








# Foot Hydrotherapy: Non-pharmacology Treatment for Reducing Anxiety in Third Trimester Pregnancy

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## Abstract

**AIM:** This research aims to examine the effect of foot hydrotherapy as a non-pharmacological therapy for reducing anxiety during pregnancy.

**METHODS:** This study applied the Quasi-Experimental method using two Group pretest-posttest designs with a comparative group. It involved 57 respondents who were recruited using a consecutive sampling technique. The Hamilton Anxiety Rating Scale questionnaire was used to measure the respondents' anxiety. The data were tested using Paired samples t-test and independent t-test.

**RESULTS:** The results of data analysis indicated that before the treatment, the anxiety values in the two groups were almost the same ( $21 \pm 2.3$  dan  $22.07 \pm 1.99$ ). After the treatment in the intervention group, the anxiety value decreased. Meanwhile, the anxiety score was increased on the 3<sup>rd</sup> day after the pretest measurement in the control group. Data analysis conducted with an Independent Sample t-test revealed that foot hydrotherapy using warm water reduced the anxiety level of pregnant women in the third trimester ( $p = 0.000$ ).

**CONCLUSION:** Giving foot hydrotherapy is effective for reducing anxiety in pregnant women. Therefore, non-pharmacological therapy can be socialized and applied to the public (society), especially pregnant women.

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## Introduction

Pregnancy is a natural process. Changes that occur in women during normal pregnancy are physiological rather than pathological. The changes can cause stress and anxiety or emotional maladaptation [1]. Excessive fear of pain, the birth process, and disabilities of the baby are part of the anxiety, especially in nullipara mothers [2], [3].

Anxiety during pregnancy can cause physical and psychological disorders, increasing the risk of morbidity in pregnant women and their fetuses [4]. The harmful effects of anxiety in pregnant women will stimulate an increase of stress hormones that can stimulate uterine contractions and increase blood pressure. It may trigger preeclampsia and increase the incidence of gestational diabetes [5], [6], [7]. Furthermore, the anxiety felt until delivery causes prolonged labor and often ends with cesarean section.

On the other hand, in terms of the psychoneurological aspect, maternal anxiety also influences the hypothalamus that affects hypophyses, stimulating the adrenal cortico tropic hormone. It impacts the adrenal glands and will produce cortisol in large quantities, which interferes with the neonatal [8], [9]. Moreover, the release of catecholamine causes placental dysfunction and obstacles to transport oxygen and various nutrient delivery to the fetus, leading to low birth weight, premature infants. In the long term, it is related to the child's behavioral disorder and emotion [10], [11], [12], [13], [14].

Various methods have been proven to have an impact on reducing anxiety, including using music therapy method, classical music, breathing relaxation method, meditation, and hydrotherapy [15], [16], [17], [18], [19]. Hydrotherapy is more efficient than other therapies since it is pretty economical and easier to do by pregnant women. Anxiety in pregnant women is a problem that may occur mainly in the third trimester of a pregnancy

before giving birth. One of the methods used is water therapy, which refers to soaking the feet into warm water. This therapy has been proven to reduce pain and blood pressure in hypertension [20], [21].

Therefore, this research aims to examine the effect of foot hydrotherapy as non-pharmacological therapy for reducing pregnancy anxiety.

## Research Methods

This study employed the Quasi-Experimental method with a comparative group. In this study, the population in this study were all pregnant women treated in Makassar primary health facilities from September 2019 to June 2020. The participants were 57 pregnant women in their third semester. It consisted of 30 mothers who got intervention and 27 mothers who were the control. In the control group, 3 respondents had resigned. Sample taking used consecutive sampling where all members of the population who meet the inclusion criteria are selected as research samples by using a large formula hypothesis sample test two independent groups. The gestational age criteria were between 28 and 38 weeks, primigravida, experienced anxiety, and ready to be respondents.

This hydrotherapy method was done by soaking the feet until the ankles in the warm water (38–39°C) for approximately 15 min. Treatment was given 3 times a day for 2 consecutive days.

The Hamilton Anxiety Rating Scale questionnaire was used to measure respondents' anxiety levels. The questionnaire consisted of 14 question items that had been tested. This measuring instrument had been tested for 25 people for a month. Using the Pearson Product Moment test, the test results with the calculated  $r$ -value (0.39–0.79),  $\alpha = 0.05$ . While the reliability test results obtained alpha Cronbach's  $r$  count was  $0.948 > r$  table (0.6), it meant reliable. Data analysis was carried out by univariate and bivariate. Bivariate analysis was conducted using paired samples  $t$ -test to assess changes before and after treatment and Independent  $t$ -test to compare the intervention and control groups.

