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The Effect of Soursop Leaf Extract in Reducing Pain in Gout Arthritis



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Abstract

Gout arthritis is a disease characterized by pain caused by deposits of monosodium crystals that accumulate in the joints due to high levels of uric acid in the blood. Currently, pain management treatment for gout arthritis patients focuses on pharmacological treatment by providing analgesics to relieve pain. Soursop leaf extract has been proven to have an effect in reducing pain, but there has been no research regarding the effect of boiled soursop leaves to reduce it. The aim of this study was to analyze the effect of giving soursop leaf decoction on reducing pain in gout arthritis patients. The research used a quasi-experimental design with a one group pre-posttest design. The sample selected by using purposive sampling technique, totaling 18 people. The independent variable was soursop leaf decoction. The dependent variable was the pain in gout arthritis. The data analysis used the Wilcoxon Signed Ranks Test statistical test. The compounds contained in soursop leaves function as a strong analgesic (pain reliever) and have antioxidant properties. The antioxidant properties contained in soursop leaves can reduce the formation of uric acid by inhibiting the production of the enzyme xanthine oxidase. This combination of analgesic and anti-inflammatory properties can reduce gout. This study found that there was an effect of giving soursop leaf decoction on reducing pain in gout arthritis patients.

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INTRODUCTION

Uric acid is a substance resulting from purine metabolism in the body. This uric acid substance is usually excreted by the kidneys through urine under normal conditions. However, under certain conditions, the kidneys are unable to excrete uric acid in a balanced manner, resulting in an excess in the blood. This excess uric acid eventually accumulates and deposits in the joints in other places, including the kidneys themselves, in the form of crystals (Sandjaya, 2019). Excess uric acid (hyperuricemia) is often referred to as gout, which is an acute inflammatory disorder characterized by pain due to the accumulation of monosodium urate crystals in the joints and soft tissues in the body (Shetty et al., 2011). Gout can generally interfere with the sufferer's daily activities. Advanced gout sufferers will experience arthritis that appears very quickly in a short time. The sufferer sleeps without any symptoms, but when he wakes up in the morning the pain is so severe that he cannot walk. If the disease process continues, other joints can be affected, namely the wrists or feet, knees and elbows (Tehupeiory, 2018). Pain is a condition in the form of an unpleasant feeling that is very subjective because each person feels pain in terms of scale or level, and only that person can explain the pain they experience (Hidayat, 2018). Based on the results of an initial survey conducted by researchers in the working area of the Gresik Nelayan Health Center, it was found that some people who lack knowledge about the correct management of gout arthritis like to buy their own medicine at the stall to reduce the pain they experience. Meanwhile, treatment for gout pain can be done pharmacologically and non-pharmacologically. Pharmacologically, it can be done using drugs, while non-pharmacologically it can be done by giving boiled water from soursop leaves. Soursop leaves contain important compounds, namely tannin, resin, crytallizable magostine and muricin alkaloids which are able to treat joint pain in gout. The compounds contained in soursop leaves function as a strong analgesic (pain reliever) and are antioxidants (Shabella, 2011). However, until now the effect of giving soursop leaf decoction on reducing pain in gout arthritis sufferers still cannot be explained.

According to Susenas (2020) in the journal Wirahmadi (2018), the incidence or prevalence of gout in the United States is very high. Based on data from The National Institutes Health (NIH) in 2002, the number of Gout arthritis sufferers in the United States reached 2.1 million people. The prevalence of gout in the UK adult population is estimated to be 1.4%, with a peak of over 7% in men aged 75 years. In China, up to 25% of the population experiences hyperuricemia. This may be caused by changes in lifestyle and diet, excessive consumption of alcohol and other medications (Wortman, 2002 in Zahara, 2018). WHO in 2022 recorded that gout sufferers in Indonesia reached 81% of the population, only 24%

