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The Effectiveness of Lavender Aromatherapy Oil and Candle to Reduce The Pain in The Active Phase of 1st Stage of Labor

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ABSTRACT

Background: The period of labor often causes excessive anxiety in the mother due to the pain felt. It can affect the delivery process. Various non-pharmacologic methods have been developed to reduce labor pain.

Purpose: This study aimed to assess the different in the effectiveness of lavender aromatherapy with oil and candles to be inhaled on reducing labor pain in the first stage of the active phase of labor.

Methods: This was a quantitative study and a quasi-experimental design with a pretest-posttest design with a control group. The sampling technique used purposive sampling with a total sample of 60 respondents. Samples were taken randomly and divided into three groups (aromatherapy oil, aromatherapy candles, control). Labor pain was measured using a numeric rating scale in the first stage of labor before and after the intervention. The research analysis used the Anova test which was useful to determine the difference in the effectiveness of candles and aromatherapy oils in reducing labor pain.

Results: Candles and lavender aromatherapy oil can reduce labor pain in the first stage of active phase of labor compared than control (p-value= 0.001). Lavender oil was found to be more effective in reducing pain compared to lavender aromatherapy candles, with the means score of labor pain after administration of lavender oil was 3.50 compared to lavender aromatherapy candles was 5.05.

Conclusion: Lavender aromatherapy oil found to be more effective in reducing labor pain in the first stage of active phase compared to aromatherapy candles. Midwife could facilitate the administration of lavender aromatherapy to reduce pain during labor

Keywords: *lavender aromatherapy candles, lavender aromatherapy oils, labor pain*

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INTRODUCTION

Labor-related anxiety may significantly amplify the pain of uterine contractions by triggering the secretion of stress hormones such as catecholamines and adrenaline. This response leads to heightened muscle tension and narrowed blood vessels, often resulting in prolonged labor, a scenario particularly prevalent among low-risk primigravida women where pain is a major factor extending labor time (Marie et al., 2007; Curzik & Jokic-Begic, 2011a). Evidence suggests that the utilization of aromatherapy can drastically reduce anxiety and pain during labor, thereby lessening the need for local anesthesia or cesarean section deliveries to as low as 14% (Kheirkhah et al., 2013b). Furthermore, lavender aromatherapy has gained attention for its potential to mitigate labor pain and decrease the frequency of cesarean sections performed due to the fear of labor pain (Kaviani et al., 2014b).

Management strategies for labor pain are bifurcated into pharmacological methods, including epidural and spinal analgesia, and non-pharmacological approaches. The latter, characterized by cost-effectiveness, efficiency, and simplicity, devoid of adverse effects, advocate for relaxation techniques (Kaviani et al., 2014a; Adams et al., 2015). Aromatherapy, particularly with essential oils such as those derived from Lavandula angustifolia, has been recognized for its sedative and antibacterial effects. While lavender aromatherapy, rich in phytochemicals like linalool, linalyl acetate, pinene, 1,8-cineole, and esters, is recognized for its relaxing, analgesic properties, and affinity for acetylcholine receptor sites, influencing the olfactory system and triggering neurochemical responses such as the release of endorphins and serotonin for a soothing effect (Olapour et al., 2013), a gap exists in comprehensively understanding its efficacy. Studies highlight the significant role of lavender essential oils in diminishing pain intensity and promoting relaxation during labor (Tanvisut et al., 2018), and evidence from quasi-experimental research indicates that lavender aromatherapy candles can notably reduce postoperative pain in cesarean section patients (Haniyah & Setyawati, 2018).

Further research substantiates the beneficial impact of lavender oil aromatherapy on reducing pain across various stages of labor and shortening the duration of labor in primigravida women (Mansour & Lamadah, 2016), with massage using lavender oil also demonstrated to alleviate pain and reduce labor duration in the second and third stages (Vakilian et al., 2018). Preliminary observations in a midwife-led delivery room show varying degrees of pain relief among laboring mothers (Curzik & Jokic-Begic, 2011b; Mansour & Lamadah, 2016; Olapour et al., 2013).

Despite these findings, a critical gap remains in determining the relative effectiveness of lavender aromatherapy delivered via oil compared to candles. This uncertainty underscores the need for targeted research to elucidate which modality offers superior pain reduction and relaxation benefits during labor, addressing an evident void in the literature on optimizing aromatherapy for labor pain management.

