EFFECTIVENESS OF LEMONGRASS DECOCTION, RED GINGER DECOCTION AND WARM WATER COMPRESS TO TREAT KNEE JOINT PAIN IN PREMENOPAUSE

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Abstract

Introduction: One of the physical changes that is often experienced during menopause is joint pain which occurs due to hormonal changes, declining of estrogen. This causes damage to the collagen matrix and results in cartilage damage, causing osteoarthritis.
Join pain can be cured by pharmacological or non-pharmacological therapy. The use of warm compresses, regular exercise, acupuncture, and consuming herbal products as nonpharmacological therapy that have been trusted for their efficacy. Lemongrass can help reduce pain and discomfort due to its analgesic propertiy. Phytonutrients found in lemongrass can improve blood circulation. (Kurniawati, 2010). There is an effect of giving warm compresses using grated red ginger (*Zingiber officinale roscoe var rubrum*) to reduce the pain in patients with *gouty arthritis*
Objectives: to determine the effectiveness of warm water compresses, lemongrass decoction compresses and red ginger decoction compresses on reducing pain in premenopause
Method: The research was quasi experiment with *pre and posttest* approach *with control group design.* Sampling using *porposive sampling* technique. *The* sample was 26 respondents for each group (78 respondents). Pain measurement using *Visual Analog Scales* (VAS). Respondents were given treatment for 15 minutes a day 2 times for 15 days
Result: showed that the average decrease in pain in the serei group was > 0.1 compared to the ginger group and > 0.6 compared to the warm water group. The pre-test and post-test pain reduction scores in the serei warm compress, red ginger warm compress and warm water compress groups have a p value <0.01.
Conclusion: There is a significant difference in pre-test and post-test pain reduction scores in all treatments with a p value <0.01 but there is no significant difference in pain reduction for all treatments with a p value> 0.05. The use of non-pharmacologic therapy can be an alternative in joint pain therapy

Keywords:
Knee pain, sere water, red ginger and warm water decoction

INTRODUCTION

The global population of postmenopausal women continues to grow. Women aged 50 and above accounted for 26% of all women and girls in the world in 2021.(1) There will be 60 million women who reach menopause In Indonesia by 2025. Indonesia had 14 million menopause or 7.4% of the total population in 2018.(2)
Menopause usually occurs between the ages of 45 and 55, with an average age of 52. However, it can also occur at a fairly early age until the age of 60. But there are also those

who enter menopause before 48 years or after 48 years. Most women start experiencing symptoms in their 40s and peak in their 50s.(1)

Menopause has got symptoms such as night sweats or *hot flushes* and vaginal dryness which could affect their quality of life. Changing physical dimension such as difficulty sleeping , feeling tired , weak quickly, reduced physical ability, and joint pain (1).

Decreasing estrogen hormone can cause damage to the collagen matrix and the cartilage itself is damaged so that it can cause osteoarthritis which causes complaints of joint pain. Joint pain that occurs affects menopausal women to carry out daily life activities (*activity dailiy living or ADL*).(3)

According to the Basic Health Research (Riskesdas) in 2018, the incidence of joint pain was 15% at the age of 45-54 years, and 15.5% at the age of 55-64 years. These pain complaints are most commonly seen in post-menopause, especially who aged > 50 years.(4)

Pain can be treated with pharmacological or non-pharmacological therapy. Pharmacological therapy includes including of analgesic drugs.(5) Non-pharmacological therapy in *rheumatoid arthritis*, such as compressing of warm water, taking analgesic drugs, exercising regularly, acupuncture, and consuming herbs that have been proven effective.(6).

