ORIGINAL ARTICLE

Effectiveness of salt and ginger water soaking on pain scale in elderly people suffering from gout

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ABSTRACT

High uric acid levels cause an increase in needle-shaped uric acid crystals, especially in joints, which can cause pain. This study aimed to determine the effectiveness of saltwater and ginger water soaking in reducing the pain scale in elderly people with gout. This study used a quasi-experimental design with two-group pre- and post-tests. The study was conducted at the Mpunda Community Health Center, Bima City, Indonesia. The sampling technique used was a non-probability technique with quota sampling, with a total sample of 192 gout sufferers divided into three groups. The Wilcoxon and Mann–Whitney tests were used for data analysis. The findings showed that salt-water soaking therapy had a P-value of 0.003, indicating that there was a difference in the pain scale results between the pre-test and post-test. Similarly, in the ginger water soaking intervention, the P-value of 0.001 indicated a difference in the pain scale results between the pre- and post-ginger water soaking tests. The average ranking of the salt water soaking group was lower, namely 7.45, compared to the ginger water soaking group, namely 15.55, which means that the salt water soaking group experienced a greater decrease in pain scale than the ginger water soaking group. In conclusion, salt-water soaking therapy is more effective than ginger water soaking therapy for pain in patients with gout. The suggestion from this study was that healthcare providers should consider recommending salt-water soaking therapy over ginger water soaking therapy for managing pain in patients with gout.

Key words:
gout, elderly, pain scale, soaking, salt water, ginger water

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INTRODUCTION

The increase in life expectancy and better nutritional status over the last decade has led to a transition in lifestyle habits, particularly in diet. This transition has led to a change from infectious diseases to non-communicable diseases.[1,2] Changes in disease patterns are related to diet, from traditional diets containing large amounts of fiber and vegetables to diets high in protein, fat, and salt. In a diet that contains a lot of purines, if the metabolic process is disturbed, the uric acid levels in the blood will increase and cause a buildup of uric acid crystals.[3,4] Uric acid results from purine metabolism in the body. Under normal conditions, UA is excreted by the kidneys through urine.[5] This situation will trigger an inflammatory response that causes pain, this is what is called gout.[6]

Gout can be influenced by several factors, including age, sex, genetics, obesity, joint injuries, work, and exercise. It can interfere with comfort during activities owing to joint pain, but it can also cause a high risk of complications, such as acute gout nephropathy, kidney stones, and hypertension.[7] Based on its various effects, gout requires appropriate and safe treatment and can be treated pharmacologically and non-pharmacologically. Pharmacological treatment usually involves the administration of anti-pain medications. In Indonesia, as many as 57% of patients with gout consume pain-free anti-pain medications that are freely sold.[8] The use of medicines that are sold freely without supervision by a doctor can result in dependence and may also have contraindications; therefore, non-pharmacological therapy can be one of the recommendations for treatment to help relieve pain in gout sufferers. These therapies can be done in various ways, namely, relaxation techniques, increasing fluid intake (water), using warm compresses, and adopting a low-purine diet by adjusting lifestyle and food intake by reducing foods that are high in purines, soaking feet in salt water, and soaking in ginger water.[9]

Warm water therapy or hydrotherapy provides warmth to the body to reduce symptoms of acute and chronic pain. This therapy is simple and can effectively reduce pain, inflammation, and muscle spasms.[10] Warm water therapy (hydrotherapy) also helps improve blood circulation by widening the blood vessels so that more oxygen is supplied to the swollen tissues. Improving blood circulation also facilitates lymph circulation, thereby cleansing the body of toxins.[11] People who suffer from various diseases, such as rheumatism, arthritis, sciatica, back pain, insomnia, fatigue, stress, poor blood circulation (hypertension), muscle pain, cramps, and stiffness, can benefit from warm water therapy (hydrotherapy) to relieve these problems. Various types of hydrotherapy are commonly used, such as soaking, sitzbath, water massage, wrapping with wet cloth, compressing, and soaking the feet.[12]

Other research has shown that cold-water immersion decreased pain, stress, anxiety, and depression, and increased joint mobility, physical activity, and quality of life. It mediates the alleviation of pain to improve the quality of life.[13] Immersion in water at 20–30°C improved life quality and dramatically reduced pain.[14] There is almost no research that discusses the effect of soaking in ginger water for reducing pain due to gout. The absence of research that discusses in depth how saltwater soaking influences pain scale creates a gap in research in this field that will be filled by our findings.

