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The Efficacy of Clove (Syzygium aromaticum) Decoction in Alleviating Gout Pain in the Elderly: A Systematic Literature Review

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ABSTRACT

Introduction: Gout pain is a common issue among the elderly, caused by the accumulation of uric acid crystals in the joints, leading to discomfort and limited mobility. Clove (Syzygium aromaticum), known for its anti-inflammatory and analgesic properties, has been studied as a potential natural treatment for alleviating gout pain.
Objective: This study aims to analyze the effectiveness of clove (Syzygium aromaticum) decoction in reducing gout pain among the elderly.
Method: A systematic review search was conducted across four journal databases: PubMed, ProQuest, Garuda, and JSTOR, covering the period from 2019 to 2024. The population involved in the studies consisted of elderly individuals diagnosed with gout. The intervention analyzed in this review was the administration of clove decoction, while pain as the primary outcome was measured using the Numerical Rating Scale (NRS). The uric acid levels, as a secondary outcome, were assessed using a GCU meter.
Two to three independent reviewers conducted the search, selection, extraction, and quality assessment of the identified articles. The selection process followed the PRISMA flowchart standards, while the quality of the articles was evaluated using the CASP checklist. The extracted data included key aspects such as author, intervention, facilitators, setting, number of sessions, duration, methods or media used, as well as the topics discussed in each study.
Result: Of the five articles identified, a total of 95 participants were involved. The administration of clove decoction significantly reduced pain intensity due to its higher eugenol content, which was given orally (consumed) and via warm compress. The intervention was administered for 5-7 days, while the warm compress was applied for 15-20 minutes. The duration of this intervention allowed sufficient time for the eugenol content in

cloves to act as an anti-inflammatory and analgesic, resulting in a more optimal therapeutic effect.
Conclusion: The administration of clove decoction is a non-pharmacological therapy that demonstrates a significant impact in reducing gout pain. It may serve as a supportive alternative in pain management, reducing the use of analgesics, and improving the quality of life with minimal side effects.

Keywords: clove, elderly, gout pain

Introduction

Gout, or gouty arthritis, is a degenerative joint disease that is commonly encountered, particularly among the elderly population (Simamora & Saragih, 2019). It is characterized by episodes of intense joint pain, which significantly interfere with daily activities and diminish patient comfort (Setiawan et al., 2021). The pain results from the accumulation of monosodium urate crystals within the joints, triggering inflammation (Maulidia & Satria, 2023). These crystals typically accumulate in joints such as the base of the big toe, knees, ankles, wrists, and elbows.

While gout is predominantly associated with aging, it can also affect individuals in their productive years (ages 30–50), although less frequently (Nasir et al., 2017). In contrast, the condition is rare among children and, when it does occur, is usually secondary to underlying disorders such as hormonal imbalances, renal disease, hematologic malignancies, or genetic factors (Oktavianti & Anzani, 2021).

The etiology of gout is closely linked to excessive intake of purine-rich foods and beverages—such as organ meats, tea, and coffee—which elevate uric acid levels in the blood (Afnuhazi, 2019). The normal range of uric acid levels is approximately 2.4–5.7 mg/dL for women and 3.4–7.0 mg/dL for men (RJ et al., 2023). The increasing prevalence of gout, especially among the elderly, has been attributed to unhealthy dietary patterns and lifestyle habits (Sucianingsih et al., 2024). Epidemiological data from Irdiansyah et al. (2022) reported a 34.2% increase in gout cases, while the World Health Organization (2018) recorded a prevalence rate of 33.3% globally.

Pain from gout significantly reduces the quality of life in older adults and may lead to severe complications if not managed properly. Conventional treatment typically involves nonsteroidal anti-inflammatory drugs (NSAIDs) and uric acid-lowering agents aimed at controlling inflammation and alleviating pain (Sammulia & Suhaera, 2019). However, prolonged use of such medications may result in adverse effects, especially in elderly patients. Inadequate management of gout can result in persistent hyperuricemia, increasing the risk of complications such as ligament and tendon damage, nephrolithiasis, and renal failure (Hariyanto et al., 2023). Additionally, poor awareness and prevention strategies contribute to increased treatment costs, particularly in chronic cases.

