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REDUCTION OF URIC ACID LEVELS WITH BAY LEAF DECOCTION IN PATIENTS WITH GOUT ARTHRITIS

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ABSTRACT

Gout Arthritis is a disease caused when the kidneys are unable to remove uric acid in the blood. This results in the accumulation of uric acid levels which manifests in inflammation in the joints and has a physical and psychological impact on the sufferer. One of the complementary therapies used to reduce uric acid levels is the use of bay leaf boiled water. The purpose of the study was to determine the effect of bay leaf decoction on uric acid levels in patients with gout atritis in the working area of the Payung Sekaki Health Center, Pekanbaru City. The research design used quasy was experimental with a time series design with control. The sample in this study was 18 people with gout who were taken using the purposive sampling technique and were differentiated into the intervention and control groups. The intervention group was given bay leaf decoction for 4 days and uric acid levels were measured before and after the administration of the leaf decoction. The instruments used were observation sheets and GCU easy touch tools. The data were analyzed using t-dependent and t-independent tests. The results of the study in the intervention group were obtained p values on day 1 (0.000), day 2 (0.000), day 3 (0.000) and day 4 (0.000). All of these results showed a p value of <0.05 which means that there was a significant effect of giving bay leaf decoction on reducing uric acid levels in the intervention group. Meanwhile, in the control group, p values were obtained which were <0.05 respectively starting from the 1st day (0.609), the 2nd day (0.870), the 3rd day (0.910), and the 4th day (0.377). Based on these findings, there was no difference in pre-test and post-test scores in the control group. The results of the t-independent test in the intervention group and the control group from days 1 to 4 obtained the same p value of 0.000 (<0.05). This means that the difference in post-test scores after being given bay leaf decoction water in the intervention and control groups. Thus, it can be concluded that giving bay leaf decoction regularly until the 4th day can help reduce uric acid levels in patients with gout arthritis.

Keywords: boiled bay leaves; gout arthritis; uric acid

INTRODUCTION

The prevalence of Non-Communicable Diseases (NCDs) in Indonesia is currently still a health problem whose cases tend to increase. The increase in NCD cases is directly proportional to the increase in mortality where there are 17 million deaths due to NCDs occurring before the age of 70 (Adnyana et al., 2023). The World Health Organization (WHO) estimates that this disease causes at least 40 million deaths each year in the world. This number is equivalent to 70% of deaths by all causes at the global level (Ministry of Health of the Republic of Indonesia, 2022). Cases of NCDs that often occur such as diabetes mellitus, hypertension, rheumatoid arthritis, osteoporosis, and gout arthritis. Gout Arthritis is a disease caused by the inability of the kidneys to excrete uric acid in the blood through urine. As a result, there is a build-up and deposition in the form of monosodium urate (MSU) crystals in the joints and even in the kidneys themselves. This results in joint inflammation and an increase in uric acid levels in the blood (Tari et al., 2021; Suryagustina et al., 2022).

Gout Arthritis is increasing drastically in Indonesia. WHO in the non-communicable disease country profile stated that cases of gout arthritis were found as many as 13.6 cases per 1,000 women in the United States. In Indonesia, people with gout atritis were recorded to reach 12-34% of the total Indonesia population of 18.3 million people, with distribution at the age of 55-64 years (45%), age 65-74 years (51.9%), and age >75 years (54.8%) (Putri et al., 2023; Kurniawan & Kartinah, 2023). Riskesdas (2018) stated that the prevalence of joint disease in Indonesia reached 7.30% with an incidence rate of 6.13% for men and 8.46% for women. Based on the age group of 15 years and above, there is a risk of joint disease. Data in Riau Province in 2018 stated that the prevalence of joint diseases based on the diagnosis of health workers in the population aged >15 years according to the district/city of Riau Province was 7.10% (Riskesdas, 2018). The number of visits of patients with gout arthritis to the Health Center is quite high at 3.74%, which makes gout arthritis one of the ten largest types of diseases in the Health Center (Wati et al., 2022).

