



The effectiveness of red ginger jelly compress on pain and inflammation status of arthritis gout patient in health center in Ambon city, Indonesia

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Abstract

Arthritis gout is a progressive chronic disease that occurs because of deposition of uric acid crystals in the tissue around the joint causing pain. One natural way to deal with pain and inflammation is by compressing using jelly which contains ginger essential oil. The objective of this research was to determine the effectiveness of red ginger jelly compress on the degree of pain and inflammatory status of patients of *Arthritis gout* in the work area of a health center in Ambon, Indonesia.

The research design used in this study was quasi-experimental with a randomized control group pre-test and post-test design approach. The sample in this study was 36 people obtained from Stratified Random Sampling. The degree of pain was measured using the Numerical Rating Scale. The experiment was done by giving red ginger jelly compress with a dose of 4% for 20 minutes per day in 3 days.

The paired t-test showed that the average difference in degrees of pain in pre-test and post-test of jelly ginger compress was 2.78 with a standard deviation of 0.548 and a p-value of 0.001. The average difference in inflammation status before and after the administration of red ginger jelly compress was 1.33 with a standard deviation of 0.594 and p-value of 0.00.

Administration of red ginger jelly compress with a dose of 4% for 20 minutes per day in 3 days could reduce the degree of pain and inflammation status in *Arthritis gout* patients.

Keywords: arthritis gout, compress, inflammation, pain, red ginger jelly

Introduction

Arthritis gout is a progressive chronic disease that occurs due to the deposition of uric acid crystals in tissues around the joints [1]. WHO records that *Arthritis gout* patients in Indonesia are reaching 81% of the population. *Arthritis gout* prevalence in Maluku Province, Indonesia is 8.9% [2, 3]. *Arthritis gout* patients in the working area of a health center have increased from 1967 in 2015 to 2230 in 2016.

Symptoms of gouty arthritis that often occur are the pain, swollen joints, and reddish to the purple skin [4]. Another consequence of joint inflammation in *Arthritis gout* due to the presence of pain is the limitation of movement so that the patient will experience decreased quality of life [5]. Besides, gout attacks often cause movement disturbances that decline in job productivity [6].

Non-pharmacological actions that have been carried out on *Arthritis gout* patients include irradiation, warming of the inflamed area with hot steam, and warm compresses with either regular warm water or grated ginger [7]. Warm compresses using ginger extract have a significant effect on reducing the degree of pain in *Arthritis gout* patients. An alternative action that can be done is to create a compress media that the patient can carry anywhere and allow the patient to do other activities during compressing.

Ginger contains cyclo-oxygenation enzymes that can reduce inflammation in *Arthritis gout* patients. Also, ginger also has a hot and spicy effect, where this heat can relieve pain, stiffness and muscle spasm or the occurrence of vasodilation of blood vessels. The maximum effect will be reached within 20

minutes after the application [7, 8]. The best red gel preparation is a gel formula with 4% red ginger rhizome extract which provides almost the same anti-inflammatory effect as NSAIDs on mice and formulated into Hydroxy Propyl Methyl Cellulose (HPMC)-based gel preparations [9].

The purpose of this study was to determine the effectiveness of red ginger jelly compress on the degree of pain and inflammatory status of patients of *Arthritis gout* in the work area of a health center in Ambon, Indonesia.

Methodology

The research design used in this study was quasi-experimental with a randomized control group pre-test and post-test design approach. The sample in this study was 36 people obtained from Stratified Random Sampling. In this study, the degree of pain and inflammatory status was measured before being given the compresses of red ginger jelly in the intervention group, and warm water compresses in the control group. Both methods were done for 20 minutes, 2 times a day in 3 days. After that, post-test measured the degree of pain and the inflammatory status of the patient. Data analysis techniques used were univariate and bivariate analysis with a paired t-test, Wilcoxon analysis, independent t-test, and Mann Whitney analysis. The research was conducted in May 2018. This research was carried out in the working area of the health center, precisely in Batu Merah, Ambon City, Indonesia. The research instruments used were respondent characteristics, Numerical Rating Scale (NRS), and the observation sheet.

Results

Table 1 shows the characteristics of respondents by age, gender, the degree of pain and status of inflammation in arthritis gout patients. The age of patients ranged from 50 until 70 years old, with women patients being dominant. The degree of pain which was measured using the Numerical Rating Scale ranged between scale 4 until scale 6, while the status of inflammation ranged from mild, moderate, and severe. All patients stated that the location of pain was on the knee.

Data analysis and statistics are shown in Table 2 and Table 3. The differences in the degree of pain between intervention group and control group are shown in Table 2. Table 3 shows the differences in the status of inflammation between the intervention group and the control group.

