

Lavandula angustifolia aromatherapy to accelerate the duration of labor

Aromaterapi Lavandula Angustifolia untuk Mempercepat Durasi Persalinan

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ABSTRACT

Background: Prolonged labor is one of the causes of maternal and neonatal mortality. Lavandula angustifolia aromatherapy has the potential to increase labor duration.

Objective: This study aimed to analyze the effect of Lavandula angustifolia aromatherapy on the duration of the first stage of active labor.

Methods: This type of research was quantitative with a posttest-only design with a control group, using simple random sampling. The study was conducted from May to July 2023 at Kediri City Hospital with a sample size of 60 participants giving birth in the active phase at Kediri City Hospital, with an intervention group of n = 30 and a control group of n = 30. In the intervention group, respondents were given Lavandula angustifolia aromatherapy through inhalation during the active phase of labor, accompanied by standard care according to hospital procedures. In the control group, respondents only received standard care. Duration assessment was carried out from 4-10 cm dilation.

Results: The results were tested using a t-test, showing that the average duration of labor in the intervention group VS the control group was m = 292.50 (13,975) minutes versus m = 374.70 (16,572) minutes with a p value of 0.000.

Conclusion: The results of this study indicate that the duration of the first stage of active labor in the intervention group was shorter than that of the control group after administration of Lavandula Angustifolia Aromatherapy. This study can be a recommendation for midwives to provide Lavandula Angustifolia Aromatherapy as a safe and effective intervention in accelerating the duration of labor.

Keywords: duration, Lavandula angustifolia aromatherapy, labor

ABSTRAK

Latar Belakang: Persalinan lama merupakan salah satu penyebab kematian ibu dan bayi baru lahir. Pemberian Aromaterapi Lavandula Angustifolia memiliki potensi untuk meningkatkan durasi persalinan.

Tujuan: Penelitian ini bertujuan untuk menganalisis pengaruh Aromaterapi Lavandula Angustifolia terhadap durasi kala I fase aktif persalinan.

Metode: Jenis penelitian ini adalah kuantitatif dengan desain posttest only with control group, menggunakan simple random sampling. Penelitian dilaksanakan pada Mei-Juli 2023 di Rumah Sakit Kota Kediri dengan besar sampel sebanyak 60 partisipan ibu melahirkan fase aktif di rumah sakit Kota Kediri dengan kelompok intervensi n=30 dan kelompok kontrol n=30. Pada kelompok intervensi, responden diberikan aromaterapi Lavandula angustifolia melalui inhalasi selama fase aktif persalinan, disertai dengan perawatan standar sesuai prosedur rumah sakit. Pada kelompok kontrol, responden hanya mendapatkan perawatan standar. Penilaian durasi dilakukan sejak pembukaan 4-10 cm.

Hasil: Hasil di uji dengan t-test, menunjukkan bahwa rerata durasi persalinan kelompok intervensi VS kelompok kontrol yaitu $m= 292.50 (13.975)$ menit versus $m=374.70 (16.572)$ menit dengan p-value 0,000.

Kesimpulan: Durasi kala I fase aktif persalinan pada kelompok intervensi lebih pendek dibanding kelompok kontrol setelah pemberian Aromaterapi *Lavandula Angustifolia*. Penelitian ini dapat menjadi rekomendasi bagi bidan untuk memberikan Aromaterapi *Lavandula Angustifolia* sebagai intervensi yang aman dan efektif dalam mempercepat durasi persalinan.

Kata kunci: aromaterapi *Lavandula angustifolia*, durasi, persalinan

INTRODUCTION

Prolonged labor in primiparous women is characterized by the first active phase lasting more than six hours.¹ The labor process is divided into four stages, with the first stage consisting of the latent phase and the active phase.² According to the World Health Organization (WHO), the global incidence of prolonged labor is estimated at approximately 17% of all deliveries. Factors contributing to prolonged labor include fetal macrosomia, a narrow birth canal, an imbalance between the maternal pelvis and the fetal head that inhibits fetal descent, and inadequate uterine contractions. Labor duration is associated with psychological factors such as anxiety, stress, and fear experienced during labor.³ Contractile dysfunction, particularly during the first and second stages, is also a common cause of prolonged labor, leading to increased labor duration.⁴ Other consequences of anxiety are increased perception of pain during labor, muscle tension, and maternal fatigue, all of which contribute to an increased risk of prolonged labor.⁵

