

THE EFFECT OF GIVING GUAVA PUDDING WITH CINNAMON WATER ON URIC ACID LEVEL OF HYPERURICEMIC PATIENTS AT PUSKESMAS BASUKI RAHMAT PALEMBANG

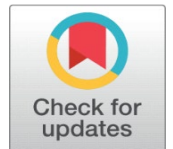


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ABSTRACT

Introduction: Hyperuricemia is a condition in which uric acid level exceed normal limits, caused either by lower excretion, higher synthesis, or both. Guava is high in vitamin C and Cinnamon contains cinnamaldehyde compounds which can reduce uric acid levels. The study aimed to determine the effect of giving guava pudding with cinnamon water on uric acid level of hyperuricemic patients at Puskesmas Basuki Rahmat Palembang.

Materials and Methods: This study was conducted in 2 phases. The first phase used non-factorial complete design and the second phase used quasi experiment study with pre-test and post-test with two group. Population in this study were all outpatients with hyperuricemia at Puskesmas Basuki Rahmat Palembang. The study sample was selected by purposive sampling with thirty samples in the treatment group and thirty samples in the control group.

Results: showed the best pudding formulation is F2. Based on result of data analyze using paired sample t-test, there was effect between the treatment done and uric acid level of hyperuricemic patients ($p=0,000$). The independent t-test result indicated that there was significant comparison between the average of uric acid levels in treatment and control groups ($p=0,042$).

Conclusion: Guava pudding with cinnamon water has effect in decreasing uric acid level of hyperuricemic patient.

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Keywords: Hyperuricemia, Uric Acid, Guava, Cinnamon

1. INTRODUCTION

Hyperuricemic is a condition when uric acid content exceeded its normal level that can cause inflammation [Hardoko et al. \(2018\)](#). Hyperuricemia is defined as >7 mg / dl in men and >6.0 mg / dl in women [De Oliveira and Burini \(2012\)](#). Hyperuricemia is pathologically characterized by overproduction or underexcretion of uric acid [Gliozzi et al. \(2016\)](#). According to the [World Health Organisation. \(2013\)](#), the prevalence of gout in the United States was 13.6 per 1,000 men and 6.4 per 1,000 women. This prevalence varies by country. The prevalence of gout in developing countries such as China and Taiwan is growing every year, while in Indonesia it is estimated that almost 80% of the population aged 40 years or over [World Health Organization. \(2013\)](#), [Junaidi \(2013\)](#).

According to [Tjokroprawiro \(2007\)](#), the prevalence of gout in Indonesia is estimated to be 1,613.6 / 100,000, and this prevalence increases with



age [Ridhoputri et al. \(2019\)](#) The results of the 2018 Riskesdas stated that the prevalence of joint disease in Indonesia, according to the diagnosis of health workers, was 11.9% and according to the doctor's diagnosis was 7.3% [Kesehatan \(2018\)](#). Treatment to treat hyperuricemia can be done pharmacologically and non-pharmacologically. Pharmacological treatment is by using drugs, such as colchicine, non-steroidal anti-inflammatory drugs (NSAIDs), and corticosteroids, to relieve gout pain [Burns and Wortmann \(2012\)](#). Pharmacological therapy is classified as effective in relieving pain or preventing acute gout. However, the side effects that are obtained need to be considered if used in the long term, such as gastrointestinal problems, kidney disease, and gastrointestinal bleeding [Widyanto \(2017\)](#). The use of the drug allopurinol also has side effects such as disorders of the skin, stomach, intestines, and blood [Lee et al. \(2017\)](#). Apart from pharmacological treatment, non-pharmacological treatment can also be done to prevent and reduce uric acid levels. Non-pharmacological interventions have a role in regulating uric acid levels [Abhishek \(2018\)](#).