This study aimed to determine the effectiveness of saltwater and ginger water soaking on the pain scale in elderly people with gout. We hope that this study will provide useful information for determining the method for reducing pain in elderly individuals with gout. It is expected that the results of this study will form the basis for

developing more effective therapies for patients with similar conditions. Thus, we hope that this research will make a significant contribution to improving the quality of life of elderly individuals suffering from gout. In addition, we hope that the results of this study will serve as a reference for health practitioners treating pain in these patients.

METHODS

This was an experimental study using a quasi-experimental, two-group pre-test–post-test research design. This study was conducted at the Mpunda Community Health Center Working Area, Bima City, between April and May 2024. The sampling technique used in this study was a nonprobability technique with quota sampling. The researchers collected samples based on the inclusion and exclusion criteria, consisting of 192 gout sufferers, namely 64 gout sufferers in the saltwater soak group, 64 gout sufferers in the ginger water soak group, and 64 gout sufferers who soaked their feet in plain water without any mixture.

The sample criteria used in this study were elderly people suffering from gout with a mild and moderate pain scale based on the results of the initial examination and having an SPMSQ score scale, namely, an incorrect score of no more than 5. The exclusion criteria were elderly people suffering from severe gout or high uric acid levels, diseases other than gout and wounds on the legs.

The intervention was conducted for 14 days at each respondent's home. The saltwater soaking group used 30 g of salt mixed with 3 liters of water at a temperature of 37-42^{0}C, and their feet were soaked ±5 cm above the ankles for 20 min. Meanwhile, in the ginger water soak group, 20 grams of ginger were crushed and then boiled in 1 liter of water. After boiling, the ginger water was mixed with 2 liters of normal water at a temperature of 37-42^{0}C, and the feet were soaked ± 5 cm above the ankles for 20 minutes.

