

Effectiveness Of Lemon Aromatherapy In Reducing Labor Anxiety Active Phase In Work Area Bukit Sari Public Health Center

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ABSTRACT

Anxiety in labor is a common feeling of fear that affects many women. High levels of anxiety can cause pain and impact contractions and the birth canal's opening. To reduce this anxiety, lemon aromatherapy may help by calming muscles and nerves. The study aimed to determine if lemon aromatherapy effectively lowers anxiety in pregnant women during early labor. **Study methods** : study design that uses a control group and a quasi-experimental pre-and post-test design. There are 46 active phase I maternity moms in the research group. Total sampling is the method of sampling. There were 23 participants in each group. Frequency distribution table for univariate data analysis, MC Nemar test and chi square test for bivariate analysis. **Results** : According to the study's findings, 23 individuals (100%) in the control group and the intervention group had moderate anxiety levels before the intervention. Following the session, anxiety levels in the control group of 13 individuals (56.5%) and the intervention group of 18 individuals (78.3%) dropped to mild levels. The chi square test findings between the intervention group and the control group showed a p-value of = 0.046 ($p < 0.05$), while the Mc Nemar test results showed a p-value of 0.000 ($p < 0.05$). **Conclusion** : Lemon aromatherapy has an impact on maternity moms' anxiety levels during the initial active period.

Keywords: anxiety, lemon aromatherapy, the first stage of Labor

INTRODUCTION

Labor is the physiological process by which the fetus and placenta, the products of conception that can survive outside the uterus, are expelled. This process begins with uterine contractions and cervical dilation.(Widiastini, 2018).

Feelings of worry, fear, and anxiety can arise during labor. These feelings of fear can increase physical reactions and mental health issues for the mother and her family, such as pain, muscle tension, and fatigue. This can hinder the labor process.(Hamdiyah, 2022).

Anxiety rates during labor are quite high. Research by Sari and colleagues showed that of 40 mothers giving birth during the active phase, nearly 70% experienced severe anxiety. The average anxiety score for these mothers was 46.43.(Sari, 2022). StudyArikalang, et al (2023)Research shows that nearly 80% of mothers experience anxiety during childbirth, with 30% experiencing mild anxiety, 30% moderate anxiety, and 20% severe anxiety. These findings highlight the importance of special attention to ensure a successful natural birth for mothers.

Excessive anxiety can worsen labor pain and affect contractions and the opening of the birth canal. Research shows that anxiety during labor prolongs the duration of stages I and II, increases blood pressure, and increases the risk of mild to moderate labor asphyxia.(Octavia, 2021).

Attention to anxiety during childbirth is now attracting global research interest. Approximately 70% of women experience severe anxiety during childbirth, indicating a high prevalence.Tan (2021)revealed a link between anxiety during labor and an increased risk of pain. Therefore, it is important to implement effective stress management measures for mothers.(Tan, 2021).

StudySidabukke (2020) identified several factors contributing to anxiety during childbirth, such as pain, physical condition, pregnancy history, ANC experience, and partner support. Rahmawati's research showed that primigravida mothers had an average anxiety score of 30.23, indicating high levels of anxiety.(Rahmawati, 2019).

Reducing anxiety during labor should begin early in pregnancy by increasing the mother's understanding. Research shows that 63.3% of mothers with good knowledge still experience anxiety, while 100% of mothers with poor knowledge experience anxiety. Therefore, anxiety management during labor is crucial for optimal care.(Widiastini, 2018).

Aromatherapy, such as lemon, can reduce anxiety during labor. ResearchOctavia, (2021)showed a decrease in anxiety in mothers in the active phase after using lemon aromatherapy, which was proven to be more effective than the control group.(Octavia, 2021).

Aromatherapy is a contemporary term referring to an ancient healing practice that utilizes pure aromatic plant extracts to improve physical, mental, and spiritual health and well-being. One example is lemon (Citrus limon) aromatherapy. In psycho-aromatherapy, inhaling

aromatherapy for 20 minutes can improve mood, induce relaxation, refreshment, and evoke positive memories.(Rahayu, 2023).

Lemon aromatherapy can be used through massage, bathing, diffuser, or on pillows.(Saras, 2023)Studies show that aromatherapy is safe and effective with minimal side effects during pregnancy and childbirth.(Bertonee, 2021).

