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The Effect of Pineapple *(Ananas comosus L.)* Juice Therapy on Reducing Uric Acid and Pain in the Elderly in Jatiroto Village

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Abstract

Background: Gout arthritis is a prevalent degenerative joint disease among the elderly, characterized by hyperuricemia and joint pain due to monosodium urate crystal deposition. In Indonesia, its prevalence reaches 11.9%, highlighting the need for accessible, non-pharmacological interventions. Pineapple *(Ananas comosus L.)* contains bromelain and vitamin C, which exhibit anti-inflammatory and uricosuric properties. **Objective:** This study aimed to evaluate the effect of pineapple juice therapy on pain reduction and uric acid levels in elderly patients with gout arthritis. **Methods:** A quasi-experimental one-group pretest–posttest design was employed. Thirty elderly gout patients in Kotokan Hamlet, Jatiroto Village, were selected using a total sampling method. The intervention consisted of 200 mL of fresh pineapple juice consumed daily for seven days. Pain intensity was measured using the Numeric Rating Scale (NRS), and serum uric acid levels were assessed with a portable uric acid meter. Data were analyzed using the Wilcoxon signed-rank test ($\alpha = 0.05$). **Results:** Post-intervention, pain levels decreased significantly, with 73% of respondents reporting mild pain and 27% reporting no pain. Uric acid levels also shifted significantly from 100% hyperuricemic at baseline to 33% within normal limits and 67% below normal post-intervention ($p = 0.000$). **Conclusion:** Pineapple juice therapy effectively reduces both pain intensity and uric acid levels in elderly individuals with gout arthritis. It is recommended as a safe, cost-effective, and complementary non-pharmacological therapy for community-based gout management.

Keywords
Pineapple juice therapy, Gout arthritis, Pain reduction, Uric acid, Elderly

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1. BACKGROUND

Gout arthritis is a degenerative inflammatory joint disease caused by chronic hyperuricemia, characterized by the deposition of monosodium urate crystals in joints and surrounding tissues (Arifuddin et al., 2024). The condition typically manifests as sudden, recurrent, and severe pain, predominantly affecting peripheral joints such as the big toe, ankles, and wrists (Safitri et al., 2023). In older adults, age-related physiological decline in renal function and metabolic rate impairs uric acid excretion, making the elderly

particularly susceptible to gout progression, tophi formation, and significant limitations in daily mobility (Indrayani et al., 2021; Amalia & Kurdi, 2024; Yoga et al., 2024).

Epidemiological data indicate a rising global burden of gout. Recent health reports suggest a steady increase in prevalence, particularly in aging populations (Faqih, 2023). In Indonesia, gout ranks as the second most common joint disease after osteoarthritis, with a national prevalence of approximately 11.9% (Kemenkes RI, 2018). East Java Province reports a notably high prevalence among older adults, reaching 18.95% in individuals aged 75 and above (Kemenkes RI, 2018). Preliminary field observations in Kotokan Hamlet, Jatiroto Village, reveal a high incidence of gout among the elderly, exacerbated by dietary habits rich in purines, physically demanding occupations, and limited adherence to long-term pharmacological management (Fitriani et al., 2021; Sueni et al., 2021).

While pharmacological interventions such as NSAIDs and colchicine are standard treatments, prolonged use often poses risks of adverse effects, particularly in elderly patients with comorbidities or compromised renal function. Consequently, non-pharmacological therapies have gained traction as safe, accessible, and sustainable alternatives for community-based gout management. Pineapple (*Ananas comosus L.*) has emerged as a promising therapeutic agent due to its rich bioactive profile, including bromelain, vitamin C, and flavonoids. Bromelain exerts potent anti-inflammatory and analgesic effects by modulating pro-inflammatory cytokines and reducing joint swelling, while vitamin C enhances renal excretion of uric acid (Pratiwi & Chaniago, 2023). Additionally, pineapple flavonoids act as antioxidants that inhibit xanthine oxidase activity, thereby reducing uric acid synthesis (Barokah & Ramadhan, 2023). Empirical studies in similar community settings have demonstrated that daily pineapple juice consumption can significantly alleviate joint pain and lower serum uric acid levels (Pratiwi et al., 2023).

Despite its therapeutic potential, rigorous empirical evidence evaluating pineapple juice therapy specifically within rural Indonesian elderly populations remains limited. Therefore, this study aims to evaluate the effect of pineapple juice therapy on pain intensity and serum uric acid levels among elderly patients with gout arthritis in Kotokan Hamlet, Jatiroto Village. The findings are expected to contribute to the development of evidence-based, cost-effective, and non-pharmacological interventions that can be

integrated into community health promotion programs.

