



Administration Effect of Lemon Aroma Therapy on Pain Reduction with Women in the 1st Active Phase

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Abstract

Pain during labor is a natural process caused by cervical dilatation, hypoxia of the uterine muscles during contractions, ischemia of the uterine corpus, stretching of the lower uterine segment, and compression of the cervical nerves. If labor pain occurs pathologically, it can trigger complications in pregnancy, one of which is prolonged labor. Data from the World Health Organization (WHO) in 2020 show that the maternal mortality rate is still high, with 295,000 women dying due to complications during pregnancy and childbirth. Prolonged labor is one of the fifth causes of maternal death in the world, accounting for 8.5% of cases. Pain can be relieved pharmacologically and non-pharmacologically, with one non-pharmacological method being lemon aromatherapy. This study aims to determine the effect of lemon aromatherapy on reducing pain intensity in the active phase of the first stage of labor at Painan Hospital in 2023. This research used a quasi-experimental design with a non-equivalent control group pretest-posttest. The study was conducted in July 2023, using both primary and secondary data. The sample consisted of 30 respondents selected through total sampling techniques. Data analysis was performed using Wilcoxon and Mann-Whitney non-parametric statistical analysis techniques. The results of the study showed that most participants in the intervention group experienced controlled severe pain before and after the intervention, while the control group mostly experienced moderate pain before the intervention and uncontrolled severe pain after the intervention. The Mann-Whitney test indicated a significant difference in pain intensity between the intervention and control groups, with a p-value of $0.000 < \alpha (0.05)$, leading to the rejection of the null hypothesis. The researchers recommend that health services provide support to mothers experiencing pain during labor to ensure a comfortable birthing process.

Keywords: Labor pain, lemon aromatherapy, active phase

Introduction

Labor pain begins to appear in the first stage of the latent phase and lasts until the active phase. In primiparas, the first stage of labor can last 20 hours, while in multiparas, it lasts 14 hours. Pain is caused by uterine contractions and cervical dilatation. The longer the pain is felt, the stronger it will be; the peak of the pain occurs in the active phase (Zhou et al., 2023). Labor pain is a combination of physical pain due to myometrial contractions accompanied by stretching of the lower uterine segment, which combines with the mother's psychological condition during labor, namely anxiety, fatigue, and worry, which can exacerbate existing physical pain. (Pujiati, 2019).

If labor pain occurs pathologically, it can trigger complications in pregnancy, one of which is prolonged labor. According to data from the World Health Organization (WHO) in 2020, the maternal mortality rate is still high, with 295,000 women dying due to complications during pregnancy and childbirth. Prolonged labor is known to be one of the top 5 causes of maternal death in the world, accounting for 8.5% of cases. In Indonesia, based on data from the Indonesian Ministry of Health, prolonged labor is ranked 3rd, following bleeding at 17.21% and shock at 7.32%, with prolonged labor at 4.3%. The 2020 Ministry of Health report indicates that prolonged labor can be triggered by various factors, including abnormal contractions (43.6%), large fetuses (22.32%), malformed presentations (20.67%), and other factors (13.41%) such as cervical abnormalities and narrow pelvis. (Kemenkes, 2020).

The problem of pain during labor can be triggered by many factors, including physical factors such as the position and size of the baby, as well as the mother's condition (AL-ataby & Talib, 2022). Additionally, the mother's activity pattern during pregnancy, such as inadequate exercise leading to improper uterine muscle function, can also influence labor pain. Psychological factors, such as maternal anxiety during childbirth, can also play a role. This is especially true for first-time mothers (primigravida) who lack experience from previous births. (Jannah, 2018).

The mother's anxiety about giving birth can disturb her psychology and have an impact on uterine contractions, leading to prolonged labor (Yang et al., 2020). Effective delivery management can be achieved through both non-pharmacological and pharmacological interventions. Non-pharmacological approaches to address complications during labor include providing aromatherapy, which can offer comfort to the mother and help manage pain. (Jannah, 2018).

One aromatherapy that can be used is lemon essential oil (Kim et al., 2022). Giving lemon aromatherapy essential oil given by inhalation is believed to be more effective in helping reduce the intensity of pain in mothers giving birth. Lemon inhalation aromatherapy can reduce labor pain during the first active phase because the lemon aroma therapy given by inhalation can be captured directly by the receptors in the nose, then provide further information because the brain controls emotions and memory and provides information to the hypothalamus which is the regulator of the internal system, body, affecting a person's psychological condition (Cholifah, 2016).

Literature Review

Aromatherapy can be administered through inhalation. This method allows for quicker absorption and a more potent effect as the essential oils are directly inhaled through the nose and transmitted to the brain's limbic system. Human sense of smell is highly sensitive, with a sharpness that can be up to 10,000 times stronger than taste (Siregar et al., 2022). Therefore, inhalation therapy can have a powerful impact on the sensory organs through which the active ingredients of essential oils pass. This therapy is particularly beneficial for treating and alleviating various conditions related to the body. Inhalation aromatherapy is especially effective in reducing pain in mothers during childbirth, as it is quickly administered and takes only a few minutes. (Widyarto, 2015).

