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The Effect of Foot Massage and Warm Footbath with *Kencur* Aromatic (*Kaempferia galanga*) on Foot Edema among Pregnant Women

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Abstract:
Foot edema or swelling is found in about 80% of pregnant women in the third trimester; it occurs due to uterine pressure which inhibits venous return, and the pull of gravity which causes greater fluid retention. The incidence of edema at the Nagrak Health Center, Cianjur Regency, in May 2021 was 20.9%. Management of foot edema can be done in a non-pharmacological way, one of which is a foot massage and warm footbath with mixed with *kencur* (*Kaempferia galanga*) aromatic. The objective was to determine the effect of foot massage and warm footbaths with *kencur* aromatic on foot edema among pregnant women at the Nagrak Health Center, Cianjur Regency. This research was a quasi-experimental study using one group pretest and posttest design. The sample was 20 respondents. The sampling technique used was purposive sampling. The instrument was the SOP and the pitting scale observation sheet. The data normality test using the Shapiro Wilk found that the data were not normally distributed, so the data analysis used the Wilcoxon test. The results were average degree of foot edema before the intervention was 3+ and the average after the intervention was 1+. Based on the Wilcoxon test, the result of the 2-tailed sign with p-value=0.000 ($p<0.05$), then statistically there was a significant reduction of foot edema between before and after foot massage and warm footbath with *kencur* aromatic performed among third-trimester pregnant women. The conclusion was that there was an effect of foot massage and a warm footbath with *kencur* aromatic on foot edema among pregnant women at the Nagrak Health Center, Cianjur Regency. The suggestion is expected that pregnant women and health workers can practice foot massage and warm foot baths with *kencur* aromatic to reduce foot edema.

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INTRODUCTION

Pregnancy is the goal to continue the offspring that occur naturally and produce a fetus that grows in a mother's womb. This period of pregnancy starts from conception to the birth of the fetus. Pregnancy lasts up to 40 weeks or 9 months 7 days, calculated from the first day of the last menstruation. This pregnancy is divided into 3 trimesters; the first trimester starts from conception to 3 months of pregnancy, the second trimester from 4 months to 6 months of pregnancy, and the third trimester starts from 7 months to 9 months (Prawirohardjo, 2014).

Pregnancy experiences physiological and psychological changes. Physiological changes include changes in the reproductive organs, cardiovascular system, kidney respiration, integument, musculoskeletal, neurology, digestion, and endocrine. Psychological change is an emotional response due to changes in body organs and increased responsibility for dealing with pregnancy and the next period of child care (Lestari et al., 2018).

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The discomforts of third-trimester pregnancy include about 50% frequent urination, 15% vaginal discharge, 40% constipation, 30% flatulence, 20% foot edema (swelling), 10% foot cramps, 20% headaches, 50% striae gravidarum, hemorrhoids 60% and 70% back pain. Edema of the foots or swelling of the foots is found in about 80% of pregnant women in the third trimester; this occurs due to uterine pressure, which inhibits venous return, and the pull of gravity, which causes greater fluid retention. The impact of foot edema on pregnant women can indicate dangerous signs in pregnancy, such as pre-eclampsia. Edema is also quite dangerous for pregnant women because it can cause disturbances in the heart, kidneys, and so on, causing these organs not to function properly (Putra & Siregar, 2019).

Foot massage and soaking warm water mixed with *kencur* (can reduce edema in third-trimester pregnant women. This foot massage is a therapy in the form of gentle massage on the foot area in a safe area that does not cause contractions. Apart from foot massage, a warm bath with a temperature of 38 degrees can also be added with *kencur* as aromatherapy. *Kencur* is also often used as traditional medicine, which is efficacious as a compress for swelling or inflammation because the rhizome extract of *kencur* has anti-inflammatory activity. (Zaenatushofi & Sulastri, 2019).

According to data from the Nagrak Health Center in Cianjur Regency, in May 2021, 124 people visited. It was found that 26 people (20.9%) of pregnant women had swollen feet (edema), and 100% had physiological swelling. Edema occurred in the second trimester in 5 people (19.2%) and the third trimester in 21 people (80.7%). Based on the description above, the writer is interested in researching "the effect of foot massage and soaking warm water mixed *kencur* on foot edema in pregnant women at the Nagrak Health Center".