2. METHODS

This study employed a quasi-experimental approach using a one-group pretest–posttest design. Measurements of pain intensity and uric acid levels were conducted before and immediately after seven-day pineapple juice intervention.

The research was conducted in Kotokan Hamlet, Jatiroto Village, Jatiroto Subdistrict, Lumajang Regency, from June 26 to July 3, 2025. The population consisted of all elderly individuals diagnosed with gout arthritis residing in the hamlet. A total sampling technique was applied to select 30 respondents who met the inclusion criteria: (1) aged ≥60 years, (2) clinically diagnosed with gout arthritis, (3) baseline serum uric acid levels exceeding normal thresholds (>7.0 mg/dL for men or >6.0 mg/dL for women), and (4) willing to participate and provide informed consent. Respondents with known pineapple allergy, severe comorbidities, or those actively consuming uric acid-lowering medication during the study period were excluded.

The independent variable was pineapple juice therapy. Fresh, ripe pineapples were sourced locally, thoroughly washed, peeled, and blended without added sugar, preservatives, or water dilution. Each respondent consumed 200 mL of freshly prepared pineapple juice daily, preferably in the morning after waking up, for seven consecutive days. Compliance was monitored daily by the research team to ensure strict adherence to the intervention protocol.

The dependent variables were pain intensity and serum uric acid levels. Pain was assessed using the Numeric Rating Scale (NRS), a validated clinical tool ranging from 0 (no pain) to 10 (worst imaginable pain). Scores were categorized as no pain (0), mild pain (1–3), moderate pain (4–6), and severe pain (7–10). Serum uric acid levels were measured using Easy Touch GCU Meter via capillary blood sampling from the fingertip. The device was calibrated according to manufacturer specifications prior to data collection. Results were classified into normal, low, and high categories based on standard clinical reference ranges.

Data were processed and analyzed using descriptive and inferential statistics. Demographic characteristics and clinical outcomes were presented in frequency distributions and percentages. Given the small sample size and non-parametric data distribution, the Wilcoxon signed-rank test was applied to evaluate significant differences between pretest and posttest

measurements. Statistical significance was established at $p < 0.05$.

This study received ethical clearance from the Research Ethics Committee of Hafshawaty Zainul Hasan University (No. 479/KEPK-UNHASA/VI/2025). Written informed consent was obtained from all participants following a comprehensive explanation of the study's objectives, procedures, potential benefits, and their right to withdraw at any time without penalty. Participant anonymity and data confidentiality were strictly maintained throughout the research process.

3. RESULTS

This study was conducted from June 26 to July 3, 2025, using a total sampling technique with 30 respondents with gout arthritis. Before administering the therapy, the researcher visited the respondents at their homes. After data collection, they were grouped into two categories: general and specific data. The general data presented the characteristics of the respondents, including gender, age, occupation, and education (Table 1).

Table 1. Demographic Characteristics of Respondents (N = 30)

Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	24	80.0
	Female	6	20.0
Age (years)	60–65	17	56.7
	66–70	9	30.0
	71–72	4	13.3
Occupation	Farmer	9	30.0
	Housewife	2	6.7
	Merchant	19	63.3
Education Level	Elementary School	15	50.0
	Junior High School	13	43.3
	Senior High School	2	6.7

The specific data present the values of gout arthritis examination before and after the intervention for each treatment. The comparison of respondents' pain levels before and after the intervention is shown in Table 2. Pain levels were measured using the NRS (Numeric Rating Scale) observation sheet.

Table 2. Comparison of Pain Intensity Levels Before and After Pineapple Juice Therapy Intervention (N = 30)

Pain Category (NRS)	Pretest		Posttest		p-value*
	f	%	f	%	
No pain (0)	0	0.0	8	26.7	0.000
Mild pain (1–3)	8	26.7	22	73.3	
Moderate pain (4–6)	22	73.3	0	0.0	
Severe pain (7–10)	0	0.0	0	0.0	
Total	30	100.0	30	100.0	

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Based on Table 2, the respondents' pretest and posttest pain scale data indicated a reduction in pain from moderate to mild. These results indicate that pineapple juice therapy reduced pain levels in patients with gout arthritis. Furthermore, the analysis of respondents' uric acid levels before and after the intervention is presented in Table 3. Table 3 shows the distribution of respondents' uric acid levels before and after receiving pineapple juice therapy.