An initial survey of 15 women giving birth at the Bukit Sari Community Health Center showed that 7 experienced severe anxiety, 3 moderate anxiety, and 3 mild anxiety, while 2 women experienced no anxiety. These findings indicate that many women experiencing severe anxiety due to pain and fear. The Bukit Sari Community Health Center and the Village Midwife have been working to prepare mothers through Mothers' Classes, where they receive education on childbirth preparation, including discussions about the challenges and roles of mothers, so they can experience a safe and comfortable birth.

Based on the background of anxiety issues that occur during labor, and considering the composition and potential benefits of lemon aromatherapy, researchers are interested in examining the effectiveness of lemon aromatherapy in reducing anxiety during the active phase of labor.

METHOD

The research method was Quasi-Experimental. This study used a pre-test and post-test. This study involved 46 anxious mothers in the Bukit Sari Community Health Center area who were due to give birth between December and February 2024. In this study, total sampling was used. Forty-six mothers in the first stage of labor in the active phase, 23 for the lemon aromatherapy intervention group, and 23 for the control group were used.

This research was conducted in the Bukit Sari Community Health Center (Puskesmas) working area from January to February 2024. Data collection tools used were observation sheets and the State-Trait Anxiety Inventory (STAI) questionnaire before and after the intervention. The researchers adapted the STAI instrument, created by psychologist Charles Spielberger in 1968, into Indonesian. This instrument has been previously used by Oktari (2007) and Laurensya (2019).

To assess the effect of lemon aromatherapy on anxiety levels in one group, the McNemar test was used. For statistical testing between two different groups, the chi-square test was used. This research has undergone an ethical review by the Health Research Ethics

Committee of STIKES Guna Bangsa Yogyakarta and has been declared ethically sound under the registration number 023/KEPK/III/2024.

RESULTS AND DISCUSSION

1. Respondent Characteristics

Table 1 Respondent Characteristics

Respondent Characteristics		Intervention Group (n:23)		Control Group (n:23)	
		N	%	N	%
Age	< 20 years	6	26.1	3	13
	20-35 year	17	73.9	20	87
	>35 years	-	-	-	-
Parity	Primigravida	6	26.1	7	30.4
	Multigravida	17	73.9	16	69.6
Work	Work	5	21.7	9	39.1
	Doesn't work	18	78.3	14	60.9
Education	Elementary School	2	8.7	4	17.4
	JUNIOR HIGH SCHOOL	6	26.1	4	17.4
	SENIOR HIGH SCHOOL	9	39.1	9	39.1
	College	6	26.1	6	26.1

Source: Processed Primary Data, 2024

According to Table 1, the characteristics of respondents by age indicate that the majority were in the 20-35 age range, with 73.9% in the intervention group and 87% in the control group. Most were also multigravida, with 73.9% in the intervention group and 69.6% in the control group. In terms of employment, 78.3% in the intervention group and 60.9% in the control group were unemployed. Regarding education, 39.1% of both groups had a high school education.

2. Frequency distribution of anxiety levels of mothers giving birth before being given lemon aromatherapy in the intervention group and control group

Table 2 Frequency distribution of anxiety levels of mothers giving birth before being given lemon aromatherapy in the intervention group and control group

Anxiety Level	Intervention Group (n:23)		Control Group (n:23)	
	N	%	N	%
Mild anxiety	-	-	-	-
Moderate anxiety	23	100	23	100
Severe anxiety	-	-	-	-

Source: Processed Primary Data, 2024

Based on table 2 above, the level of anxiety before being given lemon aromatherapy in the intervention group was 100% (23 respondents) and in the control group, 100% (23 respondents) were at a moderate level of anxiety.

3. Frequency distribution of maternal anxiety levels after being given lemon aromatherapy in the intervention group and control group.

Table 3 Frequency distribution of maternal anxiety levels after being given lemon aromatherapy in the intervention group and control group

Anxiety Level	Intervention Group (n:23)		Control Group (n:23)	
	N	%	N	%
Mild anxiety	18	78.3	13	56.5
Moderate anxiety	5	21.3	10	43.5
Severe anxiety	-	-	-	-

Source: Processed Primary Data, 2024

Based on table 3 above, the level of anxiety after being given lemon aromatherapy in the intervention group was 78.3% (18 respondents) and in the control group 56.5% (13 respondents) (56.5%) were at a mild level of anxiety.