In response to the limitations of pharmacological treatment, interest in natural and alternative therapies has grown. One such alternative is the use of clove (Syzygium aromaticum), a plant recognized for its anti-inflammatory and analgesic properties (Martias et al., 2019). Cloves contain various bioactive compounds—including alkaloids, flavonoids, saponins, tannins, steroids, triterpenoids, phenolics, and essential oils—which are present in its flowers, stems, and leaves (Anggitasari et al., 2023). Among these, eugenol is the most

prominent compound, believed to exert anti-inflammatory effects comparable to NSAIDs, making it potentially safer for elderly patients (Mustapa et al., 2018).

Traditionally, cloves have been utilized in various preparations, such as infusions and decoctions, and more recently have been incorporated into formulations like clove syrup, combining cloves, cinnamon, and honey for enhanced therapeutic potential (Laratmase et al., 2021). Consumption of clove decoctions has shown promise in reducing dependence on chemical drugs, offering a more natural and well-tolerated treatment approach that can enhance the quality of life for elderly individuals with gout (Mustapa et al., 2018).

Moreover, cloves are widely available across Indonesia and have been used for generations in traditional medicine (Tampubolon et al., 2024). From an economic standpoint, the use of cloves is cost-effective, particularly for elderly populations requiring long-term care, given their affordability and ease of procurement (Puspitasari et al., 2021). The development of herbal-based therapies also supports the broader goal of sustainable and environmentally friendly healthcare.

Nonetheless, despite their potential, several challenges remain in the clinical application of cloves. These include the limited number of robust clinical studies validating their efficacy, the need for standardized dosages, and considerations of individual health variability, particularly in elderly patients with comorbidities.

Furthermore, effective therapeutic communication plays a vital role in the success of any intervention, including natural therapies. As noted by Setiawan et al. (2024), therapeutic communication across all phases—from pre-interaction to termination—fosters trust between researchers and participants, enabling better engagement and openness.

Given the above, further research on the effectiveness of clove decoctions in reducing gout pain among the elderly is essential. Understanding the mechanisms of action and therapeutic benefits of cloves could lead to the development of safer, more accessible, and cost-effective treatment options for managing gout. This aligns with the broader objective of integrating evidence-based herbal therapies into complementary medical practices, ultimately enhancing the well-being of older adults while promoting sustainable healthcare solutions.

Objective

This study aims to analyze the effectiveness of clove (Syzygium aromaticum) decoction in reducing gout pain among the elderly.

Method

Study design

This systematic literature review refers to the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.

Search strategy

The search strategy covered the period from April 19th, 2019, to December 31st, 2024, and spanned various databases, including Pubmed, ProQuest, Garuda and JSTOR . The search strategy was limited to the last five years to ensure that researchers encompass the most recent and relevant information on a specific topic. Research and developments in a field of science can change and evolve over time, making it essential to consider the most up-to-date

literature for a comprehensive understanding. Additionally, restricting the search timeframe to the last five years aims to enable researchers to manage the number of studies they need to evaluate and synthesize.

The search employed the Medical Subject Headings (MeSH system) and keywords in advanced search engines which can be found in the appendix (supplementary file 1). These searches were performed by two of this article's co-authors (DGR and TN), who independently searched the electronic databases previously referenced.

Tabel 1. MeSH term on search strategy phase

Source	Link	Keywords	Num
Pubmed	https://tinyurl.com/3aev47f4	(((spyzygium aromaticum[MeSH Terms]) OR (clove[MeSH Terms])) AND (pain[MeSH Terms]))	4
ProQuest	https://www.proquest.com/advanced?accountid=193034	(mainsubject (spyzygium aromaticum) AND mainsubject (clove)	1
Garuda	https://tinyurl.com/4xju4wex	cengkeh AND nyeri AND asam urat AND lansia	3
JSTOR	https://tinyurl.com/369ckc3d	(((spyzygium aromaticum) OR (clove)) AND (pain))	1
		Total	**9**

Inclusion criteria

Participant

The participants involved in this study were elderly individuals suffering from gout. There were no restrictions based on sex, religion, race.