Table 3. Comparison of Serum Uric Acid Levels Before and After Pineapple Juice Therapy Intervention (N = 30)

Uric Acid Category	Pretest		Posttest		p-value*
	f	%	f	%	
Normal (Men: 3.5–7.0 mg/dL; Women: 2.6–6.0 mg/dL)	0	0.0	10	33.3	0.000
Low (Men: <3.5 mg/dL; Women: <2.6 mg/dL)	0	0.0	20	66.7	
High (Men: >7.0 mg/dL; Women: >6.0 mg/dL)	30	100.0	0	0.0	
Total	30	100.0	30	100.0	

*f = frequency; % = percentage. Uric acid categories based on clinical reference ranges (Putri et al., 2024). Measurements obtained using Easy Touch GCU Meter via capillary blood sampling. *Wilcoxon signed-rank test, $\alpha = 0.05$.*

Table 3 shows that the respondents' pretest and posttest uric acid levels decreased, with initially high levels returning to normal. Based on Tables 2 and 3, the results of pineapple juice therapy on pain and uric acid levels in patients with gout arthritis were analyzed using the Wilcoxon Test, yielding a p-value of 0.000, with a significance level of <0.005. Therefore, H1 is accepted, indicating that pineapple juice therapy is effective in reducing pain and uric acid levels in patients with gout arthritis in Dusun Kotokan, Jatiroto Village, Jatiroto District, Lumajang Regency.

4. DISCUSSION

Pain Scale Score Before Pineapple Juice Therapy Intervention

Prior to the pineapple juice therapy intervention, the majority of respondents (22; 73.3%) experienced moderate pain, while 8 (26.7%) reported mild pain. These findings reflect the typical clinical presentation of gout arthritis, wherein the accumulation of monosodium urate crystals in joint tissues triggers inflammatory responses characterized by pain, swelling, redness, and warmth (Suci Safitri et al., 2023). The predominance of moderate pain levels among respondents aligns with the pathophysiology of gout, in which crystal deposition exerts mechanical pressure on joint structures and stimulates nociceptive pathways (Arifuddin et al., 2024).

The high prevalence of pain among elderly respondents in this study can be attributed to age-related physiological decline, particularly reduced renal function that impairs uric acid excretion (Indrayani

et al., 2021). Furthermore, the occupational profile of respondents suggests that physically demanding activities may exacerbate joint stress and inflammatory responses. Research indicates that high workloads and repetitive mechanical strain can intensify gout symptoms, particularly in weight-bearing joints such as the toes, ankles, and knees (Fitriani et al., 2021; Yoga et al., 2024).

Gout-related pain typically manifests suddenly, often during nighttime or early morning hours when body temperature decreases, facilitating urate crystal precipitation in peripheral joints (Hinonaung & Tinungki, 2023). This circadian pattern of pain exacerbation can severely disrupt sleep quality and daily functioning, contributing to diminished quality of life among gout sufferers (Budiari et al., 2021). The baseline pain levels observed in this study underscore the urgent need for effective, accessible interventions to alleviate suffering and improve functional capacity in this population.

Uric Acid Levels Before Pineapple Juice Therapy Intervention

Before the intervention, all 30 respondents (100%) exhibited hyperuricemia, with serum uric acid levels exceeding normal clinical thresholds (>7.0 mg/dL for men; >6.0 mg/dL for women). This universal presentation of elevated uric acid levels confirms the diagnostic criteria for gout arthritis and reflects chronic dysregulation of purine metabolism within the study population (Putri et al., 2024).

Hyperuricemia in elderly populations arises from multifactorial mechanisms, including decreased glomerular filtration rate, reduced tubular secretion of uric acid, and increased endogenous purine synthesis associated with aging (Indrayani et al., 2021). Additionally, dietary factors play a critical role; consumption of high-purine foods such as red meat, organ meats, legumes, and alcoholic beverages can significantly elevate serum uric acid concentrations (Fitriani et al., 2021; Sueni et al., 2021). In rural Indonesian communities like Kotokan Hamlet, traditional dietary patterns rich in purine-containing foods, combined with limited health literacy regarding gout management, contribute to the high prevalence of hyperuricemia observed in this study.

The pathophysiological cascade initiated by hyperuricemia involves supersaturation of synovial fluid with uric acid, leading to nucleation and deposition of monosodium urate crystals in joints and periarticular tissues (Arifuddin et al., 2024). These crystals activate the innate

immune system, triggering inflammasome-mediated release of pro-inflammatory cytokines (IL-1β, IL-6, TNF-α) that drive acute gouty arthritis attacks (Safitri et al., 2023). The 100% prevalence of hyperuricemia among respondents highlights the critical need for interventions that address both uric acid reduction and inflammatory symptom management in community-based gout care.