4. The effect of lemon aromatherapy on the level of anxiety of mothers in labor before and after the intervention in the intervention and control groups.

Table 4 The effect of lemon aromatherapy on the level of anxiety of mothers in labor before and after the intervention in the intervention and control groups.

Variables		P-value
Intervention Group	Before	0,000
	After	
Control Group	Before	0,000
	After	

Source: Processed Primary Data, 2024

Based on Table 4 above, the McNemar test results obtained in the intervention group obtained a p-value of 0.000 (<0.05) and in the control group obtained a value of 0.000 (<0.05). Therefore, it is concluded that there is an effect of lemon aromatherapy on the level of anxiety of mothers giving birth in the first active phase.

5. Differences in the effectiveness of the anxiety levels of mothers giving birth in the first active phase between the intervention group and the control group.

Table 5 Differences in the effectiveness of the anxiety levels of mothers giving birth in the first active phase between the intervention group and the control group.

Anxiety Level	Intervention Group (n:23)		Control Group (n:23)		p-value
	N	%	N	%	
Mild anxiety	18	78.3	13	56.5	0.046
Moderate anxiety	5	21.7	10	43.5	
Severe anxiety	-	-	-	-	

Source: Processed Primary Data, 2024

Based on Table 5 above, the chi-square test results between the intervention and control groups obtained a p-value of 0.046 (<0.05). Therefore, it was concluded that there was a difference in the effectiveness of maternal anxiety levels during the active phase of the first stage of labor between the intervention and control groups.

DISCUSSION

1. Respondent characteristics

a. Age

The results showed that 73.9% of respondents aged 20-35 years in the intervention group (17 respondents), while the control group reached 87% (20 respondents). Age, measured from birth to birthday, influences an individual's knowledge; the older the person, the better their ability to absorb information. However, a small number of respondents lacked knowledge due to a lack of information and a lack of interest in reading among mothers.(Iswandari et al, 2023).

Pregnant women at risk are those aged under 20 or over 35 years, who have a higher chance of experiencing complications during pregnancy and childbirth.(Ratnaningtyas et al, 2023). This research aligns with Yasin et al.'s study, which found that two young mothers (<20 years old) experienced moderate anxiety and five individuals experienced severe anxiety. In the 20-35 age group, 17 individuals experienced mild anxiety and five individuals experienced moderate anxiety. Meanwhile, among mothers over 35 years old, only two individuals experienced mild anxiety. Pregnancy in young mothers tends to increase anxiety levels compared to older mothers.(Yasin et al, 2019).

Studies Sutrisminah et al (2021) showed a significant relationship between maternal age and anxiety during the active phase of labor. Marlina et al (2024) added that the ability to cope with anxiety is influenced by age, where older individuals tend to use more effective coping mechanisms than younger ones.

b. Parity

Parity data showed that 73.9% (17 respondents) of the intervention group and 69.6% (16 respondents) of the control group were multigravida. Parity refers to women who have given birth to a live fetus. Research shows that primigravida mothers tend to be more anxious than multigravida mothers, due to lack of experience and uncertainty during first-time childbirth, as well as fear from scary stories heard from friends or relatives.(Rohmin, 2020).

This research is in line with the study Dewi et al (2023). which found that 96% of respondents were multigravida. Sutrisminah, et al (2021) also showed a significant relationship between parity and maternal anxiety levels during childbirth, where 54% of primigravidas experienced moderate to severe anxiety, higher than multigravidas.

Other research shows a moderate relationship between parity and anxiety. The more frequently a mother has given birth, the lower her anxiety. Older and more educated pregnant

women may experience higher anxiety due to their lack of experience and the absence of family members during childbirth.(Setiawan, & Faiza, 2021).

c. Work

In the intervention group, 78.3% (18 respondents) and in the control group, 60.9% (14 respondents) were unemployed. Employment reflects economic activity and well-being. Research shows that working mothers have higher levels of knowledge than those who do not. According to Ningtyas et al (2024), work can be a cause of anxiety, where workload and feelings of incompetence can trigger individual anxiety.