Childbirth involves a wide range of experiences, including pain, emotional stress, vulnerability, potential physical injury, role changes, and the acceptance of new responsibilities. Labor pain is a multifactorial phenomenon influenced by both physiological and psychological factors.⁶ Uterine contractions and cervical dilation are the primary physiological drivers, while maternal anxiety and fear contribute to the experience of pain.⁷ Physical pain that occurs during labor reveals the labor process as the most severe pain in the normal course of a woman's life.⁸

Prolonged labor has the potential to increase adverse outcomes for both mother and newborn. Associated risks include longer hospital stays, lower neonatal Apgar scores, the need for admission to the Neonatal Intensive Care Unit (NICU) for respiratory support, and an increased likelihood of cesarean delivery.⁹ Given the high risk of maternal morbidity and perinatal asphyxia, interventions that accelerate the progression of labor are often considered.¹⁰ Although labor pain management is crucial in obstetrics, there is still a lack of standard, side-effect-free analgesic strategies.¹¹ Current approaches to labor pain relief largely fall into two categories: pharmacological and non-pharmacological interventions.¹² Pharmacological methods use analgesia but often carry potential risks for both mother and fetus. Conversely, non-pharmacological techniques, while generally well tolerated, can provide varying degrees of pain relief.¹³ Currently, non-pharmacological methods are preferred in labor pain management.¹⁴ Longer labor duration, particularly the duration of the active phase of the first stage of labor, has been associated with traditional epidural methods. Non-pharmacological techniques that can be used include massage, acupressure, reflexology, acupuncture, aromatherapy, breathing exercises, and several other approaches.¹⁵

Aromatherapy is a non-pharmacological treatment method that is easy to implement and use. It uses essential oils obtained from flowers, bark, stems, leaves, roots, fruits, and other plant parts to treat illnesses or reduce symptoms through inhalation, topical application, or bathing.¹⁶ Based on previous research findings, there was a significant difference in the duration of the active phase of the first stage of labor between the

aromatherapy group and the control group. The calming and antianxiolytic effects of aromatherapy are believed to contribute to shorter labor duration. Aromatherapy helps interrupt the pain-spasm-anxiety cycle, allowing uterine contractions to occur more physiologically. Studies also show that linalool in *Lavandula angustifolia* exerts analgesic and antispasmodic effects on smooth muscle.¹⁷

There is still little research on this topic in terms of speeding up delivery times. This is why this study was designed with the aim of analyzing the effect of *Lavandula angustifolia* aromatherapy on the duration of the active phase of the first stage of labor.

METHODS

Study design

This study employed a quantitative approach with a posttest-only design with a control group (posttest-only comparison of labor duration between groups). The study aimed to assess the effect of *Lavandula angustifolia* aromatherapy on the progression of cervical dilatation in women during the active phase of the first stage of labor. This study was conducted from May to July 2023. In the intervention group, cervical dilatation was assessed through vaginal examination performed by the attending midwife. *Lavandula angustifolia* aromatherapy was administered to the intervention group through inhalation for 30 minutes. In addition to receiving aromatherapy, the intervention group also received standard care according to hospital procedures. The control group only received standard care from the hospital. The primary outcome of this study was specifically defined as the time required from 4 to 10 cm cervical dilation. Posttest assessments were conducted when the cervical dilation was 10 cm in both groups.

In the control group, laboring women did not receive aromatherapy but were provided with standard care consisting of a left lateral position, with cervical dilatation assessment and time interval recording conducted using the same procedures as in the intervention group.

Data source and sampling procedures

Using primary data, the research was carried out at a hospital in Kediri City. Sixty pregnant women who met the inclusion criteria were recruited as study participants. The participants were then allocated into an intervention group (n = 30) and a control group (n = 30). Simple random sampling was used in this study.

It was decided at the start of the study that each group should have no more than 30 participants based on a power analysis that was performed within a 95% confidence interval and with an error margin of 0.05.

$$N = n2 = \frac{2\delta (z1 - \alpha + z1 - \beta)^2}{2a}$$

$$N = n2 = \frac{2.3,8^2 (1,96 - 2,33)^2}{2a}$$

$$n2 = 27,4 \rightarrow 30$$

The inclusion criteria in this study were primigravida and multigravida women undergoing vaginal delivery, gestational age of 37- 42 weeks, singleton pregnancy, cervical dilatation of up to 4 cm, and willingness to receive *Lavandula angustifolia* aromatherapy. The exclusion criteria included women who did not complete the intervention and those who delivered by cesarean section. Duration of labor is the length of time from the onset of labor to the birth of the baby and the expulsion of the placenta, which is divided into several stages of labor. The latent phase (from contractions to 4 cm cervical dilatation) and the active phase (from 4 cm to 10 cm) comprise the first stage. The second stage lasts from full dilation to the birth of the baby, and the third stage

begins after the baby is born and continues until the placenta is expelled. In this study, labor duration focused on the active phase, from 4 cm cervical to 10 cm dilation.¹⁸