Guava (*Psidium guajava*) is a type of shrub fruit plant. Guava has many nutrients that are beneficial to the body, including vitamin C, vitamin A, vitamin B₁, B₂, B₃, B₆, B₉, B₁₂, B₁₅, minerals, oxalic acid, malic acid, saponins, polyphenols, flavonoids, and quercetin [Aprillinda et al. \(2018\)](#). Guava is chosen as an intervention is because guava contains high vitamin C. The content of vitamin C in guava is 87 mg / 100 grams, higher than oranges which contain 49 mg / 100 grams. Vitamin C intake has a uricosuric effect which can increase the rate of breakdown of uric acid fractions in the kidneys, thereby reducing uric acid levels in the blood [Juraschek et al. \(2011\)](#). In addition, guava fruit contains a composition of natural antioxidants, namely flavonoids and polyphenols, which can reduce uric acid levels because it functions as an antioxidant and prevents the formation of free radicals in the body [Aprillinda et al. \(2018\)](#). Besides guava, a plant that also has benefits for people with hyperuricemia is cinnamon. Cinnamon (*Cinnamomum burmannii*) is one of the many spices found in Indonesia and has been used for a long time as a cooking spice and traditional herbs [Gunawan \(2011\)](#). The bark of the cinnamon plant contains essential oils with a distinctive aroma and taste. The cinnamon plant is rich in polyphenols, natural antioxidants. Some of these phenolic compounds are sinamaldehyde, coumarin, proanthocyanidin, catechins, epicatechins, and proanthocyanins [Wahyuningsih et al. \(2016\)](#).

The content of Cinnamaldehyde compounds in cinnamon can be used to help gout sufferers [Gendrowati \(2018\)](#). Cinnamaldehyde is an aldehyde derivative that also belongs to the group of polyphenol compounds with antioxidant properties as a free radical scavenger. In addition, cinnamon also contains high polyphenol compounds that also have high antioxidant activity that inhibits xanthine oxidase enzymes [Nurhayati and Umarianti \(2018\)](#).

2. MATERIALS AND METHODS

This survey was conducted in two phases. The first phase was carried out using a type of experimental study using a fully randomized non-factorial experiment. The experiments used were uniform or there were no other factors affecting the response other than the factors studied. The second phase used a quasi-experimental design with two groups, pre-test, and post-test. Two groups were used in this study: a treatment group that received cinnamon guava pudding and gout medication, and a comparative group that received flat-bottomed pudding and gout medication.

The research was conducted at Puskesmas Basuki Rahmat Palembang from July 2020 to April 2021. The population of this study included all outpatients with

hyperuricemia in Puskesmas Basuki Rahmat Palembang. Intentional sampling technique is used on the basis of predefined inclusion and exclusion criteria. The sample size in the study was calculated using the Lemeshow formula to estimate the proportion with a total of sixty respondents in each group of thirty.

3. RESULTS

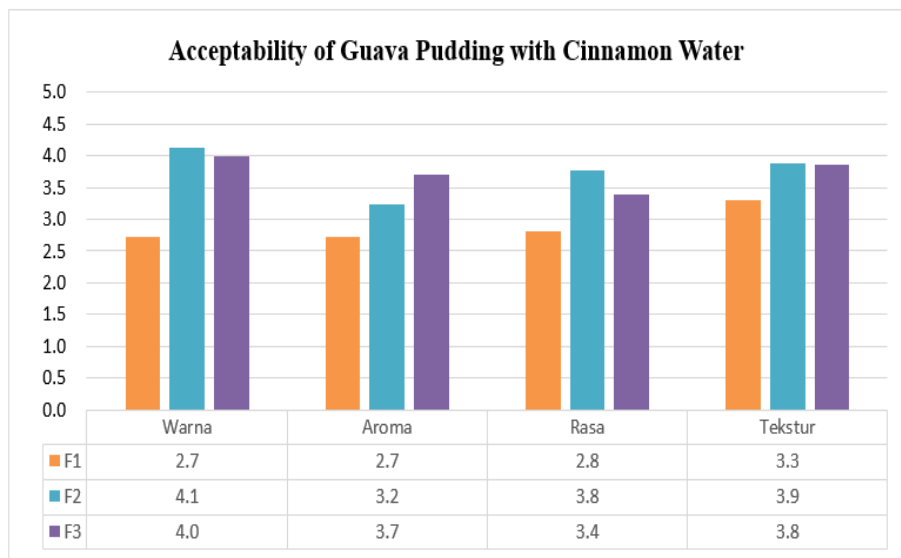


Chart 1 Acceptability of Guava Pudding with Cinnamon Water Based on Hedonic Test

Table 1 The Proximate Analysis Results of Guava Pudding with Cinnamon Water

No	Type of Analysis	Composition	Method of Analysis
1	Water (%)	89,77	SNI 01-2891-1992
2	Ash (%)	0,35	SNI 01-2891-1992
3	Fat (%)	0,23	SNI 01-2891-1992
4	Protein (%)	4,91	SNI 01-2891-1992
5	Carbohydrate (%)	4,74	By difference
6	Kadar Vitamin C (%mg)	314,99	Titrisasi Iodin