Herbal or phytopharmacology products are the alternative because they can reduce pain without side effect.(7). The Study showed that lemongrass has sedative and hypnotic properties that help to improve sleep quality and time. Lemongrass also could reduce symptoms of depression caused by fatigue and stress. Lemongrass could help reduce pain and discomfort due to its analgesic properties.(8),(9)

Red ginger has active substances in the form of gingerol, gingerdione and zingeron which function to inhibit leukotriene and prostaglandins which function as mediators of inflammation so that red ginger is used as an anti-inflammatory.(10),(11)

Arman et all explained that giving warm compresses using red ginger could relieve the pain scale of gout condition.(12)

METHODS

a quasi-experimental design with a *pre and posttest with control group design* approach was used as this study. Assessing pain reduction in premenopause was a goal of study. Pain measurements were taken before (*pretest* = O1) and after (*posttest* = O2) intervention to all the groups. The intervention group was given a lemongrass decoction and a red ginger decoction, while the control group was given a warm water compress.

The subjects were pre menopause in Bandung. Sampling was conducted using *purposive sampling* technique*. The* minimum sample in this study was 26 subjects for each group, the total sample was 78 Inclusion Criteria:

1. 45-49 years old
2. Experiencing knee joint pain with a score ≤ 5 on the VAS scale
3. Willing to be a respondent

Procedure

a. Respondents were given informed consent before involving in the study. Knee joint pain measurement was carried out using the *Visual Analog Scales* (VAS) form.
b. Divided into 3 groups, the first group of 26 respondents was given a lemongrass decoction compress and the second group was given a red ginger decoction and the other was given a warm water compress.
c. Each group performed compresses on the knee area using a small towel 2 times a day (morning and evening) with a duration of 15 minutes for 2 weeks.
d. Red ginger decoction is 500 cc of water and 50 grams of red ginger boiled at once until boiling then cooled for about 5-7 minutes, then a towel is put into the ginger water decoction to compress the knee area.

e. lemongrass decoction is 500 cc water and 3 lemongrass boiled at once until boiling then cooled for about 5-7 minutes, then a towel is put into the lemongrass decoction to compress the knee area.
f. At the end of the study (week 2), the three groups were re-measured on the pain scale using the *VAS* form.

Test the normality of the data using the *Kolmogorov Smirnov test*. Test to determine the difference in pain reduction between the treatment group and the control group using the Friedman test because the data distribution was not normal. The pain reduction scale in the three groups used the *Kurskal Wallis* Test.

RESULTS AND DISCUSSION

1. Respondent Characteristics

Table. 1
Distribution of Respondent characteristics

No.	Variables	Group					
		lemongrassCompress		ginger compress		Warm Water Compress	
		F	%	F	%	F	%
	Age						
1.	45 years old	6	23,1	11	42,3	3	11,5
2.	46 years old	0	0	2	7,7	4	15,4
3.	47 years old	3	11,5	0	0	0	0
4.	48 years old	7	26,9	1	3,8	1	3,8
5.	49 years old	10	38,5	12	46,2	18	69,2
	Total	26	100	26	100	26	100
	Number of Children						
1.	1	1	3,8	1	3,8	2	7,6
2.	2	7	26,9	11	42,3	12	46,2
3.	≥ 3	18	69,3	14	53,8	12	46,2
	Total	26	100	26	100	26	100
	Occupation						
1.	Work	3	11,5	10	38,5	3	11,5
2.	Not Working	23	88,5	16	61,5	23	88,5
	Total	26	100	26	100	26	100
	Doing Exercise						
1.	No	22	84,6	7	26,9	14	53,8
2.	2-3 times/week	4	15,4	17	65,5	11	42,3
3	4-5 times/week	0		2	7,6	1	3,8
	Total	26	100	26	100	26	100
	Duration of Exercise						
1.	No exercise	22	84,6	7	26,9	14	53,8
2.	15 minutes	2	15,4	7	26,9	6	23,1
3	15-30 minutes	2	15,4	7	26,9	4	15,4
4	30-45 minutes	0	0	4	15,4	2	7,6
5	> 45 minutes	0	0	1	3,8	0	0
	Total	26	100	26	100	26	100

Table 2.
Comparison of Pain Scale off all Groups
(before intervention)