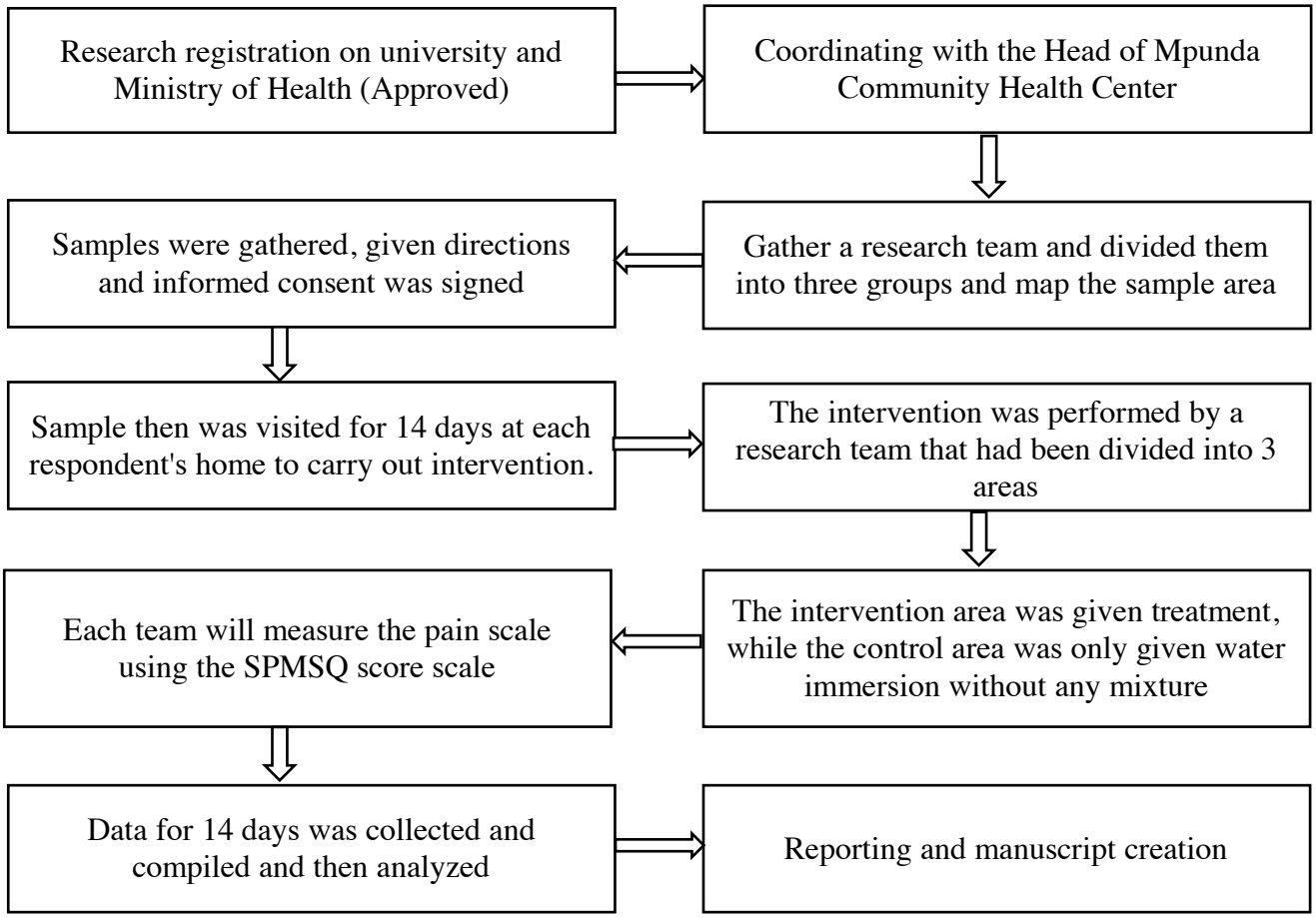

Figure 1. Research Flow

The number of samples was determined using the Lemeshow equation, which was disseminated by the Ministry of Health of the Republic of Indonesia and served as a model for this research. The effect sample size used was 0.5 with a significant level of 0.005 with the quota sampling technique. A Pearson product-moment analysis test was used to determine the validity of the questionnaire. Each submitted question had a value larger than 0.5, according to the test findings. With a Cronbach's alpha score > 0.899 in the reliability test findings, it is possible to say that the variable is consistent or reliable in measurement. Overall, the research questionnaire developed based on the Ministry of Health's model demonstrated both validity and reliability. These findings enhance the credibility of the data-collection method used in this study.

The Wilcoxon test was used to determine the effect of each group, and the Mann-Whitney test was used to determine the difference in effectiveness of the intervention between the two groups. Mann-Whitney and Wilcoxon tests were used because the data were not normally distributed. This study received ethical approval (number LB.01.03/2/218/2024) from the Poltekkes Kemenkes Mataram.

RESULTS

Table 1 shows that the majority of respondents were female in the three groups. The majority of respondents in the three groups also showed the same level of education, namely elementary school graduates. This indicates that most respondents in the study had similar educational backgrounds. Most elderly

people in each group consumed medication. Elderly individuals aged 60-74 years were included in all groups. This shows that there was a uniform pattern in the characteristics of the respondents and their drug consumption habits within these groups. Based on the results of the similarity test, the p-value is > 0.005. It can be said that the sample is homogeneous. This means that there is no significant difference between groups. Therefore, the results obtained are not influenced by sample characteristics.

