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The Effect of Warm Water Soaking Therapy on Lower Leg Edema of Pregnant Women in the Work Area of The Bandar Khalifah Health Center Serdang Bedagai

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ABSTRACT

Background: Edema in the legs of pregnant women is one of the physiological things, but if left unchecked it will compromise activities. Foot soak therapy can be used as a non-pharmacological alternative by using methods that are cheaper and easier for pregnant women.

Purpose: The general purpose of this study was to determine the effect of warm water soak therapy on lower limb edema in pregnant women.

Methods: The research design used is Quasi experiment with One Group Pret Post Test Design. The sample of pregnant women who experienced lower limb edema was 17 people. Data processing using dependent t-test (paired sample t-test). The duration of the research began from the research permit was issued, spanning approximately one month, including two weeks for data collection and two weeks for data processing, which involved presenting the findings in the form of a thesis and undergoing the supervision process.

Results: The results of this study the effect of warm water soak therapy on edema in the lower limbs of pregnant women (p-value = 0.019).

Conclusion: The results of this study the effect of warm water soak therapy on edema in the lower limbs of pregnant women (p-value = 0.019).

Keywords: *Warm Water Soak Therapy; Edema; Pregnant Women; Third trimester.*



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BACKGROUND

Pregnancy is a condition in which there is an embryo or fetus inside a woman's uterus. Pregnancy begins at the time of conception and continues until the birth of the baby. The duration of pregnancy is counted from ovulation to parturition, estimated at approximately 40 weeks and not exceeding 43 weeks. Pregnancy is divided into three trimesters: the first trimester lasts for 12 weeks, the second for 15 weeks, and the third for 13 weeks. Every woman desires a healthy pregnancy without complications until delivery. However, every pregnant woman is at risk of death (Rahayu & Mulyani, 2020).

Pregnancy complications that can lead to death include abortion, infection, pulmonary embolism, postpartum hemorrhage, hypertension, and eclampsia, including both direct and indirect complications. Meanwhile, delivery complications causing maternal death include postpartum hemorrhage, high blood pressure, infection, retained placenta, preeclampsia, eclampsia, and other accompanying diseases (Bayuana et al., 2023).

Changes during pregnancy require both physical and psychological adaptation, which may lead to discomfort—one of which is edema (Handayani et al., 2024). Edema during pregnancy is triggered by changes in estrogen levels, leading to fluid retention. This increased fluid retention is associated with physical changes during late pregnancy, such as the enlarging uterus and increased fetal weight. Additionally, weight gain increases the pressure on the legs to support the mother's body, which may lead to impaired circulation in the leg veins, resulting in edema (Adabiyah, 2021).

In the process of pregnancy there are fluctuating physiological changes. The changes that occur in pregnant women cause discomfort that can be disturbed or ignored during pregnancy. Discomfort during pregnancy includes nausea, vomiting, fatigue, upper and lower back pain, increased frequency of micturition, tingling, swelling of the legs, heartburn (Efendi et al., 2022).

Pregnant women may develop preeclampsia as a result of edema. Pregnancy-related edema usually develops about 20 weeks of pregnancy and lasts until the early postpartum phase. Physical symptoms like nausea and vomiting are common in pregnant women with preeclampsia, and they also cause psychological discomfort. Warm foot soak therapy is a non-pharmacological strategy that can help lessen edema (Adabiyah, 2021).

Foot edema is found in approximately 80% of pregnant women in the third trimester, caused by pressure from the uterus that hampers venous return and gravitational pull, leading to increased fluid retention. Edema can be an early symptom of pathological conditions or an indicator of chronic diseases during pregnancy such as anemia, intrauterine growth restriction (IUGR), preterm labor, hypertension, preeclampsia, eclampsia, placental abruption, and placenta previa with hydramnios. Diseases that may



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cause edema include chronic heart failure, kidney failure, joint disease, excessive salt intake, and physical fatigue (Adabiyah, 2021).

Such non-pharmacological alternative that is inexpensive and easy to use is foot soaking therapy. Warm water foot soaks are easy to apply, accessible, and there is no risk of any side effects. Furthermore, this medicine can help prevent side effects from medication like diuretics, which can cause fluid loss, poor uteroplacental perfusion, elevated hemoconcentration, fetal dehydration, and decreased fetal weight if not employed cautiously (Zaenatulshofi & Eti, 2019).

Foot soaking therapy with warm water has been proven effective in reducing foot edema in pregnant women in the third trimester, as demonstrated in a study by Zaenatulshofi & Eti, (2019) at PMB Supriyatin Jambi, as well as research by Handayani et al., (2024) at the Tanjung Balai Karimun Health Center. This intervention showed a statistically significant reduction in edema ($p < 0.05$) and was evaluated as a safe, easily accessible, and non-pharmacological method with no side effects. Foot soaking therapy is a suitable alternative to the use of diuretics, which can cause uteroplacental blood flow disorders, fetal weight loss, and dehydration risks if not used carefully..

