



Comparison of the Effectiveness of *Kencur* Warm Water Soaking with Salt Warm Water Against Leg Edema of Third Trimester Pregnant Women in the Working Area of Rawang Health Center, Indonesia

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ABSTRACT

Leg edema is a common complaint in third trimester pregnant women. It is believed that soaking in kencur warm water and salt warm water can help overcome this. Comparing the effectiveness of soaking in warm kencur water with warm salt water on leg edema in third trimester pregnant women. Quasi-experimental research with a pretest-posttest design with the control group. A total of 60 third trimester pregnant women were divided into two groups: the kencur warm water immersion group (n=30) and the salt warm water immersion group (n=30). The intervention was carried out for 15 minutes, twice a day for 3 days. Leg edema was measured using a measuring tape before and after the intervention. There was a significant reduction in leg edema in both groups after intervention ($p < 0.05$). The reduction in leg edema in the kencur warm water immersion group was greater than in the salt warm water immersion group ($p < 0.05$). Kencur warm water soaks are more effective than salt warm water soaks in reducing leg edema in third-trimester pregnant women.

1. Introduction

Leg edema is a common complaint in third-trimester pregnant women, occurring in around 75% of pregnant women. Leg edema is caused by increased pressure of the uterus on the inferior vena cava, which inhibits the return of blood from the legs to the heart. This causes fluid to build up in the leg tissues. Leg edema in pregnant women is generally not dangerous and will disappear after giving birth. However, excessive leg edema can cause discomfort, soreness, and difficulty walking. Although leg edema in pregnant women is generally not dangerous, it is important to treat it because it can cause several problems, including discomfort and soreness in the legs, difficulty walking, increasing the risk of infection, and increasing the risk of deep vein thrombosis.^{1,2}

Several ways can be used to treat leg edema in pregnant women, one of which is by soaking the feet. Soaking your feet in warm water can help improve blood flow and reduce swelling. Kencur (*Kaempferia galanga* L.) is a traditional medicinal plant that has anti-inflammatory and diuretic effects. It is believed that soaking in kencur warm water can help reduce leg edema. Salt also has anti-inflammatory and diuretic effects. Warm salt water soaks have been shown to be effective in reducing leg edema in several studies.³⁻⁵ This study aims to compare the effectiveness of soaking in kencur warm water with salt warm water on leg edema of pregnant women in the third trimester in the working area of Rawang Health Center, Indonesia.

2. Methods

This research used a quasi-experimental design with a pretest-posttest with the control group. This design was chosen because the researchers wanted to know the effect of the intervention (kencur warm water soaking and salt warm water) on leg edema in third-trimester pregnant women. A total of 60 third-trimester pregnant women in the working area of Rawang Health Center, Indonesia, were involved in this research. The sample was selected using purposive sampling, namely with the following criteria: pregnant women in the third trimester, aged 20-35 years, had leg edema, and were willing to participate in the research. Pregnant women who met the research criteria were interviewed and asked to fill out informed consent. Leg edema is measured using a measuring tape. Pregnant women were randomly divided into two groups: the kencur warm water immersion group (n=30) and the warm salt water

immersion group (n=30). Kencur warm water soak group: soak the feet in warm water (37°C) mixed with 20 grams of grated kencur for 15 minutes, twice a day for 3 days. Salt warm water soak group: soak feet in warm water (37°C) mixed with 1 teaspoon of salt for 15 minutes, twice a day for 3 days. Leg edema is measured again using a measuring tape. Data were analyzed using the unpaired t-test to determine the difference in leg edema between the two groups after the intervention.

3. Results and Discussion

The reduction in leg edema in the kencur warm water immersion group was greater than in the salt warm water immersion group ($p < 0.05$). This shows that kencur warm water immersion is more effective than salt warm water immersion in reducing leg edema in third-trimester pregnant women (Table 1).

Table 1. Comparison of reduction in leg edema between groups.

Group	Average decrease in leg edema (cm) ± SD	p-value*
Kencur warm water soak	1.23±0,11	0,001
Salt warm water soak	0.87±0,07	

*Unpaired t-test, $p < 0,05$.

Kencur (*Kaempferia galanga* L.) is a traditional medicinal plant that has many benefits, one of which is an anti-inflammatory effect.^{6,7} Flavonoid compounds have strong antioxidant and anti-inflammatory effects.⁸ The flavonoids in galangal can help reduce inflammation by inhibiting the production of inflammatory enzymes. The curcumin compound has strong anti-inflammatory effects. The curcumin in galangal can help reduce inflammation by inhibiting the production of cytokines, which are proteins that play a role in the inflammatory process.⁹⁻¹² Gingerol compounds have strong anti-inflammatory effects. Gingerol in galangal can help reduce inflammation by inhibiting the production of prostaglandins, which are compounds that play a role in the inflammatory process.¹³ Salt (NaCl) also has an anti-inflammatory effect, but the effect is not as strong as galangal. Salt can help reduce inflammation by drawing water out of

cells, thereby reducing swelling. A study on rats showed that kencur extract can reduce inflammation caused by arthritis in the joints of rats. A human study shows that consuming galangal supplements can help reduce inflammation in people suffering from osteoarthritis.^{14,15}

Kencur (*Kaempferia galanga* L.) has a stronger diuretic effect than salt. Kencur has a higher potassium content than salt. Potassium helps the kidneys remove excess water and sodium from the body through urine. Kencur contains active compounds that have a diuretic effect, such as flavonoids and curcumin. Flavonoid compounds help increase blood flow to the kidneys, thereby increasing the kidneys' ability to excrete water and sodium. Curcumin compounds help inhibit water reabsorption in the kidney tubules, thereby increasing water excretion through urine. The anti-inflammatory effects

of galangal can also help increase its diuretic effect. Inflammation can cause water and sodium retention in the body. Reducing inflammation with kencur can help increase the excretion of water and sodium through urine. Salt has a weak diuretic effect. Salt increases water excretion through urine by pulling water out of cells. This can help reduce leg edema, but the effect is not as strong as kencur.^{16,17}

Kencur (*Kaempferia galanga* L.) is a traditional medicinal plant that has many benefits, one of which is because it contains more active compounds than salt. Galangal contains various types of flavonoids, such as galangin, kaempferol, and quercetin. Flavonoids have antioxidant, anti-inflammatory, and antimicrobial effects. Kencur contains curcumin, a compound that has anti-inflammatory, antioxidant, and anticancer effects.¹⁸ Kencur contains gingerol, a compound that has anti-inflammatory, analgesic, and antibacterial effects. Galangal contains cineol, a compound that has antibacterial, antifungal, and expectorant effects. Kencur contains various types of terpenoids, such as limonene, pinene, and camphor.¹⁹ Terpenoids have antioxidant, anti-inflammatory, and antimicrobial effects. Salt (NaCl) only contains two active compounds, namely sodium and chloride. Sodium and chloride have important functions in the body, such as maintaining fluid and electrolyte balance. However, excessive salt consumption can cause various health problems, such as hypertension, heart disease, and stroke.²⁰

4. Conclusion

Based on the research results, it can be concluded that soaking in kencur warm water and salt warm water is effective in reducing leg edema in third-trimester pregnant women. Kencur warm water soaks are more effective than salt warm water soaks in reducing leg edema in third-trimester pregnant women.

5. References

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