Pain Scale Score After Pineapple Juice Therapy Intervention

Following seven days of pineapple juice therapy (200 mL/day), a marked reduction in pain intensity was observed: 22 respondents (73.3%) transitioned from moderate to mild pain, while 8 respondents (26.7%) reported complete pain resolution. This significant analgesic effect demonstrates the therapeutic potential of pineapple juice as a non-pharmacological intervention for gout-related pain management.

The pain-reducing properties of pineapple can be primarily attributed to bromelain, a proteolytic enzyme complex with well-documented anti-inflammatory and analgesic effects (Pratiwi & Chaniago, 2023). Bromelain modulates inflammatory pathways through multiple mechanisms: (1) inhibition of pro-inflammatory cytokine synthesis (IL-6, TNF-α), (2) reduction of bradykinin-mediated nociceptive signaling, (3) suppression of prostaglandin E2 production, and (4) attenuation of leukocyte migration to inflamed joints (Mauli et al., 2024). These actions collectively reduce joint swelling, intra-articular pressure, and pain perception, accounting for the rapid symptomatic improvement observed during the seven-day intervention period.

Additionally, pineapple's high vitamin C content contributes to pain relief by enhancing renal excretion of uric acid, thereby reducing the crystal burden that triggers inflammatory responses (Barokah & Ramadhan, 2023). Vitamin C also functions as an antioxidant, neutralizing reactive oxygen species generated during inflammatory processes and mitigating oxidative tissue damage in affected joints (Pratiwi et al., 2023). The synergistic action of bromelain's anti-inflammatory effects and vitamin C's uricosuric and antioxidant properties provides a plausible biochemical rationale for the substantial pain reduction documented in this study.

These findings align with previous community-based research demonstrating the efficacy of pineapple juice in alleviating joint pain among elderly populations with degenerative inflammatory conditions (Zuriati & Suriya, 2020). The accessibility,

affordability, and safety profile of pineapple juice make it a viable complementary therapy for gout pain management, particularly in resource-limited rural settings where long-term pharmacological treatment may be constrained by cost or medication adherence challenges.

Uric Acid Levels After Pineapple Juice Therapy Intervention

Post-intervention analysis revealed a dramatic shift in uric acid distribution: 10 respondents (33.3%) achieved normal uric acid levels, while 20 respondents (66.7%) recorded levels below the normal threshold. Notably, no respondents remained in the hyperuricemic category following the seven-day intervention. This substantial reduction in serum uric acid concentrations underscores the uricosuric potential of pineapple juice therapy.

The uric acid-lowering effect of pineapple is mediated through several complementary mechanisms. First, vitamin C enhances renal clearance of uric acid by competitively inhibiting urate reabsorption transporters in the proximal renal tubules, thereby promoting urinary excretion (Pratiwi & Chaniago, 2023). Second, pineapple flavonoids exhibit potent antioxidant activity that downregulates xanthine oxidase, the rate-limiting enzyme responsible for converting hypoxanthine and xanthine to uric acid during purine catabolism (Fika Ayu Barokah & Eka Ramadhan, 2023). Third, bromelain's anti-inflammatory properties mitigate joint inflammation, indirectly supporting renal function and uric acid homeostasis (Mauli et al., 2024).

The observation that 66.7% of respondents achieved uric acid levels below normal post-intervention warrants careful interpretation. While transient hypouricemia is generally not associated with adverse short-term health effects, sustained levels below the physiological range may theoretically impair uric acid's antioxidant function in plasma (Putri et al., 2024). However, given the brief seven-day intervention period, this finding likely reflects an acute uricosuric response rather than a pathological state. Future research should investigate optimal dosing duration and frequency to maintain uric acid within the normal physiological range without overshooting into hypouricemic territory.

These results corroborate empirical evidence from similar community settings, where daily pineapple juice consumption significantly lowered serum uric acid levels among gout sufferers (Pratiwi et al., 2023; Salsa et al., 2021). The rapid biochemical response observed within 1 week suggests that pineapple juice therapy can serve as an

effective adjunctive treatment for acute hyperuricemia, complementing dietary modifications and lifestyle interventions in comprehensive gout care programs.

Analysis of the Effect of Pineapple Juice Therapy (Ananas comosus L.) to Reduce Uric Acid Levels and Pain in Elderly People with Gout Arthritis in Jatiroto Village

Statistical analysis using the Wilcoxon signed-rank test yielded a p-value of 0.000 ($p < 0.05$), confirming a statistically significant difference in both pain intensity and serum uric acid levels before and after pineapple juice therapy. These findings provide robust empirical support for the efficacy of pineapple juice as a non-pharmacological intervention for the management of gout arthritis among elderly populations in rural Indonesian communities.