Researchers from the Bandar Khalifah Health Center in Serdang Bedagai carried out the first survey, using data collected between August – October 2024 there were up to 28 pregnant women and 17 of them developed edema during the third trimester They claimed to be unaware that using warm water for foot soak therapy helped lessen edema, given the background information provide, the authors hope to investigate the impact of warm water soaking on pregnant women's lower limb edema in the Bandar Khalifah Serdang Bedagai Health Center Working Area.

OBJECTIVE

The objective of the research is to determine the Effect of Warm Water Soak on Lower Limb Edema of Pregnant Women in the Bandar Khalifah Serdang Bedagai Health Center Working Area.

METHODS

This research is quantitative in quasi-experimental design, specifically using the one-group pretest-posttest design. This design is chosen because the study aims to compare the pretest and posttest results of the intervention group (Anantasia, 2025). The population and sample in this study consists of third-trimester pregnant women experiencing lower leg edema in the working area of Bandar Khalifah Public Health Center, Serdang Bedagai, totaling 17 individuals. The sample in this study includes the entire population, totaling 17 participants. The instruments used in this research are edema observation and warm water soaking.



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Data analysis was conducted in stages, consisting of univariate and bivariate analyses Independent T Test. Respect for human dignity and the protection of participants' rights are important ethical issues in this study. Informed consent was obtained from participants after a complete explanation of the study's objectives, benefits, and risks. Data confidentiality was ensured through a coding system (anonymity), where participants' identities were not included, and data collection forms were kept to a minimum, using only initials or codes. All collected information was kept confidential (confidentiality), and only specific data were reported for research purposes. This study received ethical approval through an ethical clearance from the Ethics Committee of Universitas Sari Mutiara Indonesia, with approval letter number: No.2517/F/KEP/USM/XII/2024.

RESULTS

Bandar Khalifah Public Health Center (Puskesmas Bandar Khalifah) is located in Bandar Khalifah, Serdang Bedagai. It is a non-inpatient health center that offers a variety of healthcare services, including general check-ups, issuance of medical certificates, outpatient care, suture removal, wound dressing, wound stitching, tooth extraction, blood pressure checks, pregnancy tests, child health examinations, blood type tests, uric acid tests, cholesterol tests, and more. The health center also provides referral services for BPJS patients to hospitals for further treatment. The quality of services at Puskesmas Bandar Khalifah is commendable, supported by competent healthcare personnel including nurses and doctors, as well as adequate medical equipment and medications. This health center serves as a reliable option for residents of Serdang Bedagai Regency to meet their healthcare needs.

Table 1. Frequency Distribution of Lower Limb Edema in Pregnant Women Before Foot Soaking

Table 1. Average Distribution of Lower Limb Edema Levels in Pregnant Women Before Warm Water Soaking in the Working Area of Bandar Khalifah Public Health Center

Edema Level	Mean	Median	Standard Max Deviation	Min-
Before		4	0,514	3-4

Based on Table 1 above, the average level of edema in pregnant women before warm water foot soaking was 3.53, with a minimum value of 3 and a maximum value of 4.



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Table 2. Frequency Distribution of Lower Limb Edema in Pregnant Women After Foot Soaking

Table 2. Average Distribution of Lower Limb Edema Levels in Pregnant Women After Warm Water Soaking in the Working Area of Bandar Khalifah Public Health Center

Edema Level	Mean	Median	Standard Max Deviation	Min-
After	1.53	2	0,514	1-2

Based on Table 2 above, the average level of edema in pregnant women after warm water foot soaking was 1.53, with a minimum value of 1 and a maximum value of 2.

Table 3. The Effect of Warm Water Soaking Therapy on Lower Limb Edema in Pregnant Women in the Working Area of Bandar Khalifah Public Health Center

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Result	Mean	Mean Different	SD	<i>p</i>	95% Confidence Interval of The Different	
					Lower	Upper
Before	3,53	0,192	0,791	0,091	1,594	2,406
After	1,53					

The results of the bivariate analysis using the Paired T-Test showed a *p*-value of 0.019 ($p < 0.05$), indicating that there is a significant effect of warm water soaking therapy on lower limb edema in pregnant women

DISCUSSION

1. Overview of the Average Edema Level in Pregnant Women Before Warm Water Soaking Therapy

Based on the results of the study, the average level of lower limb edema in pregnant women before warm water soaking therapy was 3.53, with a minimum value of 3 and a maximum of 4. Lower limb edema indicates the presence of excessive fluid in body tissues. In many cases, edema primarily occurs in the



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extracellular fluid compartment, but it can also involve intracellular fluid. According to Sawitry et al., (2020); Siregar & Fitriana, (2021), this therapy is usually done at night before bedtime to achieve a relaxing effect during sleep. Sleep is when the body rests and the heart rhythm, pulse and blood flow become more stable. It is therefore a good time for absorption of fluid accumulated in the extravascular space. The reclining position also aids venous return from the lower extremities back to the heart. Sawitry et al., (2020); Siregar & Fitriana, (2021), which reported that the average level of edema in pregnant women before warm water soaking therapy was 2.53, with a minimum value of 1 and a maximum of 4.

