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Application of Red Ginger Hydrotherapy to Reducing Feet Oedema of Pregnant Women in Trimester III

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ABSTRACT

Feet oedema in third-trimester pregnant women occurs due to obstruction of a venous return due to fluid retention and increased venous pressure in the feet area and pressure on the uterus. Red ginger hydrotherapy is an alternative to reduce feet oedema by increasing blood circulation and relaxing the body's muscles in the presence of essential oils such as aromatic compounds and oleoresin which are hotter. The purpose of this study was to determine the effect of applying red ginger hydrotherapy as an effort to reduce feet oedema in third-trimester pregnant women. The type of research used is quasi-experiment with pretest and posttest with control group design. Sampling using simple random sampling with a sample of 34 respondents. The intervention group was given red ginger hydrotherapy for 5 consecutive days, while the control group was given standard antenatal care. The research instrument used a questionnaire sheet and an observation sheet. The statistical test used is the Independent T-Test test. The decrease in feet oedema in the intervention group between before and after treatment decreased by 86.5% with a p-value of 0.000, while the decrease in feet oedema in the control group was only 45.3% with a p-value of 0.004. Analysis of the difference in the reduction of feet oedema before and after being given treatment in the intervention group and the control group obtained a p-value of 0.000. Red ginger hydrotherapy reduces feet oedema in the third trimester of pregnant women faster than standard antenatal care.

Keywords: red ginger hydrotherapy, pregnancy, feet oedema

INTRODUCTION

Pregnancy is a natural condition that starts from the process of conception until the fetus is born into the world. Generally, a woman will undergo her pregnancy for 280 days or 9 months 7 days from the first day of her last menstrual period.(1) For a woman, having a healthy pregnancy without any complications is something she wants.(2) During pregnancy in general, women experience physiological and psychological changes that cause discomfort, one of which is feet oedema.(3)

Physiologically, about 80% of pregnant women in the third trimester of pregnancy are found to have feet oedema that is not accompanied by preeclampsia or eclampsia. Increasing gestational age causes fluid retention and increased venous pressure in the feet area and pressure on the uterus which results in obstruction of venous return. If oedema is felt in the face or extremities accompanied by severe headaches and blurred vision, it means that there are danger signs in pregnancy due to pre-eclampsia. Feet oedema experienced by pregnant women is quite dangerous because important organs, such as the heart, kidneys, and several other organs cannot function properly.(2,4)

The results of interviews conducted by researchers with one of the midwives on duty at the Singgani Health Center in Palu City that the treatment of physiological feet oedema found in pregnant women is only done through counseling in the form of reducing activities that require standing or walking. for too long, avoiding the use of tight clothing that can pose a risk of impaired venous return, adjusting the position of the feet and sleeping position by lying on the left side, and not placing anything on the thigh that causes obstruction of blood circulation. Research by Lestari, et al (2018) shows that feet oedema can also be prevented by exercising, such as pregnancy exercise, feet massage, and hydrotherapy.(5)

Complementary alternative medicine is now being used by the community because of its low cost and low side effects.(6) Research conducted by Dinasty dan Azozatu (2016), showed that the difference in the degree of oedema before and after being given intervention in the form of positioning decreased by 0.70.(7) Research conducted by Maharditha, et al (2020),

states that the application of pregnancy exercise can only be done by pregnant women with certain conditions or who have obtained permission from an obstetrician who can do it.(8) According to Zaenatushofi and Eti (2019), feet massage therapy should pay attention to the duration and location of the administration to avoid contractions.(9)

Hydrotherapy is a complementary treatment that is very easy to do in all circles of society with warm water as the medium.(10) Research conducted by Putra and Ega (2019), showed that there was a decrease in feet oedema by 1.46 after being given feet soak therapy for 5 consecutive days with a duration of 20-30 minutes using water with a temperature of 40.5ºC-43ºC.(11) Soak feet can be combined with other herbal ingredients, such as ginger. This plant, known to the Indonesian people as a plant of a million properties, has the Latin name Zingiber Officinale. Ginger has been used as a beverage, kitchen ingredient, and candy and is also used in traditional medicine.(12)

There are three types of ginger that are cultivated in Indonesia, namely emprit ginger, elephant ginger, and red ginger.(13) Differences in the place of origin of ginger planting and the condition of the rhizome will determine the number of chemical compounds it contains. Although they have the same species name, the three gingers have different levels of compound content. The essential oil contained in red ginger is higher than the other 2 types of ginger, which is 3.9%. The process of entering essential oils into the body can be done in two ways, namely by inhalation which can increase the feeling of relaxation, and by absorption through the surface of the skin which helps improve blood flow.(14,15)