OBJECTIVE

This study sets out to evaluate the comparative effectiveness of lavender aromatherapy administered through oil and candles in alleviating pain during the active phase of the first stage of labor. The aim is to ascertain whether one method proves more beneficial in reducing pain and enhancing maternal comfort, thereby advancing the field of non-pharmacological labor pain management and addressing existing gaps in the research on the specific advantages of aromatherapy during childbirth.

METHODS

This research was conceptualized as a quantitative, quasi-experimental study utilizing a pretest-posttest design with a control group to examine the effects of lavender aromatherapy on alleviating labor pain. Employing purposive sampling, the study enlisted 60 participants, subsequently divided into three evenly distributed groups: one receiving lavender oil aromatherapy, another experiencing aromatherapy via scented candles, and a control group without any aromatherapy intervention.

The study's inclusion criteria targeted intrapartum mothers with cervical dilation ranging from 4 to 8 cm, undergoing uterine contractions at least three times within a 10-minute interval lasting at least 40 minutes, with the fetus positioned cephalically. Exclusion criteria ruled out participants with previous exposure to lavender aromatherapy, either through oil or candles, those with fragrance allergies, and cases with maternal or fetal health complications.

For participants in the lavender oil group, the method of administration involved applying three drops of oil on a cotton swab for inhalation at the study's commencement. In contrast, the candle group inhaled the fragrance emitted by burning candles and was introduced into the environment 15 minutes before the participant's entry, maintaining a 30 cm distance from the individual.

Pain assessment utilized the Numeric Rating Scale (NRS), a questionnaire designed to quantify labor pain intensity based on participants' verbal feedback, scored on a scale from 1 to 10. Pain levels were measured before and after the intervention, with higher scores indicating increased pain.

Data analysis techniques varied based on the distribution of the collected data, employing paired Anova tests for customarily distributed datasets and Wilcoxon tests for those not normally distributed. To ascertain the impact of aromatherapy, the study utilized unpaired Anova tests for normal distributions and Mann-Whitney tests for non-normal distributions.

Ethical considerations were paramount, with the study proceeding after receiving approval from Poltekkes Kemenkes Jakarta III's ethics committee under the clearance number LB.01.01/I/KE/L/452a/2015. Informed consent was duly obtained from all participants, who were assured of their right to withdraw from the study at any point.

RESULTS

The following is table 1, which describes the characteristics of respondents from the study. Based on table 1, the characteristics of the respondents studied include age, ethnicity, parity, psychological condition, and physical condition. In terms of age, ethnicity, parity, and physical condition, p-value> 0.05 (p>0.05) indicates that there was no significant difference in these characteristics. However, in psychological conditions, a p-value of 0.000 was obtained (p < 0.05) which indicates that there was a significant psychological difference between intrapartum mothers between groups.

Table 1; Characteristic respondents

Characteristics	Group			p-value
	Candle	Oil	Control	
Age (year)				
20 - 30	8 (42.1%)	14 (70%)	13 (65%)	0.579
≥ 30	11 (57.9%)	6 (30%)	7 (35%)	
Ethnicity				
Betawi	8 (42.1%)	5 (25%)	6 (30%)	0.906
Others	11 (57.9%)	15 (75%)	14 (70%)	
Parity				
Primipara	6 (31.6%)	10 (50%)	10 (50%)	0.412
Multipara	13 (68.4%)	10 (50%)	10 (50%)	

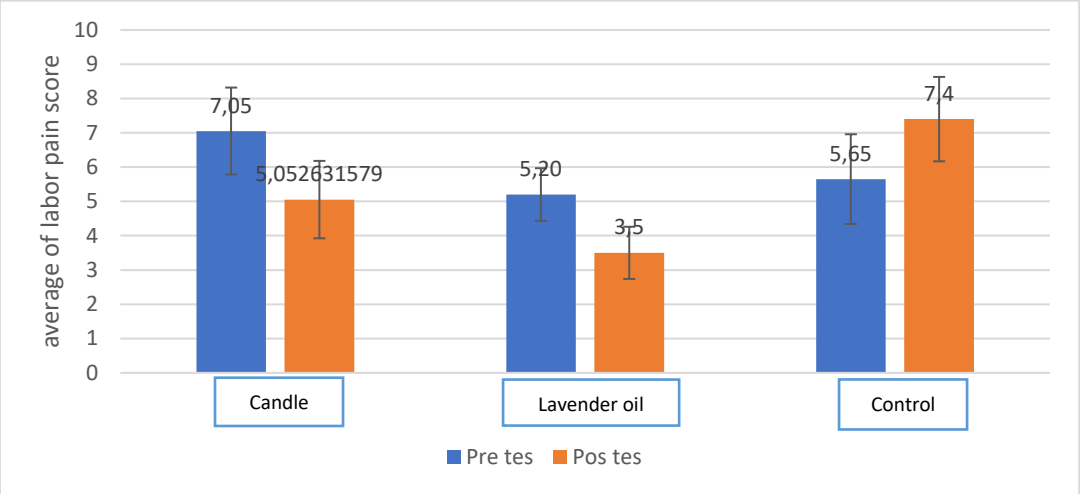
Psychological condition				
Anxiety	19 (100%)	16 (80%)	19 (95%)	0.001
Relax / calm	0 (0%)	4 (20%)	1 (5%)	
Physical condition				
Good	18 (94.7%)	17 (85%)	13 (65%)	0.051
Not good	1 (5.3%)	3 (15%)	7 (35%)	