## Results

Table 1 shows the most respondents in the age of 20–29 years old (23 respondents (76.7%) in the intervention group and 18 respondents (66.7%) in the control group). They mainly were graduated from senior high school (18 respondents (60%) in the

**Table 1: Characteristics of respondents based on age, education, and family income**

Variable	Intervention		Control	
	n	%	n	%
Group of age				
16–19 (y.o)	7	23.3	9	33.3
20–29 (y.o)	23	76.7	18	66.7
Mother's education				
Junior high school	7	23.3	8	29.6
Senior high school	18	60.0	16	59.3
University	5	16.7	3	11.1
Family income				
Low	25	83.3	17	63
Middle	5	16.7	10	37
Total	30	100	27	100

intervention group and 16 respondents (59.3%) in the control group). Meanwhile, low income was dominated the family income (25 respondents (83.3%) in the intervention group and 17 respondents (63%) in the control group).

Table 2 shows that the anxiety values in the two groups were almost the same ( $21 \pm 2.3$  dan  $22.07 \pm 1.99$ ) before treatment. However, the anxiety level went down after treatment in the intervention group; in the control group, the anxiety score increased on the 3<sup>rd</sup> day after the pretest. Bivariate analysis using an Independent  $t$ -test obtained a significant value that showed the effect of hydrotherapy on the anxiety level of pregnant women ( $p = 0.000$ ).

**Table 2: The effect of foot hydrotherapy on the anxiety level among women in third-trimester of pregnancies**

Variable	Total (n)	Before treatment Mean $\pm$ SD	After treatment Mean $\pm$ SD	p-value
Anxiety				
Intervention Group	30	$21 \pm 2.3$	$16.6 \pm 2.84$	0.000
Control Group	27	$22.07 \pm 1.99$	$23.37 \pm 1.49$	

## Discussion

This research demonstrates that hydrotherapy decreases anxiety in pregnant women in this research. As indicated in Table 1, most respondents aged 20–29 years old, graduated from senior high school, with low income. This finding shows the significant effectiveness of foot hydrotherapy with warm water in reducing anxiety in pregnant women in the third trimester ( $p = 0.000$ ).

Foot Hydrotherapy with warm water is based on the principle of heat transfer through conduction, which is the transfer of heat from warm water to the body, causing blood vessels to become wider and muscle tension to decrease; blood circulation is smooth, reducing the level of anxiety in pregnant women [20], [22], [23]. Implementation of foot hydrotherapy with warm water could reduce mild and moderate anxiety levels experienced by pregnant women in the third trimester, indicated by the decrease or the body's response to anxiety. Soaking feet into warm water should be done repeatedly and

regularly, 3 times within 2 days at a temperature of 38–40°C, so the benefits of Foot Hydrotherapy could be immediately felt by respondents [19], [21].

Foot hydrotherapy gives a feeling of warmth, which will directly touch the skin of the foot where there are many blood vessels and nerves, such as the flexus venous. The stimulation is transmitted to the posterior horn and the spinal cord. From here, it is forwarded to lamina I, II, III dorsalis radix, then to the ventral basal thalamus, and into the brain stem. Here, there is a soporific effect (sleepiness). Therefore, foot hydrotherapy, soaking feet into warm water, will make pregnant mothers more relaxed [20], [24], [25].

Foot soaks can reduce anxiety symptoms, such as cardiovascular, respiratory, and gastrointestinal symptoms. Foot hydrotherapy as a non-pharmacological treatment will affect arterial pressure by baroreceptors in the cortical sinus and aortic arch, which will convey impulses carried by nerve fibers carrying cues from all parts of the body to inform the brain about blood pressure, blood volume, and all special needs of all organs to the sympathetic nerve center and medulla [24], [26]. There is a dilation of blood vessels. Blood flow will be smooth. So, it is easy to push blood into the heart and reduce systolic pressure. The state of isovolumic ventricular relaxation causes the pressure in the ventricles to drop dramatically, causing a smoother blood flow. This will decrease diastolic pressure and reduce anxiety symptoms in pregnant women [23], [27].

However, one respondent experienced persistent anxiety before and after treatment with several symptoms, including losing interest in hobbies, feeling tense, insomnia, lack of sleep, hard to breath, fast heart rate, urination, and others. These symptoms persisted after the Foot Hydrotherapy using warm water due to the particular respondent's characteristics and psychosis, such as young age, low level of education, and low-family income [28], [29].

## Conclusion

Foot hydrotherapy using warm water is a non-pharmacological therapy given to pregnant women to reduce anxiety, especially before giving birth (prenatal). It is an easy and efficient technique.

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