Table 1. Distribution of respondents

Characteristics	Controls	Intervention 1	Intervention 2	Homogenity
Gender				
Male	28	30	25	0.995
Female	36	34	39	
Total	64	64	64	
Education				
Elementary School	26	23	28	
Junior High School	21	26	23	0.914
Senior High School	17	15	13	
Total	64	64	64	
Medication				
Yes	51	43	47	0.833
No	13	21	17	
Total	64	64	64	
Classification of the Elderly				
Age 45-59 years	22	25	28	
Age 60-74 years	34	37	31	0.975
Age 75-90 years	8	2	5	
Total	64	64	64	

Table 2 shows that salt-water soaking therapy had a Z value of -2.969 with a P-value = 0.003, indicating that there was a difference in the pain scale results between the pre- and post-test salt-water soaking. Meanwhile, in the ginger water soaking intervention, the Z value was -3.207 (P = 0.001), indicating a difference in the pain scale results between the pre- and post-ginger water soaking tests. The average rank of the salt water soaking group was lower, namely 7.45, compared to the ginger water soaking group, namely 15.55, which means that the salt water soaking group experienced a greater decrease in pain scale than the ginger water soaking group.

Table 2. The effect of saltwater and ginger water soaking therapy on pain in elderly people with gout

Variable	N	Z	P	Mean Rank	Sum of Ranks
Control (water without any mixture)	64	1.441	0.112[a]	17.8[b]	187.00[b]
Intervention 1 Pre-Post Test Salt soaking water	64	-2.969	0.003[a]	7.45[b]	82.00[b]
Intervention 2 Pre-Post Ginger soaking water	64	-3.207	0.001[a]	15.55[b]	171.00[b]

[a]Wilcoxon signed-rank test
[b]Mann–Whitney U test

Table 3 shows that the salt water soaking group experienced a greater decrease in pain scale than the ginger water soaking group with a P-value of 0.002, meaning that there was a difference in the effectiveness of saltwater and ginger water soaks on changes in the gout pain scale.

Table 3. Differences in the effectiveness of giving salt water soaks and ginger water soaks on changes in the gout pain scale

Group	N	Test Statistics	
Control (Water Without Any Mixture)	64	Mann-Whitney U	16,000
Intervention 1 (Salt Water Soaking)	64	Wilcoxon W	82,000
Intervention 2 (Ginger Soaking Water)	64	Z	-3,004
Total	192	P	0.002

Mann–Whitney U test

DISCUSSION

Saltwater soaking therapy had a Z value of -2.969 with a P value of 0.003, indicating a difference in the pain scale results between the pre- and post-tests using the saltwater soaking technique. These results indicate that saltwater soaking therapy can be effective in reducing pain. Salt-water soaking therapy can be an effective option for managing pain in patients, especially for those seeking an alternative to medications. Meanwhile, in the ginger water soaking intervention, the P-value was 0.001, indicating a difference in the pain scale results between the pre- and post-ginger water soaking tests. These results indicated that ginger water soaking therapy is effective in reducing pain. Thus, these two therapies are good choices for reducing pain in patients.

The average rank of the saltwater soaking group was lower (7.45) than that of the ginger water soaking group (15.55), which means that the saltwater soaking group experienced a greater reduction in the pain scale than the ginger water soaking group (P = 0.002), indicating a difference in the effectiveness of the two soaking groups in reducing gout pain. The results of this study showed that providing a saltwater bath was more effective in reducing the scale of pain due to gout than a ginger water bath. This demonstrates the potential of saltwater baths as an alternative therapy to reduce pain due to gout. Saltwater contains minerals that can help to reduce inflammation and pain in the body.[15]