Patients with Gout Arthritis experience several physical complaints including joint pain (32.17%), movement disorders in the joints (24.13%), warm joints (21.83%), swelling (12.64%), reddish joints (2.29%), and tophi (6.89%) (Rahmah & Mukaddas, 2016). Joint pain complaints felt by a person range from mild to severe complaints and are most common in the back (35%), shoulders (16%), knees (13%) and elbows (6%) (Auliya & Lantika, 2020). This pain complaint is the main problem for gout arthritis sufferers which can have an impact both physically, as well as non-physical aspects. In addition, the swelling that occurs in the joints results in the appearance of lumps. Then these lumps can rupture and cause injuries that result in gout sufferers being unable to work and carry out activities as usual (Desverisca et al., 2019; Marlinda & Dafriani, 2019). In addition to the physical impact, people with gout arthritis also experience psychological impacts. This condition can occur due to the presence of tophi, which makes the sufferer feel embarrassed, lacks confidence, and results in disturbed psychological aspects such as the sufferer feeling stressed to depression (Schonfeld et al., 2017; Desi et al., 2019). High levels of uric acid in the blood, which are not properly controlled, can cause fatal complications. Some of the complications of gout arthritis include secondary infections, kidney stones, fractures in the joints, cytokines, chemokines, proteases and oxidants that play a role in the acute inflammatory process also play a role in chronic inflammatory processing so that it can cause synovitis, cartilage destruction, and bone erosion (Marlinda & Dafriani, 2019; Santoso et al., 2023).

The extent of the impact of gout atritis is important to make efforts to prevent complications of gout arthritis. There are two approaches that can be taken, namely pharmacological and non-pharmacological ones. Pharmacologically treatment is carried out by administering a group of nonsteroidal anti-inflammatory drugs (OAINS) to treat joint pain and inflammation, but these drugs have side effects for other organs of the body, especially in the kidneys (Widyastuti et al., 2021). Non-pharmacological treatment is complementary therapy consisting of ancient therapy: traditional Chinese medicine, mind body therapy: music, manifulative and body based system: massage (massage), energy therapy: healing touch, biological based therapy: herbal therapy. Yusriyani et al (2022) said that people prefer alternative medicine over medical treatment, for several reasons, namely because they do not need to use a doctor's prescription as much as (46.51%), are cheaper (9.30%), have minimal side effects (11.62%), and are easy to obtain (32.55%). One of the complementary therapies that can be used for gout treatment is biological based therapy using herbal therapies such as bay leaves. Bay leaf (syzygium polyanthum wight) is a plant native to Indonesia that contains tannins, flavonoids, alkaloids, and essential oils consisting

of citrate and eugenol. Bay leaves are able to increase urine production so that they can reduce uric acid levels in the blood (Setianingrum et al., 2019). Essential oils with citrate oil and eugenol content that are anti-bacterial and have a savory aroma. Tannins have the ability to reduce and play an important role in absorbing and neutralizing free radicals and decomposition of peroxides. Flavonoids can inhibit the enzyme xanthine oxidase, which functions to inhibit the formation of uric acid (Widiyono & Aryani, 2020).

The giving of bay leaves as therapy can be done in the form of a bay leaf decoction drink. The results of previous studies also stated that the administration of bay leaf decoction was proven to be effective in reducing uric acid levels in patients with gout arthritis (Yusuf et al., 2021). Based on the results of the literature study, it was obtained that most of them used design, nonequivalent control group and one group pre test and post test and only one therapy was given. In addition, the results of the study also stated that the measurement of the impact of the administration of therapy was also carried out on the last day of therapy administration alone without looking at the changes that occurred during the administration of therapy every day (Darisa et al., 2021). Recommendation to give bay leaf decoction 3-4 times in one week (Ariyanti & Cahyani, 2020). Therefore, researchers are interested in conducting the same study with a different design, namely time series design with control to see the changes that occur every day when given bay leaf decoction therapy. The results of a preliminary study conducted on 7 patients with gout arthritis in the working area of the Payung Sekaki Health Center in Pekanbaru City found that the most common complaint was joint pain. The results of the interviews were obtained that most of the gout arthritis patients used alternative treatment in the form of herbal medicines. Patients feel that besides being easy to get, the price is cheap and does not have major side effects is the reason why this herbal therapy is used. The types of herbal therapy used are (35%) moringa leaf decoction, (30%) pandan leaf decoction, and (20%) red ginger decoction. While (15%) prefer medical treatment and visiting health centers. Based on this background description, the researcher is interested in conducting a study with the title The effect of bay leaf decoction on uric acid levels in patients with gout arthritis in the working area of the Payung Sekaki Health Center, Pekanbaru City. This study aims to determine the effect of bay leaf decoction on uric acid levels in Gout Arthritis patients in the working area of the Payung Sekaki Health Center, Pekanbaru City.