Pain Reduction	n	Median Rank	P-value
Lemongrass Group	26	42.38	
Ginger group	26	40.31	0,528*
Warm water group	26	35.81	

**Kruskal_Wallis* test

Table 3.
Average of pain scale of all groups

Pain	Lemongrass Group	Ginger Group	Warm water group
Mean pain before intervention	6,3	6,2	6,1
Mean pain after intervention	2,8	2,7	3,2
Decrease in average pain rate	3,5	3,4	2,9

Table 4
Difference in Pain Reduction in the All Groups

Compress	Group		P-value
	Pre test	Post test	
Lemongrass			
Mean ± SD	6,35±1,38	2,81±1,61	< 0,001*
Median	6	3	
Range	(5-10)	(0-6)	
Ginger			
Mean ± SD	6,15±1,19	3,73±2,01	< 0,001*
Median	6	2	
Range	(5-9)	(0-7)	
Warm Water			
Mean ± SD	6,08±1,57	3,15±1,67	< 0,001*
Median	5	3	
Range	(5-10)	(0-6)	

Table 5
Average reduction in pain in all groups

Pain Reduction	n	Median Rank	P-value
Serei Group	26	43,00	
Ginger group	26	41.13	0,339*
Warm water group	26	34.37	

**Kruskal_Wallis* test

Respondent Characteristics

Pre menopause refers to the time when getting period end. Pre menopause usually occurs at the age of 45-48 years. Based on table 4.1 the age of respondents is between

45-49 years where the most respondents are 49 years old. This is in accordance with the theory that the age of perimenopausal women is usually 45 years until the onset of menopause or 5 years before the onset of menopause.(1)

Menopause will experience a decrease in estrogen, this has an impact on changing in the bone metabolism cycle and a decrease in bone tissue. All symptoms and diseases that occur in menopause are related to decreased estrogen levels. Epidemiological data shows that estrogen during a woman's reproductive age provides significant protection to the cardiovascular and reproductive systems, bone organs, liver, and brain.(13). Praveen Kulkarni et al (2016) explain that joint pain is one of the physical complaints felt in peri menopause women due to the decline in muscle mass and loss of muscle strength which begins at the age of 40 years and will accelerate when it reaches 60 years.(14)

Based on table 4.1, most of them are household and lack of sports activity. Arista Riya (2019) reported that there was a relationship between physical activity and functional capacity in women.(15) Mendoza et all (2016) revealed that physical inactivity will harm women's health during perimenopause and will even increase physical problems. (16)

Arista Riya (2019) showed that menopausal women with less functional capacity show that all of them experience severe joint pain (100%). In menopausal women with moderate functional capacity, it shows that the incidence of severe scale pain reaches 5%, moderate scale reaches 87.5% and mild scale reaches 7.5%. In menopausal women with good functional capacity, the incidence of moderate scale pain reaches 10% and mild scale reaches 90%.(15)

Mouas Khalafi revealed that physical activity and sports training are beneficial in perimenopausal women because they have a positive effect on the pathophysiology of health problems associated with perimenopause so that *functional capacity is* optimal.(17), (13) Mendoza reported a similar thing that until now physical activities such as walking, jogging, cycling are highly recommended to improve health conditions in women.(16)

Comparison of Pain Reduction in the All Groups

Pain is a condition where feelings of discomfort are subjective, because everyone's feelings of pain are at different levels, and the person himself evaluates the pain he experiences. (18) Warm compresses provide a sense of warmth and comfort, reduce pain and also prevent muscle spasm. According to Sandi Kurniati (2020), that warm compresses themselves have a physiological impact, which can make fibrous tissue softer, the muscles more relaxed, the pain lessen or disappear, and the blood flow smoother. The heat generated from warm compresses can cause dilation and physiological changes to occur so that it can improve blood circulation and relieve pain.(19)(20)

The properties of lemongrass plant has an essential oil content which effects pharmacological and chemical properties. The essential oil has a spicy and warm taste as an anti-inflammatory and pain reliever to use as pain relief and blood circulation enhancer which are indicated for relieving muscle pain and joint pain.(21)(9)