went to the doctor, while 71% tended to immediately consume over-the-counter pain relievers. Based on the results of the Indonesian Basic Health Research (Risikedas) in 2018, the highest prevalence of gout arthritis sufferers was in Bali, reaching 19.3%. North Sulawesi also has one of the highest prevalence of gout arthritis sufferers, reaching 10.3%. From Scudamore's research, it is known that in 516 sufferers, 60% experienced the first acute gout attack affecting the big toe, and affected both toes in 5% of sufferers. The percentage of possible sufferers who experience acute gout and attacks many joints, namely the wrists or feet, knees and elbows is around 4-13%. The prevalence of gout in East Java is 17%. The prevalence of gout in Surabaya is 56.8% (Festy, 2010). Based on the results of a preliminary data survey at the Gresik Nelayan Community Health Center in 2022, data on gout arthritis patients in August was 38 with gout arthritis, in September there were 46 sufferers of gout arthritis, and in October there were 51 sufferers of gout arthritis. From the results of the initial survey conducted by researchers in the working area of the Gresik Nelayan Health Center, regarding knowledge of good management of gout arthritis, some patients know good management of gout arthritis (limiting consumption of meat, offal and nuts, patients do not consume herbal medicine, patients only take anti-inflammatory drugs), pain and decreased uric acid from the doctor), while some patients who do not know the proper management of gout arthritis like to consume offal, shrimp, nuts, and like to buy over-the-counter pain relievers in stalls rather than seeing a doctor.

Factors that influence uric acid levels are classified into three: primary factors, secondary factors and predisposing factors. Primary factors are influenced by genetic factors. Secondary factors can be caused by two things, namely excessive uric acid production and decreased uric acid excretion. Predisposing factors are influenced by age, gender and climate (Muttakin, 2008). Secondary factors can develop with other diseases (obesity, diabetes mellitus, hypertension, polycythemia, leukemia, myeloma, sickle cell anemia and kidney disease) (Kluwer, 2021). Risk factors that cause people to develop gout, Vitahealth (2017) are genetics/family history, excessive intake of purine compounds, excessive alcohol consumption, overweight (obesity), hypertension, impaired kidney function and certain medications (especially diuretics). The factors mentioned above can increase uric acid levels, if there is an increase in uric acid and marked rheumatic pain in the joints, pain, tenderness, redness and swelling, this condition is known as gout. Gout is a disease that can be controlled although it cannot be cured, but if left alone this condition can develop into crippling arthritis (Charlish, 2019). Gout has the potential to cause infection when toplus rupture occurs, kidney stones, hypertension and other heart diseases (Kluwer, 2021).

Treatment for gout sufferers is divided into 2, namely pharmacological and non-pharmacological. Pharmacological treatment uses drugs, such as: NSAIDs, colchicine, corticosteroids, probenecid, allopurinol and uroicisuric (Helmi, 2017), while non-pharmacological treatment involves limiting purine or low purine intake, energy intake according to needs, consuming more carbohydrates, reducing fat consumption, consuming lots of fluids, not consuming alcoholic drinks, consuming enough vitamins and minerals, consuming fruit and vegetables, and regular light exercise (Ardhilla, 2018). Non-pharmacological management to overcome pain in gout is with complementary therapy, namely therapy that is natural treatment, including herbal therapy (Price & Wilson, 2017). The type of medicine used in herbal therapy that can treat gout pain is soursop fruit or soursop leaves (*Annona muricata* Linn). Soursop leaves contain tannin compounds, resin, crystallizable mangostine and muricin alkaloids which can treat joint pain in gout. The compounds contained in soursop leaves function as a strong analgesic (pain reliever) and are antioxidants. The antioxidant properties contained in soursop leaves can reduce the formation of uric acid by inhibiting the production of the enzyme xanthine oxidase. This combination of analgesic and anti-inflammatory properties can reduce gout. Gout sufferers experience damage to cartilage tissue, the cartilage consists of chondrocyte cells, in the chondrocyte cells synthesis and secretion of extracellular matrix reactions take place. Mangostine extract and others contained in soursop leaves (tannins, resin, muricin alkaloid) have been proven to be able to inhibit damage to the extracellular matrix and stimulate the expression of several gene associations that make up cartilage such as collagen which consists of collagen I and collagen II and agrecan so that it helps regenerate cartilage tissue so that the pain felt by gout sufferers can be reduced (Shabella, 2021). The dose is 1 glass or the equivalent of 200 cc of boiled water from soursop leaves given 2x/day for 7 days. Therefore, researchers are interested in conducting research on the effect of

giving soursop leaf decoction on reducing pain in gout arthritis sufferers.