METHOD

This study is a quantitative research with a Quasy Experiment design using the time series design with control method. This method is a process of observation, giving, and measuring periodically in several groups or individuals recorded in a fixed time series in a row. This design also uses two groups, namely the intervention group and the control group. (Sugiyono, 2019). The population in this study is gout arthritis patients in the working area of the Payung Sekaki Health Center in Pekanbaru City as many as 95 patients as of March-April 2024. The number of samples in this study was 18 samples divided into two groups, for the intervention group as many as 9 samples and the control group as many as 9 samples. The sampling technique used in this study is purposive sampling by paying attention to the criteria of the research sample. The inclusion criteria for this study were adulthood, willing to be a respondent, and diagnosed with gout arthritis and continued to take allopurinol 100 mg 1x1 which was consumed at night after meals. Meanwhile, the exclusion criteria of this study include respondents who live outside the work area of the Payung Sekaki Health Center, have low blood pressure (hypotension), and respondents who do not complete

therapy until completion. This research has been declared ethically feasible the Health Research Ethics Committee of IKes Payung Negeri Pekanbaru.

The research instrument used to measure uric acid levels in respondents was a calibrated GCU easy touch check measuring device. Furthermore, the researcher used an observation sheet containing name, age, gender, education level, occupation, length of suffering, control history, consumption of drugs, taboo foods consumed in the last 1 day, results of uric acid level checks before and after being given bay leaf decoction intervention. This observation sheet was used on the first day of the study until the fourth day of the study. In the pre-test stage, the researcher measured uric acid levels before being given an intervention. This measurement was carried out by the respondent in a comfortable position, relaxed and using the index finger on the right hand. The number listed on the monitor of the measuring instrument is the uric acid value before the treatment, and the value will be listed on the observation sheet of each respondent as a pre-test value. After conducting the pre-test stage, before being given treatment. The researcher first explained about bay leaves and their benefits for health, after which the researcher provided an intervention for bay leaf decoction, in accordance with the standard operating procedures (SOP) consumed in the morning from 09.00 to 10.00 after breakfast. Data collection was carried out for 4 consecutive days with the administration of bay leaf decoction therapy which was previously measured uric acid levels. This stage is the last stage in the process of implementing this research. At this stage, the researcher measured uric acid levels again after the bay leaf decoction was given for 10 minutes using the GCU easy touch checker. The number listed on the monitor of the measuring instrument is the uric acid value after being treated and the value is listed on the observation sheet as a post-test value. The data that has been obtained is then processed and analyzed computerized.