Table 2 The Characteristics of Respondents

The Characteristics of Respondents	Group			
	Treatment Group		Control Group	
	n	%	n	%
Gender				
Men	9	30,0	11	36,7
Women	21	70,0	19	63,3
Total	30	100,0	30	100,0
Age				
30-49 tahun	4	13,3	10	33,3
50-64 tahun	16	53,4	15	50,0
65-80 tahun	10	33,3	5	16,7
Total	30	100,0	30	100,0
nutritional Status				
Normal	10	33,3	9	30,0

Overweight	11	36,7	14	46,7
Obesity	9	30,0	7	23,3
Total	30	100,0	30	100,0

Table 3 Mean uric acid levels before intervention in treatment and control groups

Group	Total Sample	Uric Acid Levels		Average
		Minimum	Maximum	
Treatment Group	30	6,2	14,7	9,370
Control group	30	6,1	13,6	8,403

Table 4 Mean uric acid levels after intervention in treatment and control groups

Group	Total Sample	Uric Acid Levels		Average
		Minimum	Maximum	
Treatment Group	30	5,1	8,4	6,327
Control group	30	4,9	11,8	6,993

4. BIVARIATE ANALYSIS

Table 5 The Difference in Uric Acid Levels Before and After the Intervention (Paired Sample T-Test)

Group	Initial Mean ± SD	Final Mean ± SD	t	p	n
Treatment Group	9,370±2,1835	6,327±1,0103	10,702	0,000	30
Control group	8,403±1,8121	6,993±1,5596	12,513	0,000	30

Table 6 The Difference in Uric Acid Levels Before and After the Intervention (Independent T-Test)

Group	Δ	Mean ± SD	t	p	n
Treatment Group	1,633	3,0433±1,55756	5,34	0,042	60
Control group		1,4100±0,61720			

5. DISCUSSION

5.1. ACCEPTABILITY OF GUAVA PUDDING WITH CINNAMON WATER BASED ON HEDONIC TEST

Graph 1 shows the average value given by the panelists against four criteria, namely the criteria for color, aroma, taste, and texture in the Guava Pudding with Cinnamon Water. Based on the graph, it can be seen that the type of formula most favored by the panelists based on the characteristics of color, taste, and texture is F2. As for the aroma category, panelists preferred the F3.

This shows that the combination of guava and cinnamon that is the most preferred or most acceptable to the panelists is in formulation F2. This can be seen from the four criteria, three of which are F2 which is the most superior compared to F1 and F3.

5.2. THE PROXIMATE ANALYSIS RESULTS OF GUAVA PUDDING WITH CINNAMON WATER

The results of the proximate analysis in seeing the macro nutrient content of Guava Pudding with Cinnamon Water from the best formulation, F2, are water

content of 89.77%, ash content of 0.35%, protein content of 4.91%, fat content of 0.23%, carbohydrate content of 4.74%, and levels of vitamin C 314.99% mg. From these results it can be concluded that the Guava Pudding with Cinnamon Water has very high levels of vitamin C which can help increase the rate of breakdown of uric acid fractions in the kidneys, thereby reducing uric acid levels in the blood.

5.3. THE CHARACTERISTICS OF RESPONDENTS

Based on the results, the frequency distribution of both the treatment and comparison groups was predominantly female, with the age range of respondents being 53.3% in the treatment group and 50% in the treatment group. Most of the comparison groups are at the age of 50-64 years, as well as the nutritional status of the treatment group, 36.7% of them are overweight nutritional status as well as the majority of the comparison group are also overweight, namely 46.7%.