According to previous research, Epsom salts contain chemical compounds such as sodium chloride (NaCl), calcium sulfate (CaSO4), magnesium sulfate (MgSO4) and magnesium chloride (MgCl2).[16] Salt compression therapy can effectively reduce joint pain in patients with arthritis because salt has anti-inflammatory and analgesic properties to reduce pain. Epsom salt contains a large amount of magnesium, which plays a role in inhibiting pain stimulation by nociceptors.[17] Therefore, it may have a more significant effect on the treatment of pain caused by gout. Similarly, ginger water contains natural anti-inflammatory substances that can help relieve pain; however, in this study, saltwater was shown to be more effective.[18]

Saltwater for gout sufferers reduces pain and inflammation in the affected joints. In addition, saltwater can help reduce the swelling caused by gout. Saltwater can help remove excess fluid from the affected area, thereby accelerating the healing process.[19] In addition, saltwater can have a relaxing effect on muscles that are tense due to gout. It contains minerals, such as magnesium and potassium, which can help reduce muscle tension and improve blood circulation, thereby accelerating the healing process in patients with gout. In addition, soaking the feet or parts of the body affected by gout in saltwater can provide a feeling of comfort and calm for sufferers.[20]

Ginger water is also known to have a positive effect on gout because the components of ginger can help reduce inflammation in the joints affected by gout. In addition, ginger water can naturally increase blood circulation and boost metabolism.[21] Ginger water naturally contains anti-inflammatory compounds that can relieve gout symptoms. It contains minerals and antioxidants that help neutralize free radicals in the body, thereby preventing cell and tissue damage caused by gout.[22,23]

Several studies have revealed that the saltwater soaking method can cure several diseases such as asthma, arthritis, and skin diseases.[24,25] This is because the mineral content of salt can reduce inflammation and improve skin health. This mechanism involves the dissolution of salt in water that seeps into the body through the pores of the skin, thereby providing a direct therapeutic effect on organs affected by the disease. Salt baths can also help reduce stress and improve sleep quality.[26] A chemical reaction occurs between saltwater and the body exposed to the salt bath, thereby helping to reduce inflammation and improve the immune system. Thus, salt baths can be a natural and effective alternative treatment for various health conditions.[27]

Other research suggests that saltwater can cure various diseases, including gout and skin diseases, such as eczema.[28] Saltwater is known to reduce inflammation and accelerate wound healing. Salt contains complex minerals such as magnesium, calcium, and potassium, which may provide additional health benefits.[19] However, it is important to use saltwater wisely and not excessively to avoid adverse side effects.

Gout is a disease that can be cured by healthy lifestyle changes such as adjusting diet, exercising regularly, and avoiding foods that are high in purines. In addition, medical treatments such as anti-inflammatory drugs can also help reduce gout symptoms. Alternative treatments are often an option, such as soaking the feet with herbal concoctions, which can help reduce pain and inflammation in the joints affected by gout.[6] In several Asian countries, foot soaking therapy with saltwater is believed to help reduce gout symptoms.[29–31]

Soaking in ginger water is useful for reducing joint pain because ginger contains compounds such as gingerdion, 6-gingerol, and zingerol, which suppress prostaglandins by inhibiting COX-2 activity, thereby inhibiting the production of PGE2, leukotrienes, and TNF-α in human synoviocytes and joints.[32] Ginger water soaking also aims to improve blood circulation and provides a feeling of relaxation to the body. The pharmacological effect of ginger is that it feels hot or warm, which helps improve blood circulation, reduces pain, and stimulates nerves such that stimulation is transmitted through nerve fibers, activating inhibitor neurons, and projection neurons. Neuron inhibitors prevent projection neurons from sending signals to the brain. Therefore, the door closes and there is no perception of pain.[33–35]

Saltwater soaking therapy, which is performed once a day for seven days, is more effective in reducing the severity of gout pain because the salt content can suppress the release of prostaglandins and help nerve transmission and muscle function. Epsom salt has anti-inflammatory and analgesic properties that can cure pain and has few side effects as long as it is applied correctly.[36] This is different from soaking in ginger water, where the ginger content inhibits the release of prostaglandins and causes a warm sensation in areas submerged in ginger water. Ginger is often used as a pain medication because it contains gingerol, and the warm feeling it creates can dilate the blood vessels and improve circulation.