This research is in line with Sari, (2022), which found that unemployed mothers tended to experience mild anxiety, while employed mothers experienced moderate anxiety. Statistical analysis showed a relationship between maternal employment status and levels of anxiety during childbirth, with the results of the hypothesis test indicating a significant and positive relationship, meaning that employed mothers were more likely to experience more severe anxiety.(Sari, 2022).

Individuals who are not engaged in work generally experience lower levels of stress than those who are employed, due to the pressures faced in the work environment. A lack of confidence in professional abilities or an inability to achieve optimal results can trigger anxiety in these individuals.(Ningtyas, et al, 2024).

d. Education

Based on educational status in the intervention and control groups, 39.1% of respondents (9 people) had a high school education. Knowledge is closely related to individual anxiety. Research shows that higher education improves understanding.Sumboko, et al, (2024)stated that there is a relationship between education and anxiety, because better education increases knowledge and reduces anxiety.

This research is in line with Sari, (2022), which found a significant negative relationship between education level and anxiety during childbirth. This means that the higher the education level, the lower the mother's anxiety. Education influences maternal anxiety related to the development of individual behavior and abilities.

2. Frequency distribution of maternal anxiety levels before being given lemon aromatherapy in the intervention group and control group

The results of the study showed that before the application of lemon aromatherapy, all respondents (23 people) in the intervention group and the control group experienced moderate levels of anxiety, with a percentage reaching 100%.

Amalia et al (2023) Anxiety is a feeling of discomfort and uncertainty experienced by individuals, often without a clear cause. This anxiety can negatively impact the mind and body, potentially leading to various physical ailments.

Maternal anxiety during labor can increase adrenaline secretion, which constricts blood vessels and reduces oxygen supply to the fetus. It also weakens uterine contractions, prolonging labor. Furthermore, there is increased ACTH secretion, which raises cortisol and blood sugar levels.(Aprina, et al, 2024).

This research is in line with Rahayu, (2023) who found that the level of maternal anxiety before the lemon aromatherapy intervention was mostly in the moderate category. Mahfud, et al (2025) explains that anxiety is a form of psychological distress, with feelings of worry and unease as a normal response to threat. Anxiety functions as a natural response to stress and a signal of threat and uncertainty.

3. Frequency distribution of maternal anxiety levels after being given lemon aromatherapy in the intervention group and control group

Based on the results of the study above, the level of anxiety after being given lemon aromatherapy in the intervention group was 78.3% (18 respondents) and in the control group 56.5% (13 respondents) were at a mild level of anxiety.

Aromatherapy, an ancient healing practice using aromatic plant extracts, aims to improve physical, mental, and spiritual health. For example, lemon (*Citrus limon*) aromatherapy. Inhaling the aroma for 20 minutes in psycho-aromatherapy can improve mood, promote relaxation, and promote positive memories.(Rahayu, 2023).

Lemon aromatherapy can be used through massage, bathing, diffuser, or on pillows.(Saras, 2023). Studies show that aromatherapy is safe and effective during pregnancy and childbirth.(Bertonee, 2021).

This research is supported by studies Grace (2023) found that maternal anxiety levels decreased after lemon aromatherapy intervention. Aromatherapy exerts positive effects through its pleasant scent, creating feelings of happiness and comfort. Lemon (*citrus limon*)

has been shown to be effective as an adjuvant therapy when combined with imipramine, accelerating improvement in symptoms of psychological distress. These findings provide empirical evidence supporting the effectiveness of aromatherapy for patients with anxiety. One component of lemon aromatherapy candles is linalool, which acts as a sedative. When the scent is inhaled, linalool stimulates receptors in the olfactory nerve, sending signals to the olfactory bulb. This bulb is connected to the limbic system, which receives information from hearing, sight, and smell. The amygdala and hippocampus in the limbic system are linked to scent; the hippocampus plays a role in the memory of aromatherapy scents. This information is relayed to the hypothalamus and raphe neurons, providing a calming effect and reducing anxiety during labor. (Agarwal et al, 2022).

4. The effect of lemon aromatherapy on the level of anxiety of mothers in labor before and after the intervention in the intervention and control groups.