Table 1: Characteristics of Respondents by Age, Gender, Degree of Pain and Status of Inflammation in *Arthritis Gout* Patients

Characteristics	Group of Respondents			
	Intervention		Control	
	N	%	N	%
Age				
50-60	9	50	9	50
61-70	9	50	9	50
Sex				
Men	7	39	6	33
Women	11	61	12	67
Degree of Pain				
Scale 4	5	28	7	39
Scale 5	7	39	5	28
Scale 6	6	33	6	33
Status of Inflammation				
- Mild	2	1%	5	28
- Moderate	9	50	8	44
- Severe	7	39	5	28
Location of pain				
- Knee	18	100	18	100

Table 2: Differences in the Degree of Pain between Intervention Group and Control Group

Variable	Group		t	p-value
	Intervention	Control		
	Mean ± SD	Mean ± SD		
Degree of pain (pre-test)	5.50 ± 0.618	5.06 ± 0.802	1.861	0.071
Degree of pain (post-test)	2.78 ± 0.548	3.56 ± 0.511	-4.401	0.001

Table 3: Differences in the Status of Inflammation between the Intervention Group and Control Group

Variable	Group	Mean Rank	Sum of Ranks	Z	P
Pre-test	Intervention	20.31	365.50	-1.115	0.265
	Control	16.69	300.50		
Post-test	Intervention	13.08	235.50	-3.333	0.001
	Control	23.92	430.50		

Discussion

Based on research on 18 respondents in the intervention group and 18 respondents in the control group, most patients were in the age range of 50-60 years (Table 1). Gout occurs in elder age due to decreased kidney function. Reduced kidney function is one of the endogenous factors causing *Arthritis gout* [10]. The results in Table 1 also showed that the majority

of respondents were women, both in the intervention group (61%) and the control group (67%). This occurs because of a decrease in hormones in women who experience menopause which disrupts purine metabolism.

Based on Table 1, the degree of pain in both groups was mostly in the moderate degree of pain before the treatment. The pain felt by patients with *Arthritis gout* is caused by a buildup of uric acid crystals in the joints. Piling uric acid will accumulate in the joints, tendons, and tissue in the form of monosodium urate crystals. These crystals will activate the immune system: Immunoglobulin G (IgG), Toll-like Receptors (TLR) which will stimulate Interleukin I (IL-I) as a determinant of neutrophil accumulation. IL-I stimulates the production of proinflammatory cytokines, chemotactic factors, and tumor necrosis factor-α (TNF-α). Interleukin and TNF-α stimulate the production of prostaglandin and NO (nitric oxide) as a pain mediator [11]. The content of gingerol and shagaol in ginger inhibits the formation of TNF-α, IL-1, Cox (Cyclooxygenase), and 5-Lipoxygenase so that the production of prostaglandins and leukotrienes are inhibited, therefore causes no pain [12].

The research concluded that there was an effect of red ginger jelly compress on the inflammatory status of patients with *Arthritis gout*. The inflammatory process in *Arthritis gout* occurs in 3 stages. The first stage (Asymptomatic Hyperuricemia) which usually occurs without symptoms or hyperuricemia, or there are symptoms that will go away on their own within a few days; the second stage (acute intermittent gout) where the client feels severe pain due to accumulation of monosodium urate; and the third stage (chronic tophaceous gout) is the stage where there has been accumulation of uric acid in several joints until the formation of crystals called tofus (tophi) [13].

The accumulating uric acid will accumulate in the joints, tendons, and tissue in the form of monosodium urate crystals which will cause the release of ATP (adenosine triphosphate) which stimulates the rapid release of potassium from the cell, resulting in very permeable endothelial activation. Vasodilation occurs which causes extravascular fluid secretion resulting in swelling. Vasodilatation of blood vessels causes an increase in blood flow to the joints so that a reddish to purple color appears and the joint area feels warm. Swelling will cause pain and limitation of motion [14]. Research on 18 respondents in the intervention group using red ginger jelly compress showed a significant effect. Red ginger jelly compress reduced *Arthritis gout* pain with a mean of 2.78 and p-value of 0.0011 as shown in Table 2.

The results of the study showed that the average inflammatory status before and after administration of red ginger jelly compress was 1.33 with a standard deviation of 0.594 and p-value of 0.0011, as shown in Table 3. This indicates that there is an effect of giving red ginger jelly compress to the reduction of inflammatory status in gout *Arthritis* clients. Previous research on the impact of ginger compresses on the degree of pain in elderly with *Arthritis gout* given for 3 days showed an effect size of 0.28 with a weak category. In this study, the effect size of 0.421 was obtained, which included in the healthy group. Thus, compressing using red ginger jelly has a stronger effect on reducing the degree of pain than previous studies [15].

Pharmacological results showed that ginger has several activities as an anti-inflammatory. Laboratory tests show that ginger extract has several lipooxygenases and cyclooxygenase activities that reduce levels of prostaglandin and leukotriene. Hundreds of *Arthritis gout* patients with chronic back pain injected with 5-10% of ginger extract experienced reduced degree of pain and swelling of the joints ^[16].

Conclusion

Based on the results of this research, it could be concluded that red ginger jelly compress with a dose of 4% for 20 minutes per day in 3 days could reduce the pain and inflammation status of *Arthritis gout* patients. Red ginger jelly compress decreased *Arthritis gout* pain with a mean of 2.78 and p-value of 0.0011. The typical inflammatory condition before and after the administration of red ginger jelly compress was 1.33 with a standard deviation of 0.594 and p-value of 0.0011. The substantial effect size of 0.421 was obtained which indicated that compressing using red ginger jelly has a stronger effect on reducing the degree of pain.

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