One aromatherapy that can be used is lemon essential oil. Lemon aromatherapy essential oil, when inhaled, is believed to be more effective in helping reduce the intensity of pain in mothers giving birth. Lemon inhalation aromatherapy can reduce labor pain during the first active phase because the lemon aroma therapy (Anggraini et al., 2022), when inhaled, can be directly captured by the receptors in the nose. This information is then relayed to the brain, which controls emotions and memory, and provides information to the hypothalamus, the regulator of the body's internal system, affecting a person's psychological condition. In addition, lemon aromatherapy contains limonene, which can inhibit prostaglandins and reduce pain during labor (Novita et al., 2023). Limonene controls cyclooxygenase I and II, preventing prostaglandin activity and reducing pain. The fragrance produced by lemon aromatherapy stimulates the thalamus to activate the release of neurotransmitters such as enkephalin, serotonin, and endorphins, which function as natural pain relievers. Enkephalin is a neuromodulator that inhibits physiological pain. (Cholifah, 2016).

This research is supported by the results of research conducted by Cholifah & Raden (2016), which stated that the reduction in pain intensity in clients during the 1st active phase showed that the average labor pain in the group given aromatherapy was $4.74 + 1.327$ lower than the control group, which was $5.79 + 1.316$. The Mann-Whitney test results showed $p = 0.001$, which is less than 0.05. The external variable that influences labor pain is anxiety, with a p-value of <0.05 .

The same research was also conducted by Monisye Lesawengen in 2019 regarding the effect of giving lemon aromatherapy on reducing the intensity of labor pain in the 1st stage of the active phase in primigravida mothers in independent practice midwives (BPM) in the Batu Aji Community Health Center working area. The study stated that the average score for the intensity of labor pain in the control group, when not given lemon aromatherapy, was 1.60 out of 30 respondents. In contrast, the average intensity of labor pain in the experimental group, when given lemon aromatherapy, was 0.50 out of 30 respondents. This resulted in a decrease in the average pain intensity of 1.1, calculated as the difference between the two groups. Further analysis revealed a p-value of 0.000 ($p < 0.05$), indicating a significant difference between the mean scores of giving lemon aromatherapy to reduce the intensity of labor pain in the experimental group and the control group. Therefore, it can be concluded that the pain intensity in the experimental group was lower than in the control group.

Research Method

The type of research used in this study is a quasi-experiment using a non-equivalent control group pretest and posttest research design. The research will involve two groups: the first group will receive lemon aromatherapy (intervention group), while the second group will not receive lemon aromatherapy (control group). The research was conducted from July to August 2023 at Painan Regional Hospital in Pesisir Selatan Regency. The population for this study included all mothers who gave birth in the birthing room of Painan Regional Hospital, totaling 30 individuals in July and August. Samples were selected using a total population technique, resulting in 30 samples. Data analysis was performed using Wilcoxon and Mann-Whitney non-parametric statistical analysis techniques.

Results

1. Univariate analysis

Frequency Distribution of Pain Intensity Before and After Lemon Aromatherapy at Painan Regional Hospital in 2023

	Before (<i>Pre</i>)		After (<i>Post</i>)	
	F	%	F	%
Intervention Group				
Moderate Pain	4	26,7	12	80
Controlled Severe Pain	11	73,3	3	20
Control Group				
Mild Pain	4	26,7	0	0
Moderate Pain	6	40	1	6,7
Controlled Severe Pain	5	33,4	12	80
Severe Uncontrolled Pain	0	0	2	13,4

Based on the table above, it can be seen that in the intervention group, before being given lemon aromatherapy, the majority had controlled severe pain intensity, namely 11 people (73.3%), and after being given lemon aromatherapy, the majority were in the moderate pain intensity category, namely 12 people (80%). Meanwhile, in the control group, before the intervention period, the majority had moderate pain intensity, namely 6 people (40%), and after the intervention period, the majority were in the severe pain intensity category, namely 12 people (80%).

2. Bivariate Analysis

- a. Pain Intensity Before and After Giving Lemon Aromatherapy to the Intervention Group

Wilcoxon Test of Pain Intensity Before and After Giving Lemon Aromatherapy to the Intervention Group at Painan Regional Hospital Year 2023

Intervention Group	Mean	SD	Min	Max	P
Before Intervention	6,80	0,775	5	8	0,003
After Intervention	5,67	0,900	4	7	

Based on the table above, it can be seen that the average pain intensity in the intervention group before receiving lemon aromatherapy was 6.80, whereas after receiving aromatherapy, the average pain intensity was 5.67, resulting in a decrease in pain intensity of 1.13 points. The Wilcoxon test yielded a p-value of 0.003 ($\alpha < 0.05$), indicating that there was a statistically significant difference in the intensity of pain between before and after receiving lemon aromatherapy in the intervention group. It can be concluded that there was a decrease in the intensity of labor pain in the group that received lemon aromatherapy.

