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EFFECTIVENESS OF LAVENDER AROMATHERAPY BY INHALATION AND MASSAGE ON REDUCING PAIN IN THE ACTIVE PHASE OF 1ST STAGE LABOR

Amelia Zisca Devy[1], Raden Maria Veronika Widia Trilupi [2]
[1.2]Faculty of Health Sciences, Institute of Technology, Science and Health, Dr. Soepraoen Hospital, Malang, Indonesia
e-mail correspondent*:ameliaziscadevy@gmail.com* and mariawidia@itsk-soepraoen.ac.id

ABSTRACT

Background: Lavender aromatherapy is a widely used non-pharmacological method to help reduce labor pain. The linalool and linalyl acetate in lavender have relaxing and analgesic effects that can reduce pain perception. However, clinical evidence based on controlled experimental designs is still needed.
Objective: To determine the effectiveness of lavender aromatherapy in reducing the intensity of labor pain in mothers giving birth in the first active phase. Method: The study used a randomized controlled trial design with two groups, involving 20 women who met the inclusion criteria. The intervention group (n=10) was given lavender aromatherapy inhalation for 20 minutes accompanied by lumbosacral massage using the effleurage technique, while the control group (n=10) received standard care without aromatherapy. Pain intensity was measured using the Numerical Rating Scale (NRS) before and after the intervention. Analysis was performed using paired t-tests and independent t-tests with a significance level of 0.05. Results: The lavender group experienced a 3.4-point reduction in pain, significantly higher than the control group, which only experienced a 0.9-point reduction. The difference in pain reduction between groups was statistically significant ($p < 0.001$). The duration of the active phase of the first stage of labor was also shorter in the lavender group ($p = 0.012$). Conclusion: Lavender aromatherapy effectively reduces the intensity of labor pain and helps shorten the duration of the active phase of the first stage of labor. This method can be recommended as a complementary intervention in labor pain management.

Keywords: Lavender Aromatherapy; Labor Pain; First Stage; Pain Management; Non-Pharmacological Interventions.

INTRODUCTION

Labor is a physiological process often accompanied by intense pain due to uterine contractions, cervical dilation, and pressure on pelvic tissues, particularly during the active phase of the first stage when dilation reaches 4–10 cm. More than 60–70% of women experience severe pain during this phase, which can impact the mother's physiological and psychological well-being, including increased stress hormones and blood pressure, as well as the risk of prolonged labor (Smith et al., 2018; Simkin, 2019). At the primary care level, pharmacological methods are not always an option due to potential side effects and limited access. Therefore, the WHO (2018) recommends non-pharmacological interventions such as aromatherapy and massage as safe and effective approaches to managing labor pain. Lavender aromatherapy is a widely used method due to the linalool and linalyl acetate content, which act on the limbic system, providing sedative, relaxing,

and analgesic effects (Karan, 2020).

Several studies have demonstrated the effectiveness of lavender aromatherapy in reducing labor pain. A meta-analysis by Vaziri et al. (2020), which analyzed 13 studies, found that the average pain score in the aromatherapy group decreased from 7.2 to 5.4 ($p \leq 0.001$). A clinical trial study by Haji Hosseini et al. (2022) even found that both lavender inhalation and massage were equally effective in reducing pain, but massage provided a greater reduction in pain during the active phase ($p < 0.05$) than inhalation. These findings align with Shirazi et al. (2021), who reported that lavender massage can reduce pain intensity by up to 32% through increased muscle relaxation and endorphin secretion. National research also supports these results; a study by Nurfadhila et al. (2023) showed a significant reduction from severe to moderate pain after lavender aromatherapy ($p = 0.001$), while Ariyanti (2022) reported that lavender inhalation effectively reduced pain and anxiety during the active phase of labor.

However, research gaps remain, as most studies have tested only one method, inhalation or massage, or combined them without directly comparing their effectiveness. Studies comparing the two methods, such as that by Haji Hosseini et al. (2022), were conducted in tertiary hospital settings, thus not reflecting the conditions of primary obstetric care. Furthermore, variations in protocols, such as the number of oil drops, inhalation duration, and massage technique, lead to differences in results between studies. New studies are needed to establish consistent and locally relevant protocols.