METHODS

This research method uses Pre-Experimental with a One-Group Pre-Post test Design, which aims to determine the effect of giving soursop leaf decoction on reducing pain in gout arthritis sufferers before the intervention and after the intervention. This research was conducted in the working area of the Gresik Nelayan Health Center, in February-March 2023. The population in this study were 18 respondents suffering from gout arthritis in the working area of the Nelayan Gresik Health Center, and 51 patients suffering from gout arthritis in the working area of the Nelayan Gresik Health Center within one month. Sampling in this research uses a non-probability sampling technique, purposive sampling type, namely a sample determination technique by selecting a sample from the population according to what the researcher desires (the objectives/problems in the research), so that the sample can represent previously known population characteristics (Nursalam, 2022). Based on sample size calculations, the sample size was 18 gout arthritis sufferers, which met the inclusion criteria. The independent variable in this study was the administration of boiled soursop leaves (*Annona muricata* Linn), while the dependent variable was a decrease in pain in gout arthritis sufferers. The instruments used in this research were the Standard Operational Procedure (SOP) for making soursop leaf decoction, the Wong-Baker pain scale observation sheet. The data was processed and analyzed using the Wilcoxon Sign Rank statistical test with a significance level of $p < 0.05$. If the statistical test results are found to be $p < 0.05$, then H_0 is accepted, which means that there is an effect of giving soursop leaf decoction on reducing pain in gout arthritis sufferers. On the other hand, if the statistical test results are found to be $p > 0.05$, then H_0 is rejected, which means there is no effect of giving boiled soursop leaves on reducing pain in gout arthritis sufferers.

RESULTS

1. Pain Category before Giving Soursop Leaf Decoction to Gout Arthritis Sufferers

Table 1: Assessment of Pain Categories before Giving Soursop Leaf Decoction to Gout arthritis Sufferers in the Working Area of the Fishermen's Health Center, Gresik Regency, February-March 2023

Pain Category	Frekuensi	Prosentase
No Pain (0)	0	0%
Slight Pain (1-2)	0	0%
Somewhat Annoying (3-4)	6	33.3%
Moderately Annoying (5-6)	9	50.0%
Very Annoying (7-8)	3	16.7%
Unbearable (9-10)	0	0%
Total	18 (100%)	

Table 1 shows that gout arthritis sufferers in the Gresik Regency Fishermen's Health Center working area, before being given boiled soursop leaves, found that the majority of respondents had the pain category quite bothersome as many as 9 people (50.0%) and a small percentage had the pain category very bothersome as many as 3 people (16.7%).

2. Category of pain after being given a decoction of soursop leaves to sufferers of gout arthritis

Table 2: Assessment of Pain Categories after Being Given Decoction of Soursop Leaves to Gout arthritis Sufferers in the Working Area of the Fishermen's Health Center, Gresik Regency, February-March 2023

Pain Category	Frekuensi	Prosentase
No Pain (0)	0	0%
Slight Pain (1-2)	6	33.3%
Somewhat Annoying (3-4)	9	50.0%
Moderately Annoying (5-6)	3	16.7%
Very Annoying (7-8)	0	0%
Unbearable (9-10)	0	0%
Total	18 (100%)	

Table 2 shows that gout arthritis sufferers in the Gresik Regency Fishermen's Health Center working area after being given boiled soursop leaves, respondents experienced a decrease in the pain category. It can be seen that the majority of respondents had the pain category being somewhat annoying as many as 9 people (50.0%) and a small number had the pain category being moderate. disturbed 3 people (16.7%).