Furthermore, table 2 and figure 1 explains the effect of aromatherapy on reducing labor pain based on each intervention and control group. Based on table 2 and figure 1, it is known that there was a significant reduction in pain from the two intervention groups giving lavender aromatherapy to the group that was given oil and with candles compared to the control group. P value for both groups was 0.001.

Table 2. Changes in the intensity of labor pain in the first stage of active phase before and after treatment in the treatment and control groups

	Means ± SD			
Aromatherapy	**Pre test**	**Post test**	**t**	**p-value**
Candle	7.05 ± 1.27	5.05 ± 1.13	10.677	0.001
Lavender oil	5.2 ± 0.77	3.5 ± 0.76	10.376	0.001
Control	5.65 ± 1.31	7.4 ± 1.23	-12.254	0.001

Figure 1. Differences in the average value of labor pain before and after treatment in each group



Then, table 3 explains the effectiveness between the two intervention groups, namely with lavender oil or with lavender aromatherapy candles.

Table 3. The Effectiveness of Aromatherapy Lavender Oil and Lavender Wax on Labor Pain in the First Stage of Active Phase in the Treatment Group

Treatment	Mean ± SD	p-value
Candle	5.053 ± 1.129 [b]	
Lavender oil	3.5 ± 0.761 [a]	0.001
Control	7.4 ± 1.231 [c]	

Note: On mean ± SD, if it contains different letters, it means that their indifference a significant($p<0.05$) and if it contains the same letters, it means that there is no significant

difference (p> 0.05).

Based on the table 3, the result analysis using ANOVA, obtained a p-value of 0.001, smaller than = 0.05 (p>0.05). This result can be concluded that there was a significant effect of giving aromatherapy to decrease the labor pain. In the candle and lavender oil aromatherapy group, labor pain was lower than the control group, indicating that the administration of aromatherapy using both candles and lavender oil was able to significantly reduce labor pain. The mean score of pain in the administration of lavender oil was lower than the group given candles aromatherapy and control (Mean ± SD=3.5 ± 0.761). It appears that lavender oil was more effective in reducing labor pain compared to the aromatherapy candle group and the control group.

DISCUSSION

In our study, aromatherapy with lavender oil appeared to be more effective in reducing labor pain compared to aromatherapy using candles and the control group. Aromatherapy is a non-pharmacological therapy that can be used to reduce pain, also known as complementary therapy that uses essential oil fragrances and can be combined with base oil to be used by inhalation or massage into the skin (Bouya et al., 2018; Sánchez-Vidaña et al., 2017). The way aromatherapy works in reducing pain is related to the secretion of endorphins and noradrenaline by affecting the nervous system, and it can create psychological and physical effects on the body.

The results of this study are in accordance with a randomized control clinical trial at El Shatby Maternity Hospital in Alexandria Egypt on 60 normal primigravida pregnant women with a cervical dilatation of 3-4 cm, found that the administration of lavender oil aromatherapy massaged was more effective in reducing labor pain in the early stages of active labor compared with the group carried out with ordinary oil (Mansour & Lamadah, 2016).

The use of aromatherapy in relieving labor pain provides significant results in reducing pain. This is consistent with a randomized controlled trial study on 80 primiparous mothers in Iran. This study states that the aroma of the oil released is able to provide satisfaction for maternity mothers to feel relaxed. So that with a relaxed physical and mental condition can relieve labor pain. Labor pain in the second stage decreased with p value < 0.001 in the group given aromatherapy compared to the control group (Kheirkhah et al., 2013a).

A prospective randomized controlled trial (RCT) with two arms comparing lavender aromatherapy massage and massage without aromatherapy groups in labor conducted in Iran on 60 primiparous people also reported the same result that there was a decrease in labor pain intensity in women giving birth in the first stage during the opening cervix 4cm to 10cm (Zahra, 2013).