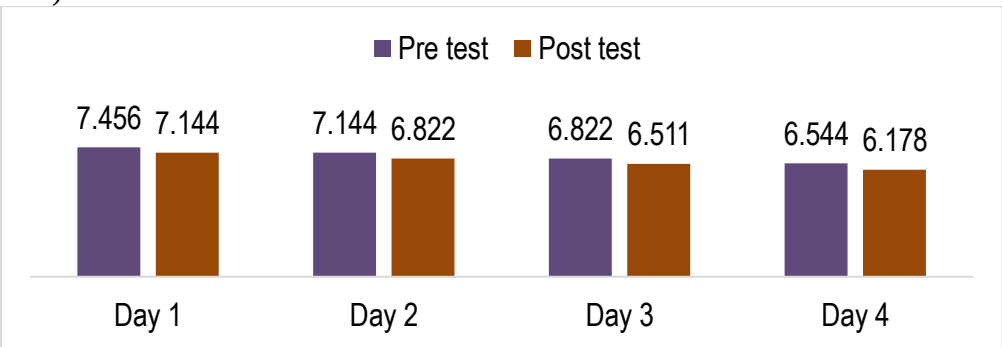
RESULT AND DISCUSSION

Table 1.
Distribution of Respondent Frequency Based on Age, Gender, Education, Occupation, Length of Suffering from GA, BMI

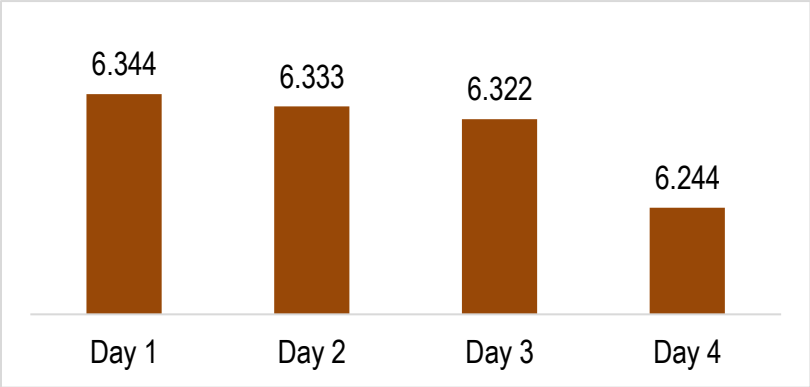
Respondent Characteristic	f	%
Age		
Adult (19-44 years old)	5	27,8
Pre-Elderly (45-54 years old)	10	55,6
Lansia (55-65 years old)	3	16,7
Gender		
Male	7	38,9
Female	11	61,1
Education		
Junior High School	6	33,3
Senior High School	12	66,7
Occupation		
Employed	13	72,2
Unemployed	5	27,8
Length of Suffering GA		
< 6 months	6	33,3
> 6 months	12	66,7
BMI		
Normal	13	72,2
Obesity	5	27,8

Based on table 1, it is known that most of the respondents are female (61.1%), aged 45-54 years (55.6%), have high school education (66.7%), work (72.2%), have a normal BMI (72.2%), and suffer from gout arthritis > 6 months (66.7%). This is in line with the research of Karuniawati (2020) which stated that as many as 28 respondents out of 48 respondents aged 48-60 years (58.3%) found a relationship between age and uric acid levels. In the elderly, there is a deterioration of cells due to the aging process which can result in organ weakness, physical deterioration, the onset of various diseases such as increased uric acid levels. One of the physical changes in the elderly is a decrease in kidney function, because the kidneys are not able to excrete purines properly so that there is a continuous purine deposition. At that age, the enzyme urokinase that oxidizes uric acid into allantoin so that it is easily removed and decreases as a person ages (Firdayanti & Susanti, 2019). The results of this study are also the same as the research of Amelia et al (2021) which stated that as many as 55 respondents out of 68 respondents were female (80.9%). Gout generally occurs in men, starting from puberty to reaching the peak of age 40-50 years, while in women, the percentage of gout begins to be found after entering menopause. The incidence of high uric acid in both developed and developing countries is increasing, especially in men aged 40-50 years, male uric acid levels increase in line with the increase in a person's age. This happens because men do not have the hormone estrogen which can help the elimination of uric acid while in women it has the hormone estrogen which helps the elimination of uric acid through the urine. When women enter menopause, the production of the hormone estrogen is decreasing, so it will easily cause women to experience gout (Fitriani, 2023).