Analysis using the McNemar test showed a p value of 0.000 in the intervention group and $p = 0.016$ in the control group, both <0.05 . This indicates a significant effect of lemon aromatherapy on maternal anxiety during the active phase, in line with research. (Nurlaili, et al (2024) who found lemon aromatherapy effective in reducing maternal anxiety.

Study (Salsabila (2020) showed that aromatherapy is effective as a complementary treatment to reduce anxiety during labor, both through inhalation and massage. (Roniati, et al (2021) also found a significant effect of lavender aromatherapy on reducing anxiety in mothers giving birth, with a p-value <0.05 .

Aromatherapy uses essential oils from plants as a therapeutic method. It works by stimulating the brain through inhalation, triggering emotional reactions such as calming, uplifting, and relaxation. Research by (Lalita, et al (2023) Studies have shown that aromatherapy can reduce anxiety and depression in high-risk pregnant women. Aromatherapy inhalation enters the brain's limbic system, which is located below the cerebral cortex. (Yana, et al., 2024).

Lemon aromatherapy can reduce anxiety thanks to the active components in its essential oil, particularly limonene. This compound has a refreshing aroma believed to have a relaxing effect, relieve stress, and improve mood. The refreshing scent of lemon also stimulates the parasympathetic nervous system, calming the stress response and promoting feelings of calm. (Nurlaili et al, 2024).

Limonene can improve mood with its aroma, which stimulates the release of neurotransmitters like serotonin and dopamine, making individuals feel happier and more optimistic. This compound also calms the nervous system, helping relieve anxiety and related physical symptoms, such as muscle tension and sleep disturbances. With its relaxing effects, limonene can reduce anxiety in stressful situations, promoting mental stability and better emotional control.(Nurlaili et al, 2024).

5. Differences in the effectiveness of maternal anxiety levels during the first active phase of labor between the intervention group and the control group.

Based on the results of the analysis using the chi square test, it shows that there is a significant difference in the effectiveness of the level of anxiety of mothers giving birth in the active phase of the first stage between the intervention group and the control group, with a p value = 0.046 which is smaller than 0.05.

Study Dewi, et al (2023)Studies have shown that lemon aromatherapy can significantly reduce maternal anxiety. Anxiety is a condition characterized by tension and worry due to a perceived threat that is not always clear, often triggered by new experiences, as opposed to fear.(Dewi et al, 2023).

Study Fuadiyah, et al (2023)Studies show that lemon aromatherapy can reduce anxiety in mothers. The inhaled lemon scent affects the olfactory nerves and hypothalamus, helping to restore emotions and calm the mind. Furthermore, lemon aromatherapy candles also provide relaxation to tense nerves.(Fuadiyah, et al 2023).

Maternal anxiety during labor can increase adrenaline secretion, which constricts blood vessels and reduces oxygen supply to the fetus. This decreased blood flow also weakens uterine contractions, prolonging labor. Furthermore, there is increased ACTH secretion, which raises cortisol and blood sugar levels.(Aprina, et al, 2024).

Therefore, lemon aromatherapy is given as an effort to reduce anxiety in mothers. Research conducted bySembiring, et al (2024)shows that aromatherapy, which utilizes essential oils or pure oil extracts, can contribute to improving or maintaining health, lifting spirits, and providing peace of mind and body.(Sembiring, et al, 2024).

Aromatherapy is an alternative medicine method that uses essential oils from plants. These essential oils have various effects, such as antiseptic, appetite stimulant, and blood circulation stimulation. Aromatherapy utilizes the scents of essential oils and candles for holistic healing, improving health and emotional well-being.(Sari, et al 2024).

CONCLUSION AND SUGGESTIONS

Based on the results of the study, the characteristics of the respondents showed that the age group of 20-35 years dominated the intervention group (73.9%) and the control group (87%). Most respondents in both groups were multigravida, with 73.9% in the intervention group and 69.6% in the control group. Many respondents in both groups were unemployed, and most had a high school education. Before lemon aromatherapy, all respondents had moderate anxiety. After aromatherapy, mild anxiety was seen in 78.3% in the intervention group and 56.5% in the control group, indicating a positive effect of lemon aromatherapy on maternal anxiety during labor.

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