In addition, red ginger also has oleoresin compounds which include [6]-gingerol as much as 25%, zingerone as much as 29.7%, and [6]-shogoal as much as 18%.(16) Due to the presence of substances arranged in oleoresin, red ginger has a spicy taste.(17) The hot and spicy taste of red ginger hydrotherapy is able to reduce inflammation, reduce pain, and muscle stiffness by increasing blood circulation and relaxing the body's muscles.(18) Research conducted by Novaldi, et al (2019) found that red ginger originating from Central Sulawesi has an oleoresin content of up to 31.82%.(19) This is different from the oleoresin content in red ginger cultivated in the Pontianak area which is only 15.59%.(20)

Research conducted by Arinda and Khayati (2019), stated that giving a feet soak with boiled red ginger at a temperature of 39ºC for 20 minutes was able to have a blood pressure-lowering effect by increasing blood circulation and increasing body muscle relaxation.(21) Consideration of the description in the background above makes researchers interested in examining the application of red ginger hydrotherapy to reduce feet oedema in third-trimester pregnant women.

METHOD

This study uses a quasi-experimental method with a pretest and posttest with a control group design. This research was carried out from March 15 to April 30, 2021, at the Singgani Public Health Center, Palu City. The population of this study was all third-trimester pregnant women with feet oedema in the work area of the Singgani Public Health Center, Palu City with a total sample of 34 respondents who were divided into 2 groups. In the intervention group, red ginger hydrotherapy was given for 5 consecutive days with a duration of 20 minutes using 2 liters with a temperature of 39ºC-43ºC and 100 grams of red ginger. The sample selected as the control group was given standard antenatal care for 5 consecutive days in the form of counseling to reduce activities that require standing too long, eating less salty foods, and adjusting the position of the feet. Sampling was done by simple random sampling. Data was collected by means of interviews, observations, and the results of the assessment of feet oedema. Assessment of feet oedema in third trimester pregnant women both before and after the intervention was carried out using a pitting technique where the index finger was marked using a pen measured with a ruler in millimeters (mm). This research has passed the ethical review from the Commission on Bioethics for Medical/Health Research, Faculty of Medicine, Sultan Agung Islamic University, Semarang with the number Ethical Clearance No. 51/III/2021/Commission on Bioethics.

Before conducting the bivariate analysis, the data normality test was first performed using the Chi-Square (X2) test. The results of the normality test showed that the feet oedema data were normally distributed, so an Independent T-Test was performed.

RESULT

Table 1: Characteristics of Respondents Based on Age, Education, Occupation, and Gestational Age

Characteristics	Respondent Groups						Total		P-Value*
	Intervention			Control					
	n	%	Mean±SD	n	%	Mean±SD	n	%	
Age									
<20 years	1	5.9	25.71±4.027	3	17.6	27.06±6.210	4	11.8	0.056
20-35 years	16	94.1		11	64.7		27	79.4	
>35 years	-			3	17.6		3	8.8	
Education									
Primary School	1	5.9		-			1	2.9	0.963
Junior High School	-			3	17.6		3	8.8	
Senior High School	7	41.2		7	41.2		14	41.2	
College Education	9	52.9		7	41.2		16	47.1	
Occupation									
Work	10	58.8		8	47.1		18	52.9	0.550
Does not work	7	41.2		9	52.9		16	47.1	

Gestational Age									
29-32 weeks	4	23.5	34.18±3.377	5	29.4	33.94±3.325	9	26.5	0.862
33-36 weeks	9	52.9		7	41.2		16	47.1	
37-40 weeks	4	23.5		5	29.4		9	26.5	

** Homogeneity Test*

Table 1 shows the percentage of respondents' characteristics, namely age, education, occupation, and gestational age. Respondents aged <20 years were 4 people (11.8%), respondents aged 20-35 years were 27 people (79.4%), while respondents aged >35 years were 3 people (8.8%). Respondents in the intervention group were on average 25 years old, while respondents in the control group were 27 years old on average. Judging from the characteristics of education, it is known that the respondents who have a background of graduating from Elementary School are 1 person (2.9%), Junior High School as many as 3 people (8.8%), Senior High School as many as 14 people (41.2) and Higher Education as many as 16 people (47.1%).