Saltwater soaking can reduce pain in patients with gout, improve blood flow, and reduce uric acid clumping in the joints. The sodium contained in salt is important for regulating fluid balance in the body, and sodium is also responsible for nerve transmission and muscle function. Epsom salt contains more magnesium, which can inhibit the production of prostaglandins and the release of acetylcholine, thereby reducing gout pain.[37]

The limitation was that the study only evaluated short-term effects, so further research is needed to determine the long-term effectiveness of saltwater soaking therapy for gout pain relief. Additionally, it would be beneficial to explore the potential side effects or drawbacks of salt water soaking therapy compared to ginger water soaking. Understanding these factors could provide a more comprehensive understanding of the overall effectiveness of each treatment option for gout pain relief.

RECOMMENDATIONS

Salt water soaking therapy carried out once a day for seven days was more effective in reducing the gout pain scale compared to ginger water soaking therapy, with the difference in the mean ranking value of salt water soaking being lower than that of ginger water soaking, indicating a greater reduction in pain in the salt water soaking group than that in ginger water soaking group. The results of the study showed that salt water soaking therapy had a more significant effect on reducing gout pain than ginger water soaking therapy. This suggests that salt water therapy could be a more effective option for individuals experiencing pain due to gout.

CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

REFERENCES

1. Wickramasinghe K, Mathers JC, Wopereis S, Marsman DS, Griffiths JC. From lifespan to healthspan: the role of nutrition in healthy ageing. J Nutr Sci. 2020;9:e33. doi: 10.1017/jns.2020.26
2. Popkin BM, Ng SW. The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is

not inevitable. Obes Rev. 2022; 23(1):e13366. doi: 10.1111/obr. 13366
3. Lubawy M, Formanowicz D. High-Fructose Diet–Induced Hyperuricemia Accompanying Metabolic Syndrome–Mechanisms and Dietary Therapy Proposals. Int J Environ Res Public Health. 2023;20(4):3596. doi: 10.3390/ijerph20043596
4. Zhang Y, Chen S, Yuan M, Xu Y, Xu H. Gout and Diet: A Comprehensive Review of Mechanisms and Management. Nutrients. 2022;14(17): 3525. doi: 10.3390/nu14173525
5. Gherghina ME, Peride I, Tiglis M, Neagu TP, Niculae A, Checherita IA. Uric Acid and Oxidative Stress-Relationship with Cardiovascular, Metabolic, and Renal Impairment. Int J Mol Sci. 2022;23(6):3188.
6. Parisa N, Kamaluddin M, Saleh M, Sinaga E. The inflammation process of gout arthritis and its treatment. J Adv Pharm Technol Res. 2023;14(3):166-170. doi: 10.4103/japtr.japtr_144_23
7. Wang S, Zhang L, Hao D, Wang L, Liu J, Niu Q, et al. Research progress of risk factors and early diagnostic biomarkers of gout-induced renal injury. Front Immunol. 2022 Sep 20;13:908517. doi: 10.3389/fimmu.2022.908517
8. Cha Y, Lee J, Choy W, Lee JS, Lee HH, Chae DS. Pathophysiology and Treatment of Gout Arthritis; including Gout Arthritis of Hip Joint: A Literature Review. Hip Pelvis. 2024;36(1):1–11. doi: 10.5371/hp.2024.36.1.1
9. Líška D. Nefarmakologická liečba dny [Non-pharmacological treatment of gout]. Vnitr Lek. 2021;67(E-2):25-28. Czech
10. Wang Y, Lu H, Li S, Zhang Y, Yan F, Huang Y, et al. Effect of cold and heat therapies on pain relief in patients with delayed onset muscle soreness: A network meta-analysis. J Rehabil Med. 2022;54:jrm00258. doi: 10.2340/jrm.v53.331
11. An J, Lee I, Yi Y. The Thermal Effects of Water Immersion on Health Outcomes: An Integrative Review. Int J Environ Res Public Health. 2019; 16(7):1280. doi: 10.3390/ijerph 16071280
12. Wangchuk P, Yeshi K, Ugyen K, Dorji J, Wangdi K, Samten, et al. Water-Based Therapies of Bhutan: Current Practices and the Recorded Clinical Evidence of Balneotherapy. Water (Basel). 2020;13(1):9.
13. Kurniasari MD, Monsen KA, Weng SF, Yang CY, Tsai HT. Cold Water Immersion Directly and Mediated by Alleviated Pain to Promote Quality of Life in Indonesian with Gout Arthritis: A Community-based Randomized Controlled Trial. Biol Res Nurs. 2022; 24(2):245–258. doi: 10.1177/10998 004211063547
14. Kurniasari MD, Karwur FF, Rayanti RE, Shih YW, Yuliana S, Miao NF, et al. Immersion in Water Between 20-30 ° C Mediated Inflammations Marker to Reduced Pain Among Indonesian With Gout Arthritis: A Community-Based Randomized Controlled Trial. Biol Res Nurs. 2023 Apr 7;25(2):267–281. doi: 10.1177/10998004221132843
15. Nam J, Kim KJ, Park G, Kim BG, Jeong GH, Jeon J eun, et al. Anti-Inflammatory Properties of Mineral-Balanced Deep Sea Water in In-Vitro and In-Vivo Models of Inflamed Intestinal Epithelium. Applied Sciences. 2020;10(15):5183.
16. Paulsamy P, Venkatesan K, Alshahrani S, Ahmad F, El-Sherbiny M, Manoharan V, et al. Alternate Warm and Cold Therapy (AWCT) on Uricemia, Sleep, Pain, Functional Ability, and Quality of Life (USPFQoL) in Patients with Gout: A Path Forward. J Healthc Eng.