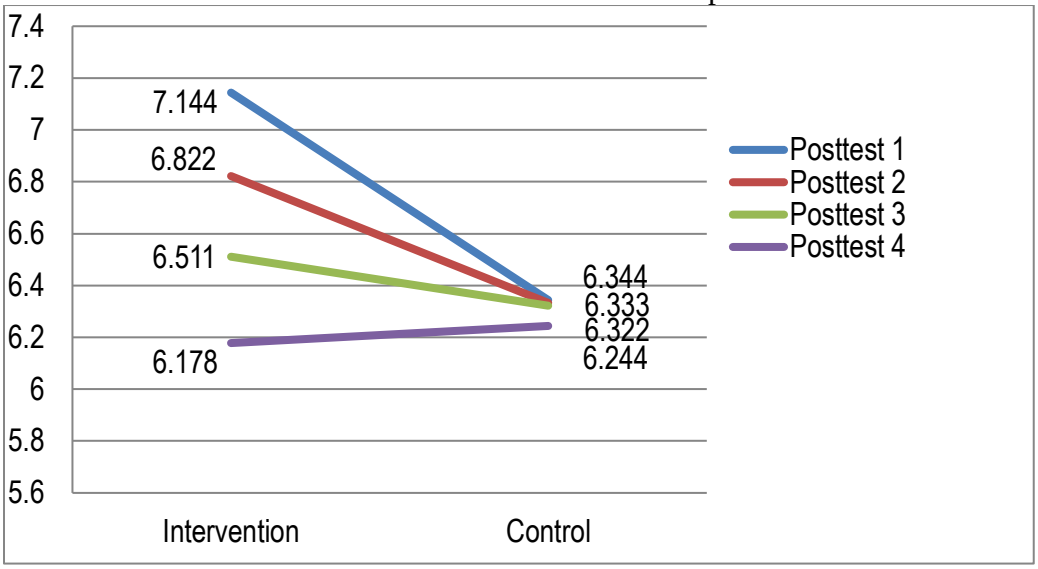
Riswana and Mulyani (2022) stated that most patients with gout arthritis have working status (85.7%). Physical activity such as overwork will increase lactic acid levels, lactic acid is formed from glycolysis that occurs in muscles, if muscles contract in a medium that does not have oxygen then glycogen which is the end product of glycolysis will disappear and lactate appears as the main end product. Improper physical activity can cause the onset of a metabolic syndrome and can lead to insulin resistance which can cause disturbances in the process of uric acid excretion. As a result, uric acid levels increase because the kidneys cannot excrete uric acid through urine (Sapitri, 2022). Obesity is one of the risk factors for gout. This is in line with the research of Faqih et al (2023) stating that as many as 26 respondents out of 51 respondents had an overweight BMI, there was a relationship between BMI and uric acid levels. People who are obese have a higher tendency to develop gout. This is because in general, people who are obese tend to consume a lot of protein, triggering an increase in uric acid through an unbalanced diet. Unbalanced intake of protein, fat, and carbohydrates causes the accumulation of uric acid or purine protein that is more than normal (Sapitri, 2022).



Graph 1. Distribution of Uric Acid Levels Frequency Before and After Administration of Bay Leaf Decoction in the Intervention Group



Graph 2. Frequency Distribution of Uric Acid Levels Before and After Giving Bay Leaf Decoction to the Control Group



Graph 3. Comparison of Uric Acid Levels Before and After Giving Bay Leaf Decoction in the Intervention and Control Groups

Table 2.
Difference in Average Uric Acid Levels Before and After Giving Bay Leaf Decoction in the Intervention Groups

Variable	Pre-Test	Post-Test	Mean Difference	p value
Day 1	7,456	7,144	0,312	0,000
Day 2	7,144	6,822	0,322	0,000
Day 3	6,822	6,511	0,311	0,000
Day 4	6,544	6,178	0,366	0,000

Based on table 2, the same p value was obtained from the first day to the fourth day of 0.000 (<0.05). This shows that H0 was rejected, which means that there was an effect of bay leaf decoction on uric acid levels in the intervention group with a consistent mean difference that decreased every day.