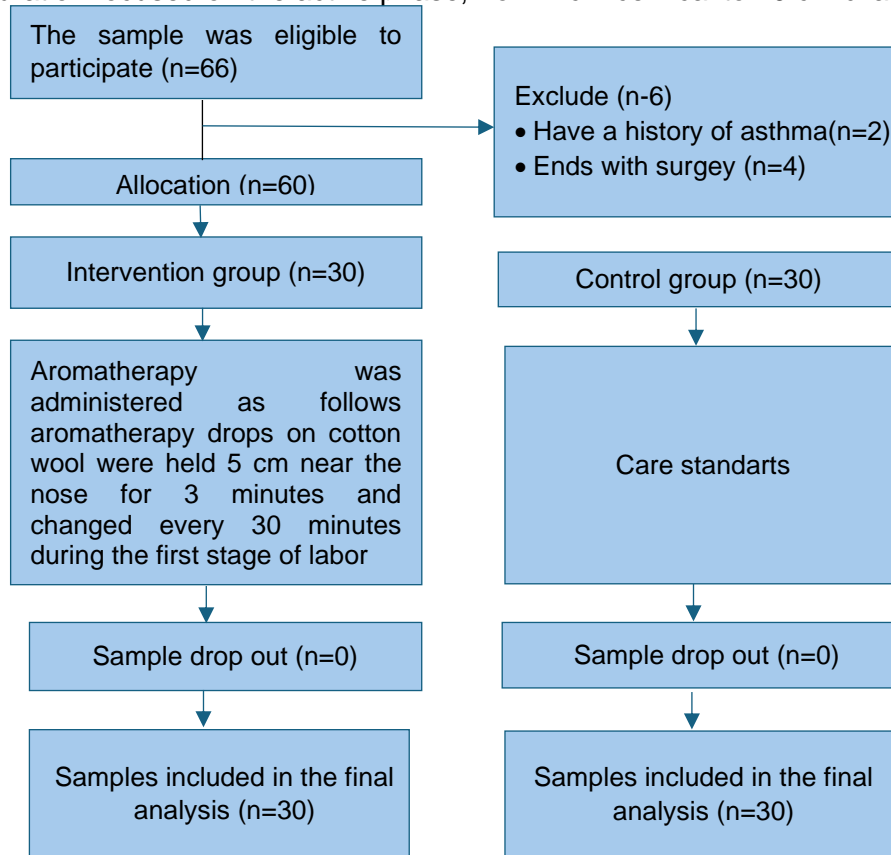


Figure 1. Research Consort

Variable of study

The variables studied in this research included the administration of *Lavandula angustifolia* aromatherapy as the independent variable and the duration of labor progression during the active phase of the first stage of labor, specifically from 4 cm to 10 cm cervical dilatation, as the dependent variable. In addition, participant characteristics analyzed in this study included age, occupation, highest level of education, and parity.

Data collection

Data collection was conducted among women giving birth in the hospital, with a total of 60 participants, consisting of an intervention group (n=30) and a control group (n=30). After that, the researchers gained informed consent as evidence of participation after outlining the study's goals, advantages, and methods. Before administering the intervention, the researchers performed a vaginal examination. The requirement for participants to receive the aromatherapy intervention was that they had experienced 4 cm of dilation, as did the control group. The intervention group received *Lavandula angustifolia* aromatherapy. The aromatherapy dose of *Lavandula angustifolia* was 1:10, 1 drop of aromatherapy mixed with 10 drops of water. Aromatherapy was administered as follows: aromatherapy drops on cotton wool were held 5 cm near the nose for 3 minutes and changed every 30 minutes during the first stage of labor. This was repeated throughout the three stages of labor until the end of the first stage. Researchers then performed another vaginal examination at full dilation (10 cm). The researchers then calculated the duration of labor from 4 to 10 cm dilation.

Measurement and instrument

The instrument used to evaluate labor progress was the partograph.¹⁹ The partograph is a standardized tool for assessing labor progress. The partograph or partogram has been established as the “gold standard” labor monitoring tool universally. It has been recommended by the World Health Organization (WHO) for use in active labor. It is a graphical representation that begins with the active stage of labor and enables thorough tracking of the duration, process, and early identification of anomalous occurrences.