The dual therapeutic effect of pineapple juice addresses two critical dimensions of gout pathophysiology: inflammatory symptomatology and metabolic dysregulation. This dual action distinguishes pineapple juice from conventional analgesics, which primarily target pain without addressing underlying hyperuricemia, and from urate-lowering medications, which may require weeks to achieve symptomatic relief (Arifuddin et al., 2024). The rapid onset of both analgesic and uricosuric effects observed in this study positions pineapple juice as a valuable complementary therapy for acute gout management, particularly during the initial phase of treatment when immediate symptom relief is paramount.

From a public health perspective, the findings have significant implications for community-based gout prevention and management programs in resource-limited settings. Pineapple is widely cultivated and affordable in Indonesia, making it an accessible therapeutic option for rural populations with limited access to healthcare facilities or financial constraints for long-term pharmacotherapy (Fitriani et al., 2021). Integration of pineapple juice therapy into primary healthcare services, delivered through community health workers could enhance self-management capacity among elderly gout sufferers while reducing dependency on medications that may pose risks of adverse effects or drug interactions in polypharmacy scenarios.

However, several methodological limitations must be acknowledged. The one-group pretest–posttest design lacks a control group, limiting causal inference and increasing the risk of confounding factors such as concurrent dietary changes, placebo effects, or natural symptom fluctuations. The seven-day intervention

period, while sufficient to observe acute biochemical and symptomatic changes, does not establish long-term efficacy, sustainability, or optimal maintenance dosing. Additionally, uric acid measurements were obtained using a portable capillary device (Easy Touch GCU Meter), which, although highly practical for community fieldwork, may exhibit slightly higher variability compared to laboratory-based venous assays.

Future research should employ randomized controlled trial designs with adequate control groups, extended follow-up periods (e.g., 4–12 weeks), and stratified sampling to strengthen external validity. Investigations into optimal dosing regimens (volume, frequency, duration), potential interactions with conventional gout medications, and cost-effectiveness analyses would further inform evidence-based guidelines for integrating pineapple juice therapy into national gout management protocols. Qualitative studies exploring patient acceptability, adherence barriers, and cultural perceptions of pineapple as medicine would also enrich the evidence base for community implementation.

In conclusion, pineapple juice therapy represents a safe, cost-effective, and physiologically sound intervention that aligns with Indonesia's national health promotion goals for aging populations. When implemented within a supervised community health framework alongside dietary counseling and lifestyle modification, pineapple juice therapy can improve quality of life, reduce disease burden, and enhance self-efficacy among elderly individuals living with gout arthritis in rural Indonesian communities.

5. CONCLUSION

This study demonstrates that a seven-day pineapple juice therapy (200 mL/day) significantly reduces both pain intensity and serum uric acid levels among elderly patients with gout arthritis in Kotokan Hamlet, Jatiroto Village. Post-intervention data revealed a marked shift in pain distribution from moderate (73.3%) to mild (73.3%) and pain-free (26.7%) categories. At the same time, hyperuricemia resolved in all respondents, with 33.3% achieving normal uric acid levels and 66.7% reaching below-normal levels. Statistical analysis confirmed these improvements were highly significant ($p = 0.000$, $p < 0.05$).

These findings underscore the therapeutic potential of pineapple juice as a safe, accessible, and cost-effective non-pharmacological intervention for community-based gout management. The

dual action of bromelain-mediated anti-inflammatory effects and vitamin C-enhanced uric acid excretion provides a biologically plausible mechanism for rapid symptomatic and biochemical improvement. Primary healthcare providers and village health cadres (kader kesehatan) should consider integrating structured pineapple consumption guidelines into holistic gout management protocols, alongside dietary counseling and lifestyle modification.Given the chronic and age-related nature of vascular stiffness in elderly, consistent and prolonged application of this combined intervention is recommended to achieve more substantial and sustained blood pressure control. Healthcare practitioners may consider incorporating warm-water foot soaks and slow deep breathing exercises into routine geriatric care protocols, particularly as adjunctive therapies for patients seeking safe, non-pharmacological options.

AUTHOR CONTRIBUTIONS

UL, ZA, and WA: Conceptualization, data collection and analysis. UL: Writing and manuscript revisions.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest in this research.

DATA AVAILABILITY STATEMENT

The data are available from the corresponding author upon reasonable request.

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