2022;2022:5471575. doi: 10.1155/2022/5471575
17. Ferrari AV, Perea JPM, Dantas LO, Silva HJA, Serrão PRM da S, Sendín FA, et al. Effect of compression by elastic bandages on pain and function in individuals with knee osteoarthritis: protocol of a randomised controlled clinical trial. BMJ Open. 2022;12(11): e066542. doi: 10.1136/bmjopen-2022-066542
18. Ballester P, Cerdá B, Arcusa R, Marhuenda J, Yamedjeu K, Zafrilla P. Effect of Ginger on Inflammatory Diseases. Molecules. 2022;27(21): 7223. doi: 10.3390/molecules27217223
19. Aragón-Vela J, González-Acevedo O, Plaza-Diaz J, Casuso RA, Huertas JR. Physiological Benefits and Performance of Sea Water Ingestion for Athletes in Endurance Events: A Systematic Review. Nutrients. 2022; 14(21):4609. doi: 10.3390/nu14214609
20. Susanti S, Andriani D, Bistara DN. The application of warm water compresses with ginger and lemongrass on pain intensity in patients with gout arthritis. Nurse and Holistic Care. 2021;1(2):63–72.
21. Sayed S, Ahmed M, El-Shehawi A, Alkafafy M, Al-Otaibi S, El-Sawy H, et al. Ginger Water Reduces Body Weight Gain and Improves Energy Expenditure in Rats. Foods. 2020;9(1):38. doi: 10.3390/foods9010038
22. Nam DG, Kim M, Choi AJ, Choe JS. Health Benefits of Antioxidant Bioactive Compounds in Ginger (Zingiber officinale) Leaves by Network Pharmacology Analysis Combined with Experimental Validation. Antioxidants (Basel). 2024; 13(6):652. doi: 10.3390/antiox 13060652
23. Shaukat MN, Nazir A, Fallico B. Ginger Bioactives: A Comprehensive Review of Health Benefits and Potential Food Applications. Antioxidants. 2023;12(11):2015. doi: 10.3390/antiox12112015
24. Elkhawaga OY, Ellety MM, Mofty SO, Ghanem MS, Mohamed AO. Review of natural compounds for potential psoriasis treatment. Inflammo pharmacology. 2023 Jun 30;31(3): 1183–1198. doi: 10.1007/s10787-023-01178-0
25. Wasik AA, Tuuminen T. Salt Therapy as a Complementary Method for the Treatment of Respiratory Tract Diseases, With a Focus on Mold-Related Illness. Altern Ther Health Med. 2021;27(S1):223–239.
26. Costantino M, Izzo V, Conti V, Manzo V, Guida A, Filippelli A. Sulphate mineral waters: A medical resource in several disorders. J Tradit Complement Med. 2020;10(4):320–326. doi: 10.1016/j.jtcme.2019.04.004
27. Peinemann F, Harari M, Peternel S, Chan T, Chan D, Labeit AM, et al. Indoor salt water baths followed by artificial ultraviolet B light for chronic plaque psoriasis. Cochrane Database Syst Rev. 2020;5(5):CD011941. doi: 10.1002/14651858.CD011941.pub2
28. Dai D, Ma X, Yan X, Bao X. The Biological Role of Dead Sea Water in Skin Health: A Review. Cosmetics. 2023;10(1):21.
29. Lee G, Cho FY, Goo B, Park YC. Acupuncture for gouty arthritis. Medicine. 2020;99(49):e23527.
30. Kurniasari MD, Monsen KA, Weng SF, Yang CY, Tsai HT. Cold Water Immersion Directly and Mediated by Alleviated Pain to Promote Quality of Life in Indonesian with Gout Arthritis: A Community-based Randomized Controlled Trial. Biol Res Nurs. 2022;24(2):245–258. doi: 10.1177/10998004211063547
31. Granados-Amores A, Campa-Córdova ÁI, Acosta-Salmón H, Angulo C, Zenteno-Savín T, Rodríguez-Jaramillo C, et al. Antioxidant Activity and Oxidative Damage Associated with

