male	16	59.3
Female	11	40.7
Employment		
Farmers	25	92.6
Retired Civil Servants	2	7.4
Currently taking gout medication		
No	27	100.0

Based on the table results, it can be seen that the respondents studied were mostly elderly aged 60-74 years old, as many as 19 (70.4%) respondents, while the fewest were very old aged 85-95 years old, as many as 2 (7.4%), respondents and middle adults aged 45-59 years

old, as many as 6 (22.2%). Respondents who were male were 16 (59.3%) respondents and women were 11 (40.7%) respondents. Respondents who worked as farmers were 25 (92.6%) respondents and retired civil servants were 2 (7.4%) respondents. Respondents who were not currently taking gout medication were 27 (100%) respondents.

Table 2. Respondent's pain scale on pre-test and post-test

Pain Scale	Pre-test		Post-test	
	n	%	n	%
Mild Pain (0-3)	0	0.0	23	85.2
Moderate Pain (4-6)	3	11.1	4	14.8
Severe Pain (7-10)	24	88.9	0	0.0

The table above shows that of the 27 respondents, the most respondents were those with a severe pain scale, amounting to 24 respondents (88.9%), and the fewest were those with a moderate pain scale, namely 3 respondents (11.1%). Based on the results shown in the table above, out of the 27 respondents included in the study, the majority experienced mild pain (23 respondents; 85.2%), while the remaining 4 respondents (14.8%) reported moderate pain.

The results showed that the mean pain score before the administration of clove essential oil therapy was 2.89, with a minimum score of 2 and a maximum score of 3. After the intervention, the mean pain score decreased to 1.15, with a minimum score of 1 and a maximum score of 2. The statistical analysis using the Wilcoxon Signed Rank Test showed a significant difference between the pre-test and post-test results ($p = 0.000$; $p < 0.05$). These findings indicate that clove essential oil therapy was effective in reducing the gout pain scale among community members in Rumahsoal Village.

Prior to the intervention, the majority of respondents (88.9%) reported pain levels in the severe category (7–10). Severe pain is a common clinical manifestation of acute gout attacks, which are characterized by intense joint inflammation due to the deposition of monosodium urate crystals. Gout is an inflammatory joint disease caused by the accumulation of uric acid crystals in the joints. The pain commonly affects several joints, particularly the toes, ankles, knees, and big toe, and may significantly interfere with an individual's daily activities and psychological well-being [20]. Previous studies have shown that massage therapy using clove essential oil can significantly reduce pain and stiffness while improving physical function in patients experiencing moderate to severe pain. Furthermore, the combination of conventional treatment and aromatherapy massage with clove essential oil has been reported to produce more effective outcomes in pain management [21].

The mean pain score before the administration of clove essential oil therapy was 2.89, while the mean score decreased to 1.15 after the intervention. This reduction may be attributed to the analgesic and anti-inflammatory effects of eugenol, the main active compound in clove oil, which is believed to promote local vasodilation and muscle relaxation. These effects may help reduce pain and stiffness, increase joint flexibility, and improve motor function. This finding is consistent with previous studies [22], which reported that the topical application of clove oil to gout-affected joints significantly reduces pain levels due to the

presence of eugenol, a compound known for its anti-inflammatory and analgesic properties. Furthermore, research by [23] indicates that eugenol exerts its effects through several mechanisms, including the inhibition of cyclooxygenase-2 (COX-2) activity, which reduces pain and swelling, stabilization of mast cell membranes to suppress inflammatory responses, and a mild agonistic effect on opioid receptors that may decrease pain perception in the central nervous system.

The effect of clove essential oil therapy on reducing gout pain scale

Based on the results of the study, it was found that prior to the administration of clove essential oil therapy (pretest), the majority of respondents experienced severe gout pain. Of the 27 respondents included in the study, 24 respondents (88.9%) reported severe pain, while 3 respondents (11.1%) experienced moderate pain. The mean pain score before the intervention was 2.89. After the administration of clove essential oil therapy, the mean pain score decreased to 1.15, indicating a reduction in the pain scale among the respondents.

Clove oil (Syzygium aromaticum) has considerable potential in reducing pain levels in individuals with gout because it contains the active compound eugenol, which possesses analgesic, anti-inflammatory, and antioxidant properties. Eugenol works by inhibiting inflammatory mediators such as prostaglandins and pro-inflammatory cytokines, thereby reducing inflammatory responses and pain sensations. The findings of this study indicate that the topical application of clove oil can significantly reduce the gout pain scale among community members in Rumahsoal, Taniwel District.

Previous studies also support these findings. Research [24] reported that the topical application of clove essential oil may induce vasodilation, or widening of blood vessels, which promotes muscle relaxation and reduces pain caused by joint stiffness. Furthermore, massage therapy using clove essential oil has been shown to be effective in relieving knee pain in patients with osteoarthritis within a short period of time and improving patients' functional status. Another study conducted by [25] demonstrated that topical clove oil significantly reduced pain intensity in gout patients, with an average pain reduction of approximately 45% ($p < 0.05$). Therefore, clove essential oil has the potential to be used as a complementary therapy for managing pain in individuals with gout.

CONCLUSION

The results of this study indicate that clove essential oil therapy (*Syzygium aromaticum*) has a significant effect on reducing the gout pain scale among community members in Rumahsoal Village.

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