Ethical considerations

The foundation for ethical approval is comprised of six core research principles: beneficence and nonmaleficence, fidelity and responsibility, integrity, justice, and respect for human rights and dignity. Additionally, ethical clearance is defined as written ethical approval granted by a research ethics committee for studies involving living subjects. Ethical approval for this study was granted by the Ethics Committee of the Politeknik Kesehatan Kemenkes Malang through a recommendation letter No. DP.04.03/F.XXI.31/959/2023.

Data analysis

To ascertain whether the data were normally distributed, the Shapiro-Wilk test was used for normality testing. The independent test was used to evaluate homogeneity. Univariate analysis was used to describe each variable. In this study, the analyzed data included age, occupation, highest level of education, and parity. Bivariate analysis was conducted when two variables were analyzed simultaneously. The statistical tests used in this study were the paired sample t-test, and differences between the two groups were analyzed using the independent sample t-test. Data analysis was performed using SPSS version 26.0.

RESULTS

Tabel 1. Distribution of Participant Characteristics

Characteristics	Group				Test statistic	p-value
	Intervention (n=30)		Control (n=30)			
	n/M	%/SD	n/M	%/SD		
Age	26,90	2,218	27,23	2,046	t(58)=0,342	0,548 ^a
Education Level					Z=-0,167	0,868 ^b
Primary school	8	26,7%	9	30%		
Secondary school	15	50%	12	40%		
High School	7	23,3%	9	30%		
Employment Status					X ² (4)	0,439 ^c
Employed	10	33,3%	15	50%		
Unemployed	20	66,7%	15	50%		
Parity					X ² (1)	0,098 ^c
Primigravida	18	60%	17	56,7%		
Multigravida	12	40%	13	43,3%		
Perceived income level					Z=-0,520	0,603 ^b
Income is lower than expenses	8	26,7%	8	26,7%		
Income equals expenses	17	56,7%	12	40%		
Income is higher than expenses	5	16,6%	10	33,3%		

Description : ^a = independent t-test (age), ^b = Mann Whitney, Education level, perceived income level), ^c = chi square (employment, parity)

Table 1 presents the general characteristics of the participants, including age, highest educational level, occupation, and parity. This study involved 60 participants in total, 30 of whom were in the intervention group and 30 of whom were in the control group. According to the table, the intervention group's mean age was 26.90 years, whereas the control group's mean age was 27.23 years. In terms of education level, the majority of

participants had secondary school education in the intervention group (15 participants (50%) and the control group (12 participants (40%)). Meanwhile, in terms of employment, the majority were unemployed in the intervention group (20 participants (66.7%) and the control group between working and not working was balanced at 15 participants (50%). Based on parity, the majority of primigravida in the intervention group were 18 participants (60%) and the control group were 17 participants (56.7%), while for perceived income level, the majority of income equals expenses in the intervention group were 17 participants (56.7%) and in the control group were 12 participants (40%). Participant characteristic data tested using Shapiro Wilk showed normally distributed data p value 0,548 ($p > 0,05$).

Table 2. Differences in the duration of the first stage of the active phase in the two groups (posttest)

Variable	Group		df	p-value
	Intervention Mean ± SD	Control Mean ± SD		
The duration of the first stage of the active phase (min)	292,50 ± 13,975	374,70 ± 16,572	58	< 0,000

Description: Independent sample t-test

Table 2 shows that the duration of active phase labor in the intervention group was shorter compared to the control group, with a mean of 292.50 ± 13.975 minutes versus 374.70 ± 16.572 minutes, with a p value of 0.000, indicating a statistically significant difference between the two groups. The intervention group experienced a shorter duration of active phase labor compared to the control group after receiving *Lavandula angustifolia* aromatherapy.

DISCUSSION

During data collection, no participants dropped out. A total of 60 participants were included in the intervention group (n=30) and the control group (n=30). Respondent characteristics were based on their highest educational level. The majority of both the control and intervention groups attended secondary school. According to earlier studies, moms with lower levels of education are more likely to have protracted labor, which increases the risk of hypoxia in the newborn. According to parity, the participants in both groups were primigravida. According to earlier studies, first-time mothers' labors last longer than those of mothers who have given birth before. This is because primigravida mothers are fearful of pain during labor and are more likely to experience problems during labor. Table 2 shows that the duration of active phase labor in the intervention group was shorter compared to the control group with a m= 292.50 ± 13.975 minutes versus m=374.70 ± 16.572 minutes, with a p < 0.001. The intervention group receiving *lavandula angustifolia*.