Intervention

Clove decoction has been traditionally used to relieve gout pain, especially in the elderly. Cloves contain eugenol, which has anti-inflammatory and analgesic properties that help reduce joint inflammation and pain caused by uric acid buildup. They also contain flavonoids, tannins, vitamins C and E, and essential minerals, which act as antioxidants and support bone health. To prepare, boil 5 cloves in 400 cc of water until reduced to 200 cc for 10-15 minutes, strain, and let it warm before drinking 1-2 times daily. For a warm compress boil 5 grams of cloves in 300 cc of water, let it sit for 1-3 minutes, and apply with a clean cloth after assessing

the pain level. While beneficial, clove decoction should be complemented with a healthy diet, light exercise, and medical consultation for optimal gout management.

Control

Eligible controls were required to receive standard care or usual care, or placebo.

Outcomes

We included studies that measured pain intensity as the primary outcome, assessed using the Numerical Rating Scale (NRS). Meanwhile, uric acid level monitoring as the secondary outcome was measured using a GCU meter.

Study design

We include study design, pre-experimental, quasy-experimental studies to assess the effect of clove decoction. Articles based on single case studies, literature reviews, systematic reviews, and opinion articles will be excluded. Only studies written in English and bahasa will be included.

Exclusion criteria

Studies were not published in english and bahasa. Individuals under the age of 12 years and families with chronic illnesses or mental disorders were excluded from the study. Articles focusing on single case studies, case report, editorial, Letter to Editor, correspondence, narrative review, scoping review, literature reviews, systematic reviews, proceeding abstract, book chapter and opinion articles were excluded from consideration in this analysis.

Study selection and data extraction

Two authors (SO, DGR) independently reviewed all titles and abstracts based on the previously described design. If a consensus between the two authors could not be reached, a senior researcher (HN, IAR) made the final decision regarding the inclusion of the questioned article. Three other authors (TN, AEP, NH) independently extracted data from each study included in the dataset. The selected study reports for inclusion contained information on authorship, year, country, design, sample size, interventions, instruments, results, and findings.

Assessment of quality

Two researchers (SO and NH) independently conducted a quality assessment of the included studies. Differences in assessment were discussed collaboratively, and if further clarification or resolution was needed, consultation was conducted with senior researchers (HS, SH). This rigorous process ensured that the quality evaluation was conducted strictly and in accordance with scientific standards.

CASP evaluation

We used the Critical Appraisal Skills Programme (CASP) to assess the quality of primary and secondary outcomes based on the following domains: study design, risk of bias, inconsistency, indirectness, imprecision, and other considerations.

Result

Figure 1. Screening process flowchart by PRISMA

From various database sources, the initial search yielded nine articles. After the selection process to remove duplicates, nine articles remained and were then processed to the next stage. Two researchers, SO and TN, independently screened the articles based on titles and abstracts, resulting in a total of nine articles. Subsequently, a full-text selection was conducted, yielding nine articles that met the inclusion and exclusion criteria. More detailed information can be found in Figure 1.

Study caracteristics

Tabel 2. Characteristic of Intervension

Author	Intervension, fasilitator, setting	Number of session	Duration	Method or media	Topic
Arianto et al. (2019) Indonesia	Administration of Clove Decoction, The facilitator is the researcher, This study was conducted at Panti Wredha Dharma Bhakti Surakarta.	Morning and evening	Conducted for seven days.	50 cloves or 5 grams of cloves are boiled using 400 cc of water to make 200 cc of water.	Not Experienced
Sari et al. (2020) Indonesia	Clove water warm compress therapy, The facilitator is the researcher, This study was conducted in Gunung Tiga, Batanghari Nuban District, East Lampung Regency.	Once every night before bedtime.	Conducted for five consecutive days.	5 grams of cloves boiled with 300 cc to boil, let stand for about 1-3 minutes until a warm temperature (45-50 °C), then observe/measure the patient's pain level, after measuring the pain scale, then apply a compress using a clean cloth on the affected joint.	Not Experienced
Hasriyanti et al. (2022) Indonesia	Administration of Clove Decoction, The facilitator is the researcher, This study was conducted at Pattiro Mampu Community Health Center, Dua Boccoe District, Bone Regency.	Not Experienced	Not Experienced	Not Experienced	Not Experienced
Royani et al. (2023) Indonesia	Administration of Clove Decoction and Ginger Decoction, The facilitator is the researcher, This study was conducted at Harapan Kita Elderly Social Institution, Palembang.	Twice	Conducted for seven days.	Not Experienced	Not Experienced
Misbah et al. (2024) Indonesia	Warm lemongrass compress and warm clove compress, The facilitator is the researcher, This study was conducted in Curahkalong Village,	Once	Conducted for seven days.	- Lemongrass decoction is boiled and left to cool until it reaches a temperature of 40°C, then applied as a	Not Experienced

	Bangsalsari District, Jember Regency.		compress to the affected joint for 15–20 minutes. - Five grams of clove flowers are boiled in 300 ml of water until boiling for a few minutes, then applied as a compress to the painful area for 20 minutes.	