Seeding Surgery for Pearl Culture in the Winged Pearl Oyster Pteria sterna. Antioxidants (Basel). 2024;13(6):723. doi: 10.3390/antiox13060723
32. Hwang YH, Kim T, Kim R, Ha H. The Natural Product 6-Gingerol Inhibits Inflammation-Associated Osteoclast Differentiation via Reduction of Prostaglandin E2 Levels. Int J Mol Sci. 2018;19(7):2068. doi: 10.3390/ijms 19072068
33. He W, Liang L, Zhang Y. Pungency Perception and the Interaction with Basic Taste Sensations: An Overview. Foods. 2023;12(12):2317. doi: 10.3390/foods12122317
34. Andrei C, Zanfirescu A, Nițulescu GM, Negreș S. Understanding the Molecular Mechanisms Underlying the Analgesic Effect of Ginger. Nutraceuticals. 2022;2(4):384–403.
35. Arcusa R, Villaño D, Marhuenda J, Cano M, Cerdà B, Zafrilla P. Potential Role of Ginger (Zingiber officinale Roscoe) in the Prevention of Neurodegenerative Diseases. Front Nutr. 2022;9:809621. doi: 10.3389/ fnut.2022.809621
36. Kurniasari MD, Karwur FF, Rayanti RE, Shih YW, Yuliana S, Miao NF, et al. Immersion in Water Between 20-30 ° C Mediated Inflammations Marker to Reduced Pain Among Indonesian With Gout Arthritis: A Community-Based Randomized Controlled Trial. Biol Res Nurs. 2023;25(2):267–281. doi: 10.1177/10998004221132843
37. Sun X, Yang L, Sun H, Sun Y, Wei S, Han Y, et al. TCM and related active compounds in the treatment of gout: the regulation of signaling pathway and urate transporter. Front Pharmacol. 2023;14:1275974. doi: 10.3389/f phar.2023.1275974