METHOD

The research design used was a quasi-experiment with a one group pretest and posttest design. The research location was the Nagrak Health Center, Cianjur Regency. The study population was all third-trimester pregnant women who were and were registered at the Health Center in May 2021. The study sample was 20 people. Massage is done on both feet for 20 minutes, then soaked in warm water at 38 ℃ mixed with 3 *kencur* knuckles (50 grams), which are crushed. This process is carried out for 5 consecutive days. To determine the level of foot edema using the pitting edema scale where 1+ = mild pitting, no visible distortion (change), disappears quickly; 2+ = deeper than 1+, no distortion (change) detected immediately, disappears in 10-15 seconds; 3+ = moderately deep, lasts more than 1 minute, affected extremity appears larger and swollen; 4+ = very deep, lasts 2-5 minutes, the affected extremity is very altered. The results of the data normality test using the Shapiro Wilk found that the data were not normally distributed, so the data analysis used the Wilcoxon test. Ethical Examption: No.10.342.B/KEPK-FKMUMJ/XI/2021.

RESULT

Univariate Analysis Results

Distribution of foot edema frequency before and after intervention in third-trimester pregnant women in the working area of the Nagrak Health Center, Cianjur Regency.

Table 1. Frequency Distribution of Foot Edema in Third-Trimester Pregnant Women

Foot Edema	Pre-test		Post-test	
	n	%	n	%
Level 1+	0	0	17	85
Level 2+	11	55	3	15
Level 3+	9	45	0	0
Level 4+	0	0	0	0

Based on Table 1, the results of the scale of foot edema in third-trimester pregnant women before doing foot massage and soaking in warm water mixed with *kencur*, 9 people had level 2+ foot edema (45%) and 11 people had level 3+ foot edema (55%). Meanwhile, after doing a foot massage and soaking in warm water mixed with *kencur*, 17 people experienced foot edema to level 1+ (85%), and 3 experienced foot edema to level 2+ (15%).

Table 2. Overview of Average Foot Edema Before and After Foot Massage and Warm Water Soak Mixed *Kencur*

Variable	Mean	Mean difference	Min	Max
Pretest	2.55	1.40	2	3
Posttest	1.15		1	2

Based on Table 2 the average value before being given a foot massage and soaking in warm water mixed with *kencur* is 2.55 and the average after being given a foot massage and soaking in warm water mixed with *kencur* is 1.15. So, it was found that the average difference between foot edema in pregnant women before and after being given foot massage and soaking warm water mixed with *kencur* was 1.40.

Effects of Foot Massage and Warm Water Soak Mixed Kencur

Table 3. Effects of Foot Massage and Warm Water Soak *Kencur*

Variable	Mean Rank	Sum of Ranks	Z	p-value
Pre-test	9.00	153.000	-3.758	0.000
Post-test	0.00	0.00		

The results of the Wilcoxon test revealed a significance value of 0.000 <0.05, meaning p-value <0.05, so it can be concluded that H_0 is rejected. H_a is accepted, meaning that there is an effect of foot massage and warm water soak mixed with *kencur* on foot edema in pregnant women at the Nagrak Health Center, Cianjur Regency.

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DISCUSSION

Description of the average degree of edema in pregnant women before and after foot massage

Based on the results of the research on the effect of massage and soaking in warm water mixed with *kencur* on Trimester III pregnant women, on day 1, the average foot edema in third-trimester pregnant women is at level 3+ meaning that it is deep enough, can last more than 1 minute, extremities affected areas appear larger and swell. Whereas on the 5th day, the average foot edema in pregnant women is at level 1+, meaning mild pitting, no visible distortion (change), and disappears quickly.

Based on Table 2, it was found that the average pregnant woman who experienced foot edema before the intervention was worth 2.55, and after being given an intervention with a foot massage and soaking warm water mixed with *kencur* for 5 consecutive days, the average pregnant woman who experienced foot edema became 1.15. This means that the average degree of foot edema has decreased by 1.40.

Pregnant women can experience edema in various parts of their body, including the lower extremities throughout the body. Edema occurs due to venous pressure on compression of fetal growth and often occurs in the lower extremities of pregnant women. This is caused by decreased venous blood return due to the inferior vena cava being compressed by fetal growth. This decrease in backflow results in an accumulation of fluid in the lower body, especially if the pregnant woman stands for a long time (Manuaba, 2013).

Edema in pregnancy can be treated through massage therapy; the working principle of massage therapy is to focus on the body parts with edema. Massage therapy has good benefits in treating edema in pregnancy. Massage therapy's benefits include increasing blood circulation, relaxing muscles, eliminating muscle spasms, reducing anxiety, reducing swelling and discomfort due to edema, and reducing symptoms due to depression (Chase, 2016).