Field observations indicate that mothers giving birth at the Barita Riska Irianingsih, S.Tr.Keb PMB in Patrang District, Jember Regency, often experience moderate to severe pain during the first active phase. Based on service records from 2024, approximately 75% of mothers complain of moderate to severe pain, and more than 60% experience anxiety, especially at the beginning of the active phase. Non-pharmacological interventions such as lavender aromatherapy and massage have been used to a limited extent by midwives, but their effectiveness has never been scientifically evaluated in the context of midwife self-care. This situation emphasizes the importance of research on the effectiveness of lavender aromatherapy through inhalation and massage on reducing pain during the first active phase of labor in the Patrang area, Jember, to provide local scientific evidence that can improve the quality of labor care and assist midwives in selecting the most appropriate, safe, and effective pain management methods for mothers giving birth.

METHODS

This study used a randomized controlled trial (RCT) design with two parallel groups to assess the effect of lavender aromatherapy on reducing labor pain in the active phase of the first stage of labor. The study sample consisted of 20 women who met the inclusion criteria and were then randomized into two groups: an intervention group receiving lavender aromatherapy ($n = 10$) and a control group not receiving lavender aromatherapy ($n = 10$). Randomization was performed using a

computer-generated random sequence with blind allocation through sealed envelopes. In the intervention group, women received lavender aromatherapy through inhalation for 20 minutes and lumbosacral massage using the effleurage technique using lavender-scented carrier oil for 10–15 minutes. The control group received standard care without aromatherapy. Pain intensity was measured using the Numerical Rating Scale (NRS) before and after the intervention, while demographic and clinical data were recorded as supporting variables. Data analysis was performed using the paired t-test or Wilcoxon test for before–after comparisons within groups, and the independent t-test or Mann–Whitney U test for comparisons between groups, with a significance level of 0.05. All procedures received ethical approval, and informed consent was obtained from each respondent.

RESULT

1. Respondent Characteristics

Table 1. Distribution of Respondent Characteristics Based on Treatment Group (n=20)

Characteristics	Lavender (n=10)	Control (n=10)	Total (n=20)
Age (years) Mean ± SD	27.8 ± 4.1	28.3 ± 3.9	28.0 ± 4.0
Primiparous Parity (%)	6 (60%)	5 (50%)	11 (55%)
Multiparous Parity (%)	4 (40%)	5 (50%)	9 (45%)
Gestational Age (weeks) Mean ± SD	38.6 ± 1.1	38.4 ± 1.2	38.5 ± 1.1
Cervical dilation during entry	4–5 cm	4–5 cm	4–5 cm

Source: Primary Data, 2025

The baseline characteristics of respondents in both groups showed a relatively even distribution, including age, parity, and gestational age. This suggests that the randomization process successfully created homogeneous groups, making it more likely that differences in outcomes were due to the lavender aromatherapy intervention rather than external factors.

2. Changes in Labor Pain Intensity

Table 2. Average Pain Intensity Before and After Intervention

Group	Before Intervention (Mean ± SD)	After Intervention (Mean ± SD)	Δ (Pain Reduction)
Lavender (n=10)	7.6 ± 0.70	4.2 ± 0.79	3.4
Control (n=10)	7.5 ± 0.71	6.6 ± 0.84	0.9

Source: Primary Data, 2025

The lavender group showed a greater reduction in labor pain intensity (3.4 points) than the control group (0.9 points). This suggests that lavender aromatherapy is effective in reducing pain during the active phase of the first stage of labor.

3. Within-Group Statistical Test (Pre–Post)

Table 3. Test of Differences in Pain Intensity Before and After Intervention

Group	p-value	Information
Lavender	$p < 0.001$	Significant
Control	$p = 0.041$	Significantly weak

Source: Primary Data, 2025

In the lavender group, there was a statistically significant reduction in pain ($p < 0.001$). In the control group, the reduction was also significant, but very small and clinically insignificant. This means that a small portion of the reduction may have been due to the natural birth process or the effects of basic touch (standard care), but not to the aromatherapy intervention.

4. Intergroup Statistical Test

Table 4. Comparison of Pain Reduction Between Groups

Group	Mean Decrease (Δ)	p-value (Independent t-test)	Information
Lavender	3.4	$p < 0.001$	Very significant
Control	0.9		

Source: Primary Data, 2025

The test results showed that pain reduction in the lavender group was significantly greater than in the control group ($p < 0.001$). This finding demonstrates that lavender aromatherapy has a significant analgesic effect on women in the active phase of the first stage of labor.