3. Effect of Soursop Leaf Decoction on Reducing Pain in Gout arthritis Sufferers

Table 3: Effect of Giving Soursop Leaf Decoction on Reducing Pain in Gout arthritis Sufferers in the Working Area of the Fishermen's Health Center, Gresik Regency, February-March 2023

Pain Gout Arthritis	Before	After
Mean	5.28	3.22
Std. Deviation	1.227	1.215

Wilcoxon Signed Ranks Test value sig (2-tailed) = 0.000

Table 3 shows that based on the results of the Wilcoxon Signed Ranks Test statistical test, it is known that the average value before being given boiled soursop leaves was 5.28 and the standard deviation value was 1.227, while the average value after being given boiled soursop leaves was 3.22 and the standard deviation value was 1.215. The research results obtained from analysis using the Wilcoxon Signed Ranks Test statistical test showed a significant value = 0.000, meaning $p < 0.05$, so H_1 was accepted, meaning there was an effect of giving soursop leaf decoction on reducing pain in Gout arthritis sufferers.

DISCUSSION

1. Pain Category before Giving Soursop Leaf Decoction to Gout Arthritis Sufferers.

Gout is a metabolic disorder that was known by Hippocrates in ancient Greece. Gout or gout is a disease that occurs due to excess uric acid in the blood which then accumulates and deposits in the form of crystals in the joints (Sandjaya, 2019). Pain is something that is very subjective, there is no objective measure of it, so only the person who feels it is the most accurate and precise in defining pain (Prasetyo, 2020). Treatment of pain in gout can be done pharmacologically and non-pharmacologically. Pharmacologically it can be done using medicines, while non-pharmacologically it can be done by giving boiled water from soursop leaves. Soursop leaves contain important compounds, namely tannins, resins, crystallizable mangostine and muricin alkaloids which are able to treat joint pain in gout (Shabella, 2021).

Before being given boiled water from soursop leaves, most of the respondents experienced pain which was quite disturbing, this was because many respondents did not care about their health, respondents did not take good care of the condition of their joints because they felt fine and there would be no symptoms of gout. Coupled with the lack of information and knowledge about health and respondents said they did not want to maintain their diet and did not want to implement healthy living behavior in their daily lives. Based on research results, pain in gout arthritis sufferers tends to be lower in men compared to women. Based on gender characteristics, the majority of respondents were female, 10 people (56%). This is because in men the uric acid value is higher, namely above 8.5, and in women the uric acid value is lower, on average above 7.5. Judging from the age characteristics, it shows that the majority of respondents were aged 51-65 years as many as 9 people (50%). This is because when a person gets older there will be changes or decreases in metabolic processes in the body and gout is a disease caused by disorders of uric acid metabolism in the body (Widi, et al. 2017). The level of education can influence a person's knowledge about a disease. Based on educational characteristics, the majority of respondents with elementary school education, 9 people (50%) suffer from gout arthritis, in this case a person's education can have an influence in obtaining information and someone with higher education is

wiser in responding to a problem, for example in the field of disease, those with higher education those with high levels are wiser in dealing with their illnesses, considering that illnesses must be treated immediately so that they don't get worse, so that illnesses are easier to overcome, on the other hand, if someone has low education, they lack knowledge so they don't adopt healthy living behavior. If we look at the job characteristics, the majority of respondents work as self-employed people, 9 people (50%), the workload can cause someone to experience problems, this is because the workload is tiring every day for a long period of time resulting in worsening health, leading to chronic fatigue.

2. Category of pain after being given a decoction of soursop leaves to sufferers of gout arthritis.

The change in pain category in gout arthritis sufferers after giving soursop leaf decoction is due to the fact that soursop leaves contain tannin, resin, crystallizable mangostine and muricin alkaloids which are able to treat joint pain in gout. The compounds contained in soursop leaves function as a strong analgesic (pain reliever) and are antioxidants. The antioxidant properties contained in soursop leaves can reduce the formation of uric acid by inhibiting the production of the enzyme xanthine oxidase. This combination of analgesic and anti-inflammatory properties can reduce gout (Shabella, 2021). The results of research conducted in the working area of the Gresik Regency Fishermen's Health Center showed that all respondents experienced a decrease in the pain category they felt. This is because the respondents followed the therapy procedures given by the researcher well, the respondents were able to properly apply the Health Education that had been given by the researcher before administering the soursop leaf decoction, they were able to regulate their diet, implement healthy living behavior, and the respondents paid more attention to their condition his health. So the results of the research show that respondents experienced a decrease in pain.