In line with the results of other studies, it was found that the average level of edema in pregnant women before the action was taken was 2.53, with a minimum value of 1 and a maximum of 4. The measurement results on the degree of edema showed a change between before the warm water soak and after it was done, namely 2.53 to 1.07, where most of the changes occurred from day 3 to day 5. This shows that the decrease in edema occurred due to the intervention (Putra & Siregar, 2019).

Besides that, in this study, there were also 3 people (15%) pregnant women who still experienced level 2+ foot edema, which was deeper than 1+; no distortion (change) was immediately detected and lasted about 10-15 seconds.

Based on other studies, from these results, from 5 respondents, 2 respondents were found with level 3 edema and 3 respondents with level 2 edema. Of the 4 respondents, they did not work (housewives), and one respondent was a tailor. The recovery rate from edema itself depends on the influence of the mother's daily activities. High maternal mobilization will be different from low maternal mobilization. High maternal mobilization is aimed at pregnant women who have activities and movements every day, such as walking, exercising, washing, and doing other household chores. The decrease in edema will differ from pregnant women who only do a little physical activity and movement daily. This difference in activity can trigger muscle tension and joint pain, reducing the degree of edema (Zaenatushofi & Sulastri, 2019).

In addition, based on research on the characteristics of parity in mothers in the intervention group, we can see that most respondents were in multigravida pregnancies, namely 5 people (50%), and the minority of respondents were in grand multigravida pregnancies, 1 person (10%).

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This is in line with Hidayat's research in 2014 with the results that most pregnant women were in the 2nd gravida at 60.9%, the 3rd gravida at 13%, and the primigravidas at 26.1% (Yanti et al., 2020).

Likewise, other studies made observations for 5 days by providing warm water immersion interventions with a mixture of *kencur*. The results of his research were that before soaking in warm water with a mixture of *kencur*, the respondent experienced second-degree edema; after soaking in warm water with a mixture of kencur, the respondent experienced a decrease in foot edema to the degree I. Soaking warm water with a mixture of *kencur* effectively reduces the degree of foot edema in mothers. third trimester pregnant (Utami, 2020).

According to researchers, in general, foot edema that occurs in third-trimester pregnant women is physiological foot edema, where foot edema occurs due to compression of the veins on the right side of the abdomen (vena cava) by the enlarged uterus so that blood returning to the heart decreases and accumulates in the lower extremities. The decrease in the degree of foot edema that occurs in pregnant women can be caused physiologically. Still, other factors cause foot edema, which is based on the mother's parity and depends on the pattern of the mother's daily activities. Therefore, pregnant women who experience foot edema in the third trimester must immediately get treatment because it will cause danger signs for pregnancy. One of the efforts to treat foot edema is by doing foot massage and soaking in warm water mixed with *kencur*.

Effects of Foot Massage and Warm Water Soak Mixed Kencur

Based on the results of the research on the effect of foot massage and warm water soak mixed with *kencur* on foot edema in pregnant women, a p-value = 0.000 or p<0.05 means that based on statistical testing, if the sig value ≤ 0.05, then H0 is rejected and Ha is accepted and significant that there is an effect of foot massage and soaking warm water mixed with kencur on foot edema in pregnant women at the Nagrak Health Center, Cianjur Regency.

According to Manuaba (2013), edema in the foot occurs due to fluid accumulation due to pressure on the inferior vena cava. Foot massage and soaking warm water mixed with *kencur* can dilate blood vessels so blood flow will be smooth, and it is easy to push blood into the heart. This situation causes blood flow to become smoother; the result is blood circulation returning to the heart so that it is easier for the body to withdraw extracellular fluids and will reduce foot edema. Scientifically, massage therapy has good benefits in treating edema in pregnancy. Some of the benefits of massage therapy include increasing blood circulation, relaxing muscles, eliminating muscle spasms, reducing anxiety, reducing swelling and discomfort due to edema, and reducing symptoms of depression. Research on foot massage can not only reduce the degree of edema but is also able to provide a sense of relaxation for pregnant women during administration (Manuaba, 2013).

Coban & Sirin's study (2010) stated that foot massage is one of the methods that can be applied to reducing edema in pregnancy. Foot massage is a non-pharmacological treatment proven to reduce pregnancy edema and improve blood circulation. In that study, foot massage given for 10 minutes on each foot every day for 5 consecutive days would cause a significant change in ankle circumference. This shows the effect of foot massage in reducing physiological edema in late pregnancy (Coban & Sirin, 2010).