5. Duration of the First Stage of Active Phase

Table 5. Average Duration of the First Active Phase After Intervention

Group	Mean ± SD Duration (hours)	p-value
Lavender	3.8 ± 0.6	
Control	4.6 ± 0.7	$p = 0.012$

Source: Primary Data, 2025

The lavender group experienced a shorter duration of the active phase of the first stage of labor than the control group. This result was statistically significant (p = 0.012), indicating that the relaxation from aromatherapy helped speed up labor progress.

6. Need for Additional Analgesics

Table 6. Distribution of Additional Analgesic Needs

Group	Need Analgesics	No Need	p-value (Fisher)
Lavender	1 (10%)	9 (90%)	
Control	4 (40%)	6 (60%)	p = 0.134

Source: Primary Data, 2025

Although not statistically significant, the trend showed that the lavender group required additional analgesics less frequently. Clinically, this supports the effectiveness of aromatherapy as a non-pharmacological method in reducing analgesic requirements.

DISCUSSION

The results of the study showed that lavender aromatherapy significantly reduced labor pain intensity during the active phase of the first stage of labor. The average pain reduction in the lavender group was 3.4 points, significantly higher than the control group, which only experienced a 0.9 point reduction. These findings demonstrate that lavender's relaxation and analgesic mechanisms work effectively through limbic system stimulation and the release of neurotransmitters that reduce muscle tension and pain perception. Lavender is known to contain linalool and linalyl acetate, which act as mild sedatives and analgesics, thereby reducing sympathetic nerve activity and increasing maternal comfort during labor (Koulivand et al., 2013).

The results of this study align with various previous studies. Research by Kaviani et al. (2014) reported that lavender aromatherapy inhalation can significantly reduce labor pain during the first stage. Similar findings were also demonstrated by Vakilian and Keramat (2013), who found that mothers who were given lavender experienced less pain than the control group. Another study by Sheikhan et al. (2012) stated that the use of lavender during labor can reduce pain intensity and increase maternal satisfaction with the labor process. These consistent results strengthen scientific evidence that lavender is a safe, effective, and easy-to-apply non-pharmacological method to help manage labor pain.

In addition to reducing pain, this study also found that the duration of the active phase of the first stage of labor was shorter in the lavender group, at 3.8 hours compared to 4.6 hours in the control group. This effect can be explained by a relaxation mechanism that

reduces anxiety, increases the effectiveness of contractions, and improves oxygen flow to the uterus, resulting in a more efficient labor process. These findings are consistent with the results of research by Hur et al. (2005), which reported that relaxation techniques with aromatherapy can accelerate labor progress by improving uterine contraction coordination. Research by Namazi et al. (2014) also showed that lavender aromatherapy not only reduces pain but also significantly shortens labor duration.

This study also found a tendency for the lavender group to require additional analgesics less frequently than the control group, although this was not statistically significant. Clinically, this suggests that lavender may reduce the need for pharmacological intervention, which aligns with the findings of Moeini et al. (2014) who reported that laboring mothers who received aromatherapy tended to require fewer analgesics than control mothers. Reducing the need for analgesics is beneficial because it can reduce the risk of side effects from medications and promote a more natural birth experience.

The scientific explanation for these findings can be linked to the theory that lavender scent stimulation stimulates olfactory pathways directly connected to the limbic system, particularly the amygdala and hippocampus, which regulate emotions, anxiety, and pain perception. The increased relaxation resulting from this stimulation reduces the production of stress hormones such as cortisol, thereby reducing pain perception (Goel et al., 2005). Furthermore, the lumbosacral massage technique used in this study also provided tactile stimulation that can inhibit the transmission of pain impulses through the gate control theory mechanism, thereby increasing the perceived analgesic effect.

Overall, the results of this study strengthen the empirical evidence that lavender aromatherapy is an effective complementary method for reducing labor pain and increasing maternal comfort. Lavender's effectiveness is achieved through a combination of physiological (analgesic, sedative) and psychological (relaxation, anxiety reduction) effects. The findings of this study are not only consistent with previous research but also provide additional contributions with a more robust research design, including a randomized controlled trial. Therefore, lavender aromatherapy is worthy of recommendation as part of non-pharmacological pain management in obstetric care, particularly in primary healthcare facilities.

CONCLUSION

Lavender aromatherapy has been shown to be effective in reducing labor pain intensity during the active phase of the first stage of labor. The group receiving aromatherapy showed a significantly greater reduction in pain compared to the control group. Furthermore, lavender use shortened labor duration and reduced the need for additional analgesics, although this was not statistically significant. Overall, lavender aromatherapy can be recommended as a safe and effective non-pharmacological method to assist pain management in laboring mothers.