According to the present researcher, the average degree of lower limb edema in this study was level 4, where pressure on the limb results in a depression deeper than 7 mm, with a rebound time of approximately 7 seconds. Generally, the edema observed in this study is physiological, caused by the enlarged uterus compressing the major blood vessels on the right side of the abdomen (vena cava), which in turn reduces venous return to the heart, causing fluid accumulation

2. Overview of the Average Edema Level in Pregnant Women After Warm Water Soaking Therapy

The findings revealed that the average level of lower limb edema in pregnant women after warm water soaking therapy was 1.53, with a minimum value of 1 and a maximum of 2 (Siregar & Fitriana, 2021). Edema in pregnant women can cause discomfort, a heavy sensation, and cramps at night. It may also lead to more serious conditions such as cardiac or renal complications, impairing the function of these vital organs. Management of lower limb edema can be addressed through warm foot soaking therapy (foot hydrotherapy), which helps to improve blood circulation by dilating blood vessels and increasing oxygen delivery to swollen tissues (Siregar & Fitriana, 2021). This result aligns with research by Sawitry et al., (2020) which found that the average edema level in pregnant women after warm water soaking therapy was 1.07, with values ranging from 0 to 2.

According to the researcher, the signs and symptoms of lower limb edema require immediate management. One such intervention is warm compress therapy. In this study, edema management was carried out by soaking the feet in warm water (temperature 37– 40°C) up to 10–15 cm above the ankle for 20–30 minutes daily over a period of 7 days. The results showed a change in edema levels from before to after the intervention—from an average of 2.53 to 1.07—with the most significant reduction occurring between days 3 and 5. This indicates that the decrease in edema level is due to the effectiveness of warm water foot soaking therapy in pregnant women.



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3. The Effect of Warm Water Foot Soaking Therapy on Lower Limb Edema in Pregnant Women

Based on research conducted at the Bandar Khalifah Community Health Center, warm water foot bath therapy showed a significant effect on reducing lower extremity swelling in pregnant women ($p = 0.019$; $p < 0.05$). Physiologically, this therapy provides two main benefits. First, warm water triggers vasodilation of blood vessels, thereby improving circulation and accelerating oxygen distribution to tissues experiencing edema. Second, the hydrostatic pressure from the soak stimulates ligaments and muscles, contributing to joint stability and reducing muscle tension. The combination of thermal and mechanical effects makes foot hydrotherapy an effective non-pharmacological intervention for managing physiological edema in the third trimester of pregnancy (Ismail, 2024).

The use of foot soaking therapy can be a more economical and simple non-pharmacological option. This foot soak in warm water can be done easily by anyone, without requiring large costs, and does not cause harmful side effects. With this alternative massage and foot soak can be given to pregnant women who experience oedema to help pregnant women overcome oedema and increase the comfort of pregnant women (Prianti, 2023)

The uncomfortable impact of edema during pregnancy can be reduced by various measures. To reduce the risk of leg swelling, it is recommended to avoid wearing clothes that are too tight so as not to impede venous return, change body position frequently, reduce prolonged standing time, avoid sitting with objects pressing on the knees or thighs to prevent circulation disorders, rest by lying on the left side so as to maximize blood flow in both legs, perform recommended pregnancy exercises, and adopt the habit of doing massage or massage on the legs, as well as soaking the feet in warm water (Vilca et al., 2025)

According to the researcher's assumption, the effect of warm water therapy on lower limb edema occurs because the heat transferred from the warm water to the body causes vasodilation and muscle relaxation, resulting in improved blood circulation. This vasodilation facilitates venous return to the heart, enabling the body to reabsorb fluid from the extracellular space more effectively, thus reducing lower limb edema



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CONCLUSION

1. The average level of lower limb edema in pregnant women before receiving warm water foot soak therapy was 3.53, with a minimum value of 3 and a maximum value of 4.
2. The average level of lower limb edema in pregnant women after receiving warm water foot soak therapy was 1.53, with a minimum value of 1 and a maximum value of 2
3. There was a significant effect of warm water foot soak therapy on lower limb edema in pregnant women, as indicated by a p-value of 0.019.

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