Compared to the control group, aromatherapy had a shorter average labor duration. This is due to *Lavandula Angustifolia* Aromatherapy's ability to help laboring women' physical and mental health. While it can alleviate physical pain, it can also quiet the mind, ease stress and anxiety, and provide laboring moms peace of mind, which will give them the energy they need to push through labor. *Lavandula Angustifolia* aromatherapy helps birthing mothers relax by stimulating the brain to reduce discomfort.

Theoretically, labor will proceed more swiftly for multigravida mothers once they reach the active phase. The partograph predicts that cervical dilatation will rise by 1 cm every hour. Premature birth, extended labor, and the potential for low birth weight are all consequences of anxiety and depression in expectant moms.

It can be concluded that the length of the initial active phase is shortened after *Lavandula Angustifolia* aromatherapy intervention is given to laboring mothers. The

findings of this investigation into the use of *Lavandula angustifolia* aromatherapy align with a study that used 102 participants split into three groups: Group 1 breathed in Aromatherapy with *Lavandula Angustifolia*, massage therapy with *Lavandula Angustifolia* Aromatherapy oil, and a control group (Group 3) were all included. According to the study's findings, laboring mothers can effectively reduce their labor discomfort by receiving massages and inhaling aromatherapy oil of *Lavandula angustifolia*. During the first stage of labor, massage and inhalation therapy help moms cope with the discomfort without experiencing any negative side effects. Anxiety during pregnancy and labor increases pain intensity and reduces a mother's ability to cope. The most common cause of anxiety is fear of childbirth, which can lead to prolonged labor, causing harm to both mother and fetus. This anxiety can be reduced with proper training.²² Aromatherapy is known to have benefits in improving psychological and physical well-being.²⁰ Aromatherapy molecules are converted into neural signals in the olfactory system, amygdala, and limbic system, thus producing therapeutic effects through the release of various neurotransmitters such as enkephalins, endorphins, and serotonin.²¹ Several studies have shown that *Lavandula angustifolia* aromatherapy can be used to reduce anxiety and pain in women during labor.²²

Aromatherapy can shorten the duration of labor because the scent stimulation inhaled by the mother activates the limbic system, causing relaxation and reducing anxiety, which in turn reduces the activity of the sympathetic nervous system and stress hormone levels (catecholamines); this decrease in catecholamines reduces the resistance to the release and action of oxytocin, improves uteroplacental blood flow, and makes uterine contractions more effective, coordinated, and adequate, so that the progress of cervical dilation and fetal descent takes place more optimally and ultimately contributes to shortening the duration of labor.²³ This effect is attributed to the presence of linalool and linalyl acetate in *Lavandula angustifolia*, where linalyl acetate exhibits mild effects. The narcotic effect and linalool act as a sedative.²⁴ By reducing labor pain, women feel more comfortable during labor and the duration of labor becomes shorter.

Strengths include the presence of a control group and the absence of participant dropout during data collection. The study's weaknesses include the lack of a randomized controlled trial, small sample size, and variation in gravida. Some potential biases include: Selection bias: The study was conducted only in a hospital, which potentially results in a higher number of referrals compared to independent midwife practices or community health centers. Given the researcher's time constraints and the greater availability of participants at the hospital, the study was conducted in a hospital. Performance bias occurred because the researcher paid more attention to participants receiving the intervention than to the control group. To address this, the researcher was accompanied by an enumerator. An unaddressed confounding factor was: women in labor experienced anxiety about their labor, which affected the duration of labor. The implications of this study are the context in which aromatherapy is used in midwifery practice, as an adjunct intervention, or as part of standard maternity care.

CONCLUSION

Our study concluded that the duration of the active phase of the first stage of labor was shorter after *Lavandula angustifolia* aromatherapy was administered to the intervention group compared to the control group. This is likely due to reduced pain during labor, resulting in greater maternal comfort, resulting in shorter labor duration. It is expected that *Lavandula angustifolia* aromatherapy intervention can serve as an alternative for midwives in providing non-pharmacological midwifery care during labor to shorten the duration of the active phase of the first stage of labor in laboring mothers.

Future studies are recommended to use randomized controlled trials with larger samples and assess other aspects of the benefits of *Lavandula angustifolia* aromatherapy.

ACKNOWLEDGEMENT

We would like to thank the participants who were willing to participate in this research until completion.

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