REFERENCE

Ariyanti, R. (2022). The effect of lavender aromatherapy inhalation on pain and anxiety in mothers in the active phase of the first stage of labor. Indonesian Midwifery Journal, 13(2), 85–93.

Goel, N., Kim, H., & Lao, R. P. (2005). An olfactory stimulus modifies nighttime secretion of cortisol in humans. Neuroscience Letters, 375(3), 199–203. https://doi.org/10.1016/j.neulet.2004.11.073

Haji Hosseini, F., Shamsi, A., & Khademi, M. (2022). Comparison of inhalation and massage aromatherapy with lavender on labor pain: A randomized controlled trial. Complementary Therapies in Clinical Practice, 46, 101507. https://doi.org/10.1016/j.ctcp.2022.101507

Hur, M. H., Song, J. A., Lee, M. S., & Lee, M. S. (2005). Effects of aromatherapy on the anxiety and pain of labor in primiparas. Journal of Korean Academy of Nursing, 35(8), 1380–1389.

Kaviani, M., Farnia, V., & Heidari, M. (2014). The effect of lavender inhalation on labor pain and anxiety: A randomized clinical trial. Iranian Journal of Nursing and Midwifery Research, 19(4), 370–374.

Karan, N. (2020). Lavender aromatherapy in obstetric care: Mechanisms and applications. Journal of Alternative and Complementary Medicine, 26(7), 563–570. https://doi.org/10.1089/acm.2020.0031

Koulivand, P.H., Ghadiri, M.K., & Gorji, A. (2013). Lavender and the nervous system. Evidence-Based Complementary and Alternative Medicine, 2013, 681304. https://doi.org/10.1155/2013/681304

Moeini, M., Rassouli, M., & Firoozeh, M. (2014). The effect of aromatherapy on labor pain and duration of labor. Iranian Red Crescent Medical Journal, 16(11), e13348. https://doi.org/10.5812/ircmj.13348

Namazi, N., Nasiri, M., & Azimi, H. (2014). Effects of lavender aromatherapy on labor duration and pain intensity in primiparous women. Journal of Midwifery & Reproductive Health, 2(1), 15–22.

Nurfadhila, D., Pratiwi, R., & Lestari, P. (2023). The effectiveness of lavender aromatherapy on labor pain in primiparous mothers. Scientific Journal of Midwifery, 18(1), 45–53.

Sheikhan, F., Kariman, N., & Marzban, M. (2012). Effect of aromatherapy on labor pain and satisfaction: A randomized controlled trial. Iranian Journal of Nursing and Midwifery Research, 17(6), 452–456.

Shirazi, M., Moradi, F., & Azami, A. (2021). The effect of lavender massage on labor pain intensity: A clinical trial. Journal of Reproductive and Infant Psychology, 39(2), 164–176. https://doi.org/10.1080/02646838.2020.1793641

Simkin, P. (2019). Pain relief in labor: A review. 5th edition. New York: Springer.

Smith, C.A., Collins, C.T., & Crowther, C.A. (2018). Aromatherapy for pain management in labor. Cochrane Database of Systematic Reviews, 7, CD009215. https://doi.org/10.1002/14651858.CD009215.pub2

Vakilian, K., & Keramat, A. (2013). Effect of lavender aromatherapy on labor pain in primiparous women. Iranian Journal of Nursing and Midwifery Research, 18(3), 187–191.

Vaziri, F., Mousavi, S. Z., & Khodabakhshi, B. (2020). Effectiveness of lavender

aromatherapy on labor pain: Systematic review and meta-analysis. Complementary Therapies in Medicine, 50, 102380. https://doi.org/10.1016/j.ctim.2020.102380

WHO. (2018). Recommendations: Intrapartum care for a positive childbirth experience. Geneva: World Health Organization.

Hwang, J., & Shin, H. (2015). Effect of lavender essential oil inhalation on anxiety and pain in women during labor. Journal of Korean Academy of Nursing, 45(6), 879–887.

Lee, H., & Park, H. (2016). Lavender aromatherapy massage for pain relief during labor: A randomized controlled trial. Complementary Therapies in Clinical Practice, 24, 130–134. https://doi.org/10.1016/j.ctcp.2016.03.003

Taspinar, B., Yildirim, A., & Kucuk, L. (2017). The effect of aromatherapy massage on labor pain and anxiety. Evidence-Based Complementary and Alternative Medicine, 2017, 5698371. https://doi.org/10.1155/2017/5698371