b. Pain Intensity Before and After Giving Lemon Aromatherapy to the Control Group

Wilcoxon Test of Pain Intensity Before and After Giving Lemon Aromatherapy to the Control Group at Painan Regional Hospital Year 2023

Control Group	Mean	SD	Min	Max	P
Before Intervention	5,47	1,922	3	8	0,001
After Intervention	7,60	1,352	5	10	

Based on the table above, it can be seen that the average pain intensity in the control group before the intervention period was 5.47, while after the intervention period, the average pain intensity was 7.60, resulting in an increase in pain intensity of 2.13 points. The Wilcoxon test produced a p-value of 0.001 ($\alpha < 0.05$), concluding that statistically, there was a significant difference in the intensity of pain between before the intervention period and after the intervention period in the control group. It can be concluded that there was an increase in the intensity of labor pain during the first active phase in the group that was not given lemon aromatherapy.

c. Differences in Pain Intensity Before Intervention in the Intervention Group and Control Group

Differences in Changes in Pain Intensity Before Intervention Between the Intervention Group and Control Group at Painan Regional Hospital in 2023

Pain Intensity Before Intervention							
	Mean	Media n	SD	Min	Max	Mean Rank	P
Control	5,47	6,00	1,922	3-8	8	12,50	0,054
Intervention	6,80	7,00	0,775	5-8	8	18,50	

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Based on the table above, it can be seen that the P-value = 0.054 ($\alpha > 0.05$). The mean rank of pain intensity in the control group was 12.50, which is smaller than the mean rank of pain intensity in the intervention group of 18.50. Therefore, it was concluded that there was no difference in pain between the control group and the intervention group before being given lemon aromatherapy.

d. Differences in Pain Intensity After Intervention Between the Intervention Group and Control Group

Differences in Changes in Pain Intensity After Intervention in the Intervention Group and Control Group at Painan Regional Hospital in 2023

Pain Intensity After Intervention							<i>P</i>
	Mean	Median	SD	Min	Max	Mean Rank	
Control	7,60	7,00	1,352	5	10	21,37	0,000
Intervention	5,67	6,00	0,900	4	7	9,63	

Based on the table, it can be seen that there is a difference in changes in pain intensity after intervention between the intervention group and the control group, with a mean difference of 1.93 points. The mean rank of pain intensity in the intervention group was 9.63, which is smaller than the mean rank of pain intensity in the control group, which was 21.37. The results of the Mann-Whitney test yielded a P-value of 0.000 ($\alpha < 0.05$). Therefore, it was concluded that there was a significant difference in changes in pain between the control group and the intervention group after being given lemon aromatherapy.

Discussion

Lemon aromatherapy has an effect on the intensity of labor pain in the first stage of the active phase, as evidenced by a difference in the average pain intensity of mothers in labor measured by behavioral observation sheets and the Bourbanis scale. It is evident that the pain intensity after intervention in the intervention group, with a value of 9.63, was lower than that after intervention in the control group, with a value of 21.37. The results of the Mann-Whitney test indicate a significant difference in pain intensity after intervention between the intervention group and the control group, with a p-value of 0.000.

These findings align with a study by Cholifah & Raden (2016), which reported a reduction in pain intensity during the 1st active phase in clients receiving aromatherapy compared to the control group. The average labor pain in the aromatherapy group was $4.74 + 1.327$, lower than the control group's $5.79 + 1.316$. The Mann-Whitney test results showed a p-value of $0.001 < 0.05$. An external variable that influences labor pain is anxiety, with a p-value < 0.05 .

Aromatherapy can be administered through inhalation, which allows for quicker

absorption and a more direct effect as the aroma is inhaled through the nose and transmitted to the brain's limbic system. The sense of smell in humans is highly sensitive, making inhalation therapy effective in treating various conditions. Lemon essential oil is a suitable option for aromatherapy, as it can help reduce pain during childbirth.

Lemon aromatherapy contains limonene, which inhibits prostaglandins and reduces pain during labor by controlling cyclooxygenase I and II. The fragrance of lemon aromatherapy stimulates the release of neurotransmitters like encephaline, serotonin, and endorphins, which act as natural pain relievers.

The application of lemon aromatherapy during labor is believed to lower the level of labor pain by reducing anxiety and fear, controlling pain sensation during contractions, and increasing endorphin and epinephrine levels in the body. This holistic approach can contribute to a more comfortable childbirth experience for mothers.

Conclusion

Based on the results of the research and discussion, it can be concluded that inhaling lemon aromatherapy has an effect on reducing labor pain during the first active phase in mothers giving birth. Health workers, especially midwives, are recommended to consider aromatherapy as a complementary therapy for labor pain management. Additionally, it is hoped that future research can be conducted with a larger number of respondents, using either the same or different methods.

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