In line with other studies, the results showed an effect of foot massage and warm water mixed with aromatic ginger foot soaks on foot edema in third-trimester pregnant women at RSIA K in 2022 (p = 0.000). Foot massage and warm water mixed with a *kencur* aromatic foot bath effectively reduce foot edema in pregnant women. Healthcare providers, especially midwives, must implement this intervention to reduce foot edema in pregnant women (Novelia et al., 2022).

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Applying foot edema treatment using foot massage and soaking in warm water mixed with *kencur* is one of the non-pharmacological interventions that can be used for pregnant women. This foot massage is a therapy that gently massages the foot area for 20 minutes a day for 5 days in a safe area that does not cause contractions. Apart from foot massage, soak in warm water at 38 ℃; you can also add *kencur* as aromatherapy. *Kencur* is also often used as a traditional medicine, one of which is efficacious as a compress for swelling or inflammation.

Warm water foot soak therapy has a physiological impact on the body. The first impacts the blood vessels where the warm water makes blood circulation smooth; the second is the loading factor in the water, which benefits the muscles and ligaments and affects the joints of the body. Warm water has a physiological impact on the body by increasing blood circulation by widening blood vessels so that more oxygen is supplied to the tissues and strengthening muscles and ligaments (Putra & Siregar, 2019).

This research is supported by the results of other studies where the results of the analysis in this study can be seen from the pretest and posttest results. Before the therapy was carried out, all 10 pregnant women experienced physiological foot edema. After the therapy was carried out on pregnant women, the posttest results showed that most pregnant women who experienced edema experienced a decrease in swelling of the edematous feet, namely as many as 10 (100%), with the results of the p-value test=0.00. This means that there is an effect of foot massage and soaking in hot water mixed with *kencur* on the physiological foot edema of third-trimester pregnant women (Yanti et al., 2020).

From the results of a literature review regarding the application of foot massage and soaking warm water mixed with *kencur* in third-trimester pregnant women, foot massage can reduce edema in pregnant women because it can improve blood circulation and stretch the muscles, soaking warm water mixed with *kencur* is also an appropriate effort to provide a feeling of warmth in the feet so that blood circulation becomes smooth. The mixture of *kencur* also provides anti-inflammatory against swollen feet due to edema. This warm feeling is produced by *kencur* because it contains oleoresin, which has an anti-inflammatory effect and can relieve muscle tension. The warm effect of *kencur* can also cause vasodilation of blood vessels, causing an increase in blood circulation and causing a decrease in pain (Ali et al., 2020).

According to the researchers, the effect of foot massage and soaking in warm water mixed with galingale on foot edema in pregnant women is that foot that are massaged for 20 minutes for 5 consecutive days are very effective in improving blood circulation, which experience swelling due to repeated touching or rubbing or massage. causes an increase in temperature in the massage area and stimulates the foot nerve sensors, resulting in vasodilation of blood vessels which affects increased blood flow, smooth blood circulation, and reduces edema. In addition, the feet given warm water soak therapy will cause heat transfer from warm water to the body, causing blood vessels to widen and decrease muscle tension so blood circulation will run smoothly. The result is blood circulation back to the heart, making it easier to draw back extracellular fluid and will reduce foot edema. The use of *kencur* has long been used by Indonesian people as a traditional medicine; one of its functions is to compress swelling or inflammation. In this case, because in the content of *kencur* there are compounds of the flavonoid group which function as anti-inflammatory or anti-inflammatory.

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CONCLUSION

Based on the results of research on the effect of foot massage and warm water soak mixed with *kencur* on foot edema in pregnant women at the Nagrak Health Center in 2021 that the average degree of foot edema before foot massage and warm water soak mixed with *kencur* is at level 3+ meaning it is deep enough, can lasts more than 1 minute, the affected extremity looks larger and swells while the average degree of foot edema after a foot massage and soaking in warm water mixed with *kencur* is at level 1+ meaning mild pitting, no visible distortion (change), fast disappearing. From the day of the study, it can also be concluded that foot massage and soaking in warm water mixed with galingale affect foot edema in pregnant women at the Nagrak Health Center, Cianjur Regency. It is hoped that pregnant women and health workers can massage and soak feet in warm water mixed with *kencur* to reduce foot edema.

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