Table 3. Data extraction

Author, year, country	Design (Sample size)	Intervention (Case)	Instrument (Outcome)	Findings
Arianto et al. (2019) Indonesia	Quasy-Eksperimental	Administration of Clove Decoction (Knee Pain)	GCU for pain intensity	The administration of clove decoction for 7 days, twice a day, can reduce pain caused by gout in the elderly. Among the three respondents tested, there was a significant decrease in pain scale after the therapy was given. These results prove that clove decoction has the potential as an effective non-pharmacological therapy in reducing gout pain.
Sari et al. (2020) Indonesia	Quasy-Eksperimental	Clove water warm compress therapy	GCU for pain intensity	There is an effect of clove water warm compress (Spyzygium Aromaticum) on reducing pain intensity in elderly with gouty arthritis.
Hasriyanti et al. (2022) Indonesia	Quasy-Eksperimental	Administration of Clove Decoction (Knee Pain)	GCU for pain intensity	Clove warm water compress therapy is effective in reducing pain levels from severe

				pain to moderate, mild, or even no pain.
Royani et al. (2023) Indonesia	Quasy-Eksperimental	Administration of Clove Decoction and Ginger Decoction	GCU for pain intensity	The administration of clove and ginger decoction is effective in reducing gout pain in the elderly, with clove being more effective than ginger. The eugenol content in cloves has stronger anti-inflammatory and analgesic effects compared to the gingerol in ginger.
Misbah et al. (2024) Indonesia	Quasy-Eksperimental	Warm lemongrass compress and warm clove compress.	GCU for pain intensity	Clove warm compresses are significantly more effective in reducing pain in gout sufferers than lemongrass warm compresses.

Tabel 4. CASP Checklist for quality of studies

Author/year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Arianto et al. (2019)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Sari et al. (2020)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Hasriyanti et al. (2022)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Royani et al. (2023)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Misbah et al. (2024)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y

Discussion

This systematic review evaluated several studies examining the effects of clove decoction and clove-based therapies in reducing gout-related pain among elderly individuals. Overall, the findings consistently indicate that clove decoction has a positive impact on alleviating gout pain. Most studies reported a significant reduction in uric acid levels and pain intensity following intervention. Prior to treatment, respondents typically exhibited elevated uric acid levels, which declined after the administration of clove-based therapies. The

reduction in pain is largely attributed to the eugenol content in cloves, a compound with known anti-inflammatory and analgesic properties. Putri et al. (2014) reported that eugenol constitutes approximately 70–80% of the clove's composition and possesses stimulant, local anesthetic, carminative, antiemetic, antiseptic, and antispasmodic effects.

According to Azizah et al. (2021), uric acid levels and pain intensity were commonly assessed using GCU (Gout Check Up) tools and the Numeric Rating Scale (NRS), which served as the primary instruments across various studies. Several researchers have examined the effectiveness of clove therapy: Arianto et al. (2019) and Hasriyanti et al. (2022) investigated the efficacy of clove decoction in lowering uric acid levels and pain intensity; Sari et al. (2020) evaluated warm clove water compresses, which are believed to enhance blood circulation and muscle relaxation, thereby reducing acute gout pain. Royani et al. (2023) compared the effectiveness of clove and ginger decoctions, while Misbah et al. (2024) explored the use of warm compresses made from lemongrass and cloves.