Characteristics of respondents if assessed based on work, data obtained that respondents who have additional work besides working as housewives are 18 people (52.9%), while respondents who only work as housewives are 16 people (47.1%). When examined from gestational age, it was found that 16 respondents (47.1%), with a gestational age of 33-36 weeks, while respondents with a gestational age of 29-32 weeks and 37-40 weeks each were known to be 9 (26.5%). Respondents in the intervention group had an average gestational age of 34 weeks, while respondents in the control group had an average gestational age of 33 weeks. The results of the homogeneity test of respondents' characteristics which include age, education, occupation, and gestational age obtained a significance value of p-value > 0.05, indicating that the variance of the two population groups is homogeneous.

Table 2: Variable Normality Test

Variable	P-value*	Output
Pre Feet Oedema	0.063	Normal

** Chi-Square Test (X2)*

Table 2 shows that the normality test of feet oedema data for pregnant women in the third trimester before being given treatment has a p-value of 0.063> 0.05, so it can be concluded that the data are normally distributed. Normally distributed data were analyzed using the Independent T-Test.

Table 3:Analysis of the application of red ginger hydrotherapy on the reduction of feet oedema in third-trimester pregnant women in the intervention group and control group before and after treatment

Groups	Mean±SD		P-value	Mean±SD	P-value
	Pretest	5th Posttest		Δpre-post	
Intervention	3.06±1.298	0.41±0.618	0.000*	2.647±0.996	0.000*
Control	2.47±0.943	1.35±1.169	0.004*	1.118±0.485	

** Independent T-Test*

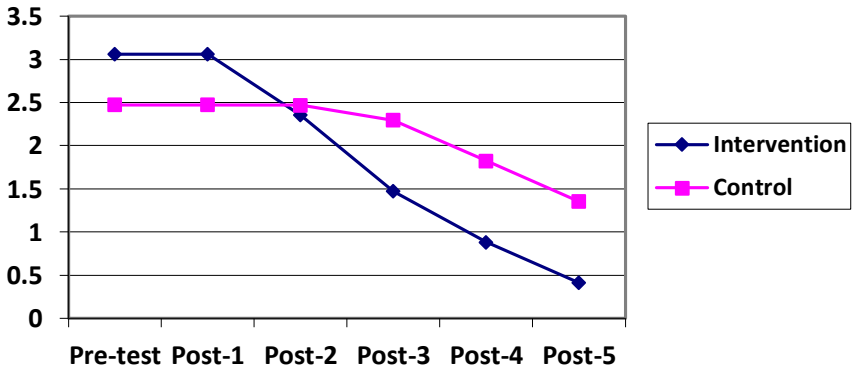

Fig 1: Changes of feet oedema

Table 3 and figure 1 shows the decrease in feet oedema in the intervention group and the control group. The decrease in feet oedema in the intervention group between before and after treatment was 2,647 (86.5%). This is different from what happened in the control group where feet oedema decreased only by 1,118 mm (45.3%). The results of the independent t-test analysis of the decrease in feet oedema in the intervention group before and after being given treatment in the form of red

ginger hydrotherapy obtained a p-value of 0.000 ($p < 0.05$), while in the control group before and after treatment was given in the form of standard antenatal care p-value obtained 0.004 ($p<0.05$) so that it can be interpreted that there is a significant or significant difference in feet oedema between before and after being given treatment both the intervention group and the control group. Analysis of the difference in delta reduction in feet oedema before and after being given treatment between the intervention group and the control group obtained a p-value of 0.000 ($p < 0.05$), so it can be interpreted that there is a significant difference in the reduction of feet oedema between the intervention group and the control group.

DISCUSSION

The results of this study indicate that red ginger hydrotherapy interventions and standard antenatal care interventions are able to provide beneficial effects for third-trimester pregnant women in an effort to reduce feet oedema. This is evidenced by the independent t-test of the decrease in feet oedema before and after being given treatment in the intervention group p-value of 0.000 ($p<0.05$) and in the control group p-value of 0.004 ($p<0.05$). However, there was a difference in the mean decrease in the depth of feet oedema between the intervention group and the control group for 5 days of treatment.

Before being given treatment, the average depth of feet oedema of pregnant women in the third trimester in the intervention group was 3.06 and decreased to 0.41 after receiving red ginger hydrotherapy. This is different from the decrease in feet oedema in third-trimester pregnant women in the control group which was initially 2.47 and decreased to 1.35 after receiving standard antenatal care in the form of counseling. The difference in the average decrease in feet oedema of pregnant women in the third trimester in the intervention group between before and after the application of red ginger hydrotherapy was 86.5%, while in the control group it was only 45.3%. The data obtained can be concluded that red ginger hydrotherapy reduces feet oedema in third-trimester pregnant women more quickly.