3. Effect of Soursop Leaf Decoction on Reducing Pain in Gout arthritis Sufferers.

The reduction in pain in gout arthritis sufferers is due to the content of soursop leaves, namely tannin compounds, resin, crystallizable mangostine and the alkaloid murisin which can overcome joint pain in gout. The compounds contained in soursop leaves

function as a strong analgesic (pain reliever) and are antioxidants. The antioxidant properties contained in soursop leaves can reduce the formation of uric acid by inhibiting the production of the enzyme xanthine oxidase. This combination of analgesic and anti-inflammatory properties can reduce gout. Gout sufferers experience damage to cartilage tissue, the cartilage consists of chondrocyte cells, in the chondrocyte cells synthesis and secretion of extracellular matrix reactions take place. Mangostine extract and others contained in soursop leaves (tannins, resin, muricin alkaloid) have been proven to be able to inhibit damage to the extracellular matrix and stimulate the expression of several gene associations that make up cartilage such as collagen which consists of collagen I and collagen II and agrecan so that it helps regenerate cartilage tissue so that the pain felt by gout sufferers can be reduced (Shabella, 2021). The way soursop leaves work is the same as the drug allopurinol which works by inhibiting the xanthine oxidase enzyme.

For gout arthritis sufferers, some respondents took medication. Based on the characteristics of drug consumption, 9 respondents (50%) consumed drugs. This is because respondents are dependent on drugs to reduce their pain. In this study, respondents who suffered from gout arthritis were put into one treatment group by being given water boiled with soursop leaves, the dose given was 1 glass or the equivalent of 200 cc of water boiled with soursop leaves given 2x/day for 7 days. The results obtained from this treatment showed that there was a decrease in pain categories after 7 days of giving boiled water from soursop leaves, on average respondents experienced a decrease in pain by 2, but from the results obtained by researchers there were several respondents who experienced a decrease in pain by only one, this is because the respondents did not drink boiled water from soursop leaves regularly or according to what the researchers determined, namely drinking boiled water in the morning and evening, because the respondents were busy, causing respondents to forget to drink boiled water from soursop leaves, they drank boiled water from soursop leaves given by researchers when remembering it. From these results it can be seen that there is an effect of giving soursop leaf decoction on reducing pain in gout arthritis sufferers. Reducing the pain category felt by gout arthritis sufferers can help them carry out their daily routines smoothly. So it is necessary to develop a complementary therapy by administering a decoction of soursop leaves in the hope of achieving optimal body condition.

Giving boiled water from soursop leaves to respondents suffering from gout arthritis also experienced a decrease in uric acid test results. Before being given boiled water from soursop leaves, all respondents were tested for uric acid with uric acid results above the normal limit, namely more than 2.6-6 mg/dl in women and 3.5-7 mg/dl in men. After being given boiled water from soursop leaves at a dose of 1 glass (200 cc) of boiled water from soursop leaves given 2x/day for 7 days, all respondents experienced a decrease in their uric acid examination results, although not all respondents experienced a decrease in uric acid within normal limits.

CONCLUSION

Most respondents had the pain category quite annoying (5-6) before being given the soursop leaf decoction and the majority of respondents had the pain category somewhat disturbing (3-4) after being given the soursop leaf decoction. So, it can be said that there is an effect before and after giving soursop leaf decoction on reducing pain in gout arthritis sufferers.

SUGGESTION

Based on the results of research that has been carried out, suggestions that can be given by researchers are: For Community Health Centers and Nurses, it can be used as a supporting therapy for the treatment of Gout arthritis so that it helps in reducing pain in Gout arthritis sufferers, collaborating with local health centers to form an Integrated Development Post for people who suffering from a non-communicable disease. For the community, boiled soursop leaves can be an alternative natural medicine option for treating Gout Arthritis to reduce pain, by consuming boiled water from soursop leaves until the pain is reduced. For future researchers, respondents who were given boiled soursop leaves in the same place can use a control group so that there is a comparison and confounding factors can be minimized.

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The authors have no conflict of interest in publishing the articles.

AUTHOR CONTRIBUTIONS

All authors fully contribute to research activities starting from drafting activities, tabulating data management, writing drafts of manuscripts and analysis. Each author makes a positive contribution to this activity from start to finish, including publishing articles in this journal

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