The studies employed a variety of intervention methods and research designs. Arianto et al. (2019) used a case study design involving three elderly participants, reporting pain reduction after seven days of clove decoction consumption. Sari et al. (2020) applied warm clove compresses for five consecutive days in a sample of eleven elderly individuals, resulting in significant pain relief. Hasriyanti et al. (2022), through a true experimental design with 30 participants, reported a statistically significant effect of clove decoction on pain reduction ($p = 0.000$). Royani et al. (2023) conducted a comparative study with 30 elderly participants and found that clove decoction was more effective than ginger in relieving gout pain over a seven-day period. Misbah et al. (2024) concluded that warm clove compresses were more effective than other warm compresses in alleviating pain, suggesting the potential of this method as a practical and natural alternative for gout management.

These studies also present several strengths. Many employed experimental designs with pre-test and post-test measurements, which allowed for reliable comparisons of patient outcomes before and after intervention. Additionally, the use of objective tools such as the GCU and NRS enhanced the validity of the findings. Comparative studies, such as those by Royani et al. (2023) and Misbah et al. (2024), further strengthened the evidence by evaluating the relative effectiveness of clove therapy against other natural remedies, such as ginger and lemongrass.

However, certain limitations must be acknowledged. Several studies had small sample sizes, such as the case study by Arianto et al. (2019), which included only three participants, limiting the generalizability of the findings. Furthermore, a lack of control groups in some studies (e.g., Arianto et al., 2019; Royani et al., 2023) makes it difficult to isolate the treatment effect from other confounding variables. The short duration of interventions, typically ranging from 5 to 7 days, raises questions about the long-term efficacy and sustainability of the therapy. Some studies also relied heavily on subjective assessments (e.g., NRS) without follow-up biochemical confirmation of uric acid levels, which weakens clinical verification of therapeutic outcomes.

Despite these limitations, the clinical implications of clove-based therapies remain promising. Clove decoctions and warm clove compresses have shown potential as complementary non-pharmacological interventions for managing gout pain in elderly patients.

Studies such as those by Arianto et al. (2019) and Hasriyanti et al. (2022) support the regular use of clove decoctions to alleviate joint pain, offering a safer alternative to long-term NSAID use, which can pose serious health risks in geriatric populations. Likewise, the findings of Sari et al. (2020) and Misbah et al. (2024) suggest that warm clove compresses may help improve local circulation and reduce inflammation, further enhancing their utility as supportive therapies.

In addition, Royani et al. (2023) demonstrated that cloves were more effective than ginger in reducing pain and uric acid levels, reinforcing the value of clove therapy in traditional medicine practices. This also highlights the potential for broader integration of herbal therapies into geriatric care protocols, especially in settings where access to pharmacological treatment may be limited or associated with financial burden.

Nevertheless, future research is needed to build upon the current findings. Studies involving larger, more diverse samples and longer follow-up periods are necessary to evaluate the long-term safety and efficacy of clove-based therapies. Randomized controlled trials that combine clove therapy with conventional medical treatments could also provide a more comprehensive understanding of their synergistic effects. Moreover, the development of standardized dosing protocols and formulation methods (e.g., decoction vs. compress) will be crucial in optimizing treatment outcomes and ensuring safe clinical application.

Conclusion

Clove-based therapies, including clove decoction and warm clove water compresses, show promising potential in relieving gout-related pain in the elderly due to their anti-inflammatory and analgesic properties. These treatments may serve as effective complementary approaches that reduce dependence on conventional medications, especially in patients vulnerable to side effects. While comparative findings highlight the need for individualized herbal interventions, the current body of evidence is constrained by limited sample sizes, short treatment durations, and methodological inconsistencies. To establish clove therapy as a reliable clinical option, further research through large-scale, well-designed studies is needed to determine optimal usage, confirm long-term efficacy and safety, and guide integration into clinical practice. Additionally, patient education and monitoring remain essential to ensure safe and effective implementation.

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Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

The researchers stated that there is no conflict of interest related to the implementation and publication of the results of this research. The entire research process, from planning, data collection, analysis, to report preparation, was carried out independently without any influence or pressure from any third party. A commitment to research ethics is upheld

throughout the research process, ensuring transparency, accuracy and honesty in reporting results. Respondents' participation was voluntary with informed consent, and their confidentiality and privacy were maintained in accordance with applicable research ethics standards. With this statement, researchers hope that the research results can be trusted and used as a valid reference for the development of science and health practices related to ethnomedicine and reproductive health.

Ethical consideration

Not applicable.

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