A previous study conducted by Putra and Ega (2019), showed a 1.46 reduction in feet oedema with the application of hydrotherapy using warm water for 5 consecutive days.(11) Soaking the feet in a warm solution can improve blood and muscle circulation, and reduce the incidence of oedema.(22) In addition, the physiological effects on the body of using warm water baths are proven to be able to help stabilize blood flow and heart work, as well as strengthen muscles and ligaments that affect the joints of the body.(23) Harismayanti, et al (2020) said that soaking the feet in warm water causes a conduction process, namely heat transfer from warm water to the feet. This will help increase blood circulation by widening blood vessels which will result in more oxygen supply.(24)

Some study results state that to achieve maximum results, hydrotherapy for pregnant women can be done by inserting the feet and soaking them up to a height of 10-15 cm above the ankles in warm water which has a temperature of 39ºC-43ºC for 5 consecutive days with a duration of 20-30 minute.(11,21) Research conducted by Hafiz and Riyadi (2020), the warm water used in the application of hydrotherapy is 2 liters.(25) Soaking the feet in warm water will cause a systemic response to heat through stimulation that will send impulses from the periphery to the hypothalamus..(22) Warm water is proven to be able to help flexibility of movement by increasing the elasticity of collagen and accelerating the process of dilation of blood vessels.(26) The application of warm water feet baths is usually combined with several herbal plants.(27)

The application of hydrotherapy combined with red ginger to reduce feet oedema in third-trimester pregnant women, in this study was proven to be able to reduce feet oedema by 2.65. The addition of red ginger to warm water for feet baths contributed to a decrease in feet oedema by 1.18. A greater reduction in feet oedema occurred in the intervention group with the use of red ginger because of the content of oleoresin and essential oil compounds that add a warm feeling when used together with warm water. This will further help speed up the process of reducing feet oedema felt by pregnant women in the third trimester. Red ginger is one of the typical plants that is famous in Indonesia because of its oleoresin and essential oil content. Oleoresin contained in red ginger rhizome can give a spicy taste, while the essential oil is able to produce a distinctive aroma. The presence of zingiberene and zingiberol compounds in essential oils causes red ginger to have a fragrant smell.(28) This research is in line with the research of Sani and Noor (2021), who stated that the presence of oleoresin compounds contained in red ginger will help accelerate and smooth blood flow, and ease the work of the heart through increased blood circulation..(22) Putri, et al (2021) said that the gingerol compound in red ginger which has a spicy and hot effect can increase blood flow by causing vasodilation in blood vessels.(29) Red ginger is a plant that has anti-inflammatory properties and has been used to treat swelling, rheumatism, and headaches.(30)

The presence of anthocyanin compounds that provide red pigment in red ginger skin causes these compounds to function as antioxidants and anti-inflammatory, so it is not recommended to use peeled red ginger..(31–33) Giving therapy using red ginger needs to pay attention to how to manage it. In order to obtain optimal benefits from red ginger, it is recommended not to cook it until it boils or brew it with hot water. This is done to avoid the loss of the active compounds it contains.(34) The pharmacological effects resulting from the use of red ginger in the presence of a hot and spicy taste have been proven to be able to relieve pain, stiffness, and muscle spasms, and can help vasodilation in blood vessels that can be felt maximally within 20 minutes.(35)

Research conducted by Putri, et al (2016) found that the essential oil contained in red ginger at a dose of 100 grams was 18-35 mL.(36) The mechanism of essential oils entering the body can be through the process of inhalation of the olfactory system and absorption of the skin surface. Essential oils will enter through the nose and meet the olfactory mucous membrane which is in charge of identifying odors. Furthermore, it is sent through the olfactory nerves to the limbic system of the brain which is closely related to emotional and psychological responses. The response is determined by the quality of the essential oils used to regulate body functions to make them more relaxed.(14)

CONCLUSION

The conclusion from this study was that red ginger hydrotherapy was proven to be more effective in reducing battery oedema in third-trimester pregnant women compared to standard antenatal care. Red ginger hydrotherapy was able to

reduce feet oedema in third-trimester pregnant women by 2,647 mm (86.5%), while standard antenatal care intervention was only 1,118 mm (45.3%) with a p-value of 0.000 ($p < 0.05$). It is hoped that this study can be used as a reference for further research, by adding a longer duration of administration (>20 minutes in >5 consecutive days) and the intervention time that can be applied 2 times a day, namely in the morning and evening. days that have not been studied in this study. The author would like to thank Singgani Public Health Center, District Health Office of Palu, Poltekkes Kemenkes Semarang and all parties contributed to this study.

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