Based on the theory, in women who have not menopause yet, the levels of the hormone estrogen are high enough, this hormone helps to excrete blood uric acid through the urine so that uric acid levels in women who have not menopause are generally normal [Kertia \(2009\)](#).

After the age of 30, gouty arthritis is more common in men than in women. However, the incidence of gouty arthritis after age 60 is the same between men and women. The prevalence of gouty arthritis in men increases with age and peaks between the ages of 75 and 84 years. Age in the elderly also affects the incidence of gout [Ticinesi et al. \(2017\)](#).

In a study, Nurjaknah also said that the age group of 30-50 years on average 90% experienced uric acid above normal. Research conducted by Budianti regarding nutritional status and medical history as determinants of hyperuricemia, states that there is a relationship between body mass index and blood uric acid level. This shows that the higher a person's BMI, the higher the risk of hyperuricemia. The higher the BMI, the higher the risk of suffering from obesity. Obesity is a risk factor for gout. It is believed that this is because the level of leptin, a substance that regulates the concentration of uric acid in the blood, rises, causing hyperuricemia. [Nurjaknah and Wahid \(2017\)](#), [Budianti \(2008\)](#).

5.4. THE EFFECT OF GIVING GUAVA PUDDING WITH CINNAMON WATER IN DECREASING URIC ACID LEVEL

It is known that of the 30 samples in the treatment group, the mean uric acid level before the intervention was 9.370 mg/dl and after the intervention was 6.327 mg/dl. This shows that there is a decrease of 3.043 mg/dl in the blood uric acid levels in the treatment group.

Based on the results of the independent tests above, we know that the p-value is 0.042 ($p < 0.05$), so we conclude that there is a significant comparison with the mean uric acid level in the guava-pudding treatment group and the control group using cinnamon water and medications from Puskesmas did not receive guava pudding with cinnamon water but were consuming medications from Puskesmas.

The choice of guava as an intervention is because guava is one type of fruit that contains high vitamin C. The content of vitamin C in guava is 87 mg / 100 grams, higher than oranges which contain 49 mg / 100 grams. Vitamin C intake can reduce uric acid levels in the blood because it has a uricosuric effect that can increase the rate of breakdown of the uric acid fraction in the kidneys [Juraschek et al. \(2011\)](#).

According to Shekar *et al.* (2012) Cinnamon also contains compounds in the form of phenols, terpenoids and saponins, which are sources of antioxidants. Some of these phenolic compounds are sinamaldehyde, coumarin, proanthocyanidin, catechins, epicatechins, and proanthocyanins Wahyuningsih *et al.* (2016). The content of sinamaldehyde compounds in cinnamon can be used to help gout sufferers Gendrowati (2018). According to Astawan (2011), polyphenol-rich compounds also have high antioxidant activity that inhibits the enzyme xanthine oxidase. Xanthine oxidase enzyme catalyzes the conversion of purine to uric acid Astawan (2011), Tuiyo (2015).

This study is in line with the research of April Linda, showing that there is a significant relationship between guava and decreased blood uric acid levels. This study states that guava which is high in Vitamin C content increases the glomerular filtration rate in the process of reabsorption and excreted in the urine. In addition, guava fruit contains a natural antioxidant composition that reduces uric acid levels because it functions as an antioxidant and prevents the formation of free radicals in the body Aprillinda *et al.* (2018).

It is also in line with the research of Nurhayati and Umarianti (2018) which shows that there is a relationship between giving cinnamon stew and menu to a decrease in blood uric acid levels. The content of Sinamaldehyde in cinnamon is responsible as a radical scavenger and as a substance that inhibits the xanthine oxidase enzyme to convert purines into uric acid Nurhayati and Umarianti (2018). Research Therapy of Guava Pudding with Cinnamon Water can be chosen as an alternative treatment to reduce uric acid levels naturally, is safer and more affordable. In addition, respondents take drugs and adjust their diet by reducing foods that contain high purines.

6. CONCLUSION

The effect of Guava Pudding with Cinnamon Water on blood uric acid levels of hyperuricemia sufferers in the Basuki Rahmat Public Health Center Palembang, it can be concluded that the results of the Independent T-Test with a p-value of 0.042 indicate that an effect of giving Guava Pudding with Cinnamon Water in decreasing uric acid levels.

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