Table 3.
Difference in Average Uric Acid Levels after Drinking Bay Leaf Decoction Between Intervention and Control Groups

Variable	Mean	SD	f	p value
Intervention	7,144	1,26	9	0,111
Control (Day 1)	6,344	0,66	9	
Intervention	6,822	1,17	9	0,281
Control (Day 2)	6,333	0,61	9	
Intervention	6,511	1,19	9	0,686
Control (Day 3)	6,322	0,70	9	
Intervention	6,178	1,12	9	0,876
Control (Day 4)	6,244	0,60	9	

The result of the bivariate analysis using t-independent test, obtained p value 0.111, 0.281, 0.686, and 0.876 (>0,05) from 1st-4th day, which mean there was no difference in the average uric acid level after being given bay leaf decoction between the experimental and the control group for patient with gout artritis in Payung Sekaki Primary Health Care. Statistically, there is no difference, but the therapy of bay leaf decoction is *faster in helping to reduce uric acid levels.* The results of this study are in line with the research of Ardilla and Hidayat (2022) which stated that the results of measuring the average value of uric acid levels decreased after being given bay leaf boiled water therapy. The results showed that the average uric acid was reduced from 10.01 mg/dl to 4.78 mg/dl with a p value of 0.02 (< 0.05). The intervention group that had been given bay leaf boiled water for 3 days showed a decrease in uric acid levels. Herdianto et al (2023) stated that the use of bay leaf boiled water can be an alternative treatment for gout. Bay leaves can increase urine production so that they can excrete uric acid, in addition to being able to relieve the pain caused. In addition, the abundant content in bay leaves consists of several compounds such as essential oils, tannins, and flavonoids. The content in the bay leaf can reduce uric acid levels by inhibiting the action of the xanthine oxidase enzyme so that it can inhibit the formation of uric acid.

Herdianto et al (2023) said that there was an effect of giving a decoction of bay leaves for 4 days to reduce the average uric acid level from 8.1 mg/dl to 7.6 mg/dl. Wulandari et al (2023) added that the flavonoid content in bay leaves also has activity as an antioxidant which can inhibit the action of the xanthine oxidase enzyme so that the formation of uric acid is inhibited. The structure of flavonoids that have double bonds can easily bind to the enzyme compound xanthine oxidase so that in metabolism the formation of uric acid production can be controlled. Tannins are complex organic substances, consisting of phenolic compounds that are difficult to separate and difficult to crystallize, precipitate proteins from their solutions and compound with proteins. The essential oil content in bay leaves generally works as an antimicrobial. The essential oil contained in bay leaves as much as 0.5% consists of eugenol and citrate as a diuretic.

Ndede et al (2019) stated that bay leaf is one of the effective non-pharmacological therapies in reducing uric acid levels because it contains flavonoids, flavonoid compounds can inhibit the enzyme xanthine oxidase caused by the presence of hydroxyl groups in C-5 or C-7 atoms and the presence of double bonds between C-2 or C-3 that allow an acid reaction. The ability of flavonoids to bind the xanthine oxidase enzyme is through competitive inhibition mechanisms and interactions with enzymes in the side groups. The results of the study are the same as those obtained by Zuhriyah and Sari (2022) that there is a difference in the average level of uric acid before and after the administration of bay leaf decoction. These results showed a decrease in uric acid levels after respondents were given a decoction of bay leaves for 3 days. The average value of uric acid levels

before being given bay leaf decoction was 9.18 mg/dl and the average value of uric acid levels after being given bay leaf decoction was 7.97 mg/dl.

CONCLUSION

Based on the results of the study, it can be concluded that by drinking the decoction bay leaf helps in reducing uric acid levels in the patients with gout arthritis. The application of bay leaf decoction for 4 consecutive days in the intervention group significantly reduced uric acid levels from the first day to the fourth day of intervention although the tendency also occurred in the control group. However, the reduction in uric acid levels in the intervention group was much better than in the control group. Drinking the decoction bay leaf regularly can be used as one of the complementary therapies for the patients with gout arthritis in avoiding the adverse effects of increasing uric acid level.

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