Giving lavender oil aromatherapy with the inhalation method seems effective in reducing labor pain. This is closely related to the mother's level of satisfaction with the outcome of childbirth which is closely related to the experience of pain. By avoiding severe pain, it has a positive effect on the labor experience (Raju, 2014b).

Labor pains must be addressed properly by mother during labor, because the impact of uncontrolled labor pain can give poor delivery outcomes such as prolonged labor that ends in cesarean section, and also respiratory failure in newborns (Floris & Irion, 2015; Raju, 2014a; Tabatabaeichehr & Mortazavi, 2020). Pain will be closely related to anxiety which will stimulate the sympathetic nervous system to release stress-related hormones such as noradrenaline, cortisol and adrenaline. These hormones will have the consequence of increasing strong pain and if not handled properly it will increase discomfort to the mother and adversely affect the outcome of labor. For this reason, it is important to carry out a management in providing appropriate midwifery care so that it can help mothers cope with their pain well, including the provision of lavender oil

aromatherapy.

Utilization of lavender aromatherapy provides a good response psychologically to mothers in labor especially in reducing labor pain. Lavender aromatherapy can provide a relaxing effect and also contains analgesic compounds and contains linalyl acetate which has a sedative effect which if inhaled the aroma will affect the nervous system and provide a relaxing effect on the body (Yazdkhasti & Pirak, 2016).

This study has several advantages, including using a valid and reliable pain measurement tool, namely the Numeric Rating Scale for Pain (NRS), the accuracy of the results can be properly accounted for (Hawker et al., 2020). However, some limitations of this study need to be considered, such as the effect of other possible factors that influence the results of pain reduction such as massage during the first stage of labor and the presence of a companion who can psychologically provide a relaxing effect were not included in the confounding variables in the study, this could lead to bias in the interpretation of research results.

CONCLUSION

In summary, our research demonstrates that inhalation of lavender oil aromatherapy surpasses both candle-based aromatherapy and control interventions in alleviating labor pain during the first stage. This study underscores the efficacy of lavender oil aromatherapy as a viable, non-pharmacological, and cost-effective method for pain management in childbirth, aligning with previous findings that highlight its safety and effectiveness without adverse effects on mothers and neonates (Bouya et al., 2018; Sánchez-Vidaña et al., 2017).

A key strength of this study is its rigorous methodological approach, utilizing a well-established pain assessment tool, the Numeric Rating Scale for Pain (NRS), ensuring the reliability and validity of our pain measurement outcomes (Hawker et al., 2020). However, the study's limitations include potential confounding factors such as the psychological impact of massage and the supportive presence of partners or midwives during labor, which were not controlled and might have influenced pain perception.

Given these considerations, further research is recommended to explore the interaction effects of lavender aromatherapy with other non-pharmacological pain management techniques and to assess long-term outcomes on maternal and neonatal health. Expanding the scope of future studies to include a broader demographic and setting variations could also provide more generalized evidence of lavender aromatherapy's effectiveness in labor pain management. Acknowledging these insights, lavender oil aromatherapy, particularly through inhalation, emerges as a superior choice for reducing labor pain, meriting its integration into midwifery practice to enhance maternal comfort and satisfaction during childbirth.

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REFERENCES

Adams, J., Frawley, J., Steel, A., Broom, A., & Sibbritt, D. (2015). Use of pharmacological and non-pharmacological labour pain management techniques and their relationship to maternal and infant birth outcomes: Examination of a nationally representative sample of 1835 pregnant women. *Midwifery*, *31*(4), 458–463. https://doi.org/10.1016/j.midw.2014.12.012

Bouya, S., Ahmadidarehsima, S., Badakhsh, M., Balouchi, A., & koochakzai, M. (2018). Effect of aromatherapy interventions on hemodialysis complications: A systematic review. *Complementary Therapies in Clinical Practice*, *32*(April), 130–138.

https://doi.org/10.1016/j.ctcp.2018.06.008

Curzik, D., & Jokic-Begic, N. (2011a). Anxiety sensitivity and anxiety as correlates of expected, experienced and recalled labor pain. *Journal of Psychosomatic Obstetrics and Gynecology*, *32*(4), 198–203. https://doi.org/10.3109/0167482X.2011.626093

Curzik, & Jokic-Begic. (2011b). Anxiety sensitivity and anxiety as correlates of expected, experienced and recalled labor pain. *Journal of Psychosomatic Obstetrics and Gynecology*, *32*(4