Lemongrass contains antioxidant benefits that can help prevent cancer, in lemongrass there is a content of anti-microbial and anti-bacterial substances that are useful as infection drugs and contain analgetic compounds that help pain relief such as muscle pain and joint pain due to rheumatoid arthritis or anti-rheumatism.(9)(8)(21)

Warm lemongrass compress (*Cymbopogon citratus*) can improve blood circulation in tissues and dilate blood vessels, increased cell activity will reduce pain. The content of lemongrass plants is essential oil which has a spicy taste and is warm as an anti-inflammatory (anti-inflammatory), so that the heat can increase blood flow which will increase the supply of oxygen to the tissues, cells get oxygen so as to reduce pain. (8)(9)(22)

Lemongrass compress is an alternative therapy that can be done independently to reduce pain, because lemongrass contains active compounds that can reduce pain and lemongrass plants also contain cyclo-oxygenase enzymes that can reduce inflammation in patients with rheumatoid arthritis, in addition lemongrass also has a pharmacological effect,

as a warm spicy taste. This warm spicy taste could effect of pain relief, stiffness and muscle spasm, making vasodilation of blood vessels. Stated that there is an significant effect before and after giving a warm compress of lemongrass decoction of the pain complaint.(23)(22)(9)(24)

The use of red ginger as a compresses is safer than the oral compsumtion. Excessive oral use of ginger could cause gastrointestinal disorders such as diarrhea(25).(11)(10)

The use of ginger in compresses or taped over the skin can affect systemic absorption. This is because ginger has active ingredients in the form of gingerol and shagaol which can dissolve in water and oil, so it has the potential to be absorbed into the skin.(26) Ginger compresses have benefits in reducing pain in patients with Gouty Arthritis because ginger contains 6- gingerdion, 6-gingerol, zingerol which suppresses prostaglandins through inhibition of COX-2 activity thus inhibiting the production of PGE2 and leukotrienes and TNF- in synoviocytes and joints.(27)(10)(11)

The hot and spicy effect of ginger allows vasodilation of blood vessels, therefore there will be an increase in blood circulation and cause a decrease in pain by removing inflammatory products such as bradykinin, histamine and prostaglandins that cause pain. Heat will stimulate nerve cells to close, thus inhibiting the transmission of pain impulses to the spinal cord and brain.(25) (10)

Suciati (2017) found that giving warm compresses using ginger can reduce the pain scale in patients with gouty arthritis. Ginger compresses using warm water can reduce pain intensity in patients with gouty arthritis.(10) Likewise, research by Rini Daud (2018) showed a significant difference in the average knee pain scale between before and after being treated with ginger compress.(11)

Ingredients found in ginger have benefits for reducing pain, such as gingerol, shogaol, and zingeron. Gingerol has a phenol group that is thermolabeled, so when exposed to heat and air it will change into shogaol and zingerol. These ingredients are found in powdered ginger, while whole ginger contains few of them. Shogaol and zingerol can increase the permeability of oleoresin to penetrate the skin without causing irritation. The heat effect produced by ginger compress can reduce pain in osteoarthritis by inhibiting the formation of prostaglandins as pain mediators if the pain scale is on a mild to moderate scale. If the pain scale is severe, then ginger compresses can no longer be done, and further medical measures need to be taken, such as synovial fluid injection.(7)(27)

Warm compresses that are done to reduce pain, occur due to the transfer of heat from the compress either ginger, sere stems or warm water to the outside of the body. This has an impact on dilating blood vessels, and relieves ischemia so as to reduce muscle tension so that joint pain can be reduced or even disappear.(19)(24)(25)(23)

CONCLUSIONS

a. There was a significant decrease in pain before and after the intervention in all treatment groups with a p value <0.01.
b. There is no significant difference in pain reduction between the treatment of sere decoction compress, red ginger decoction compress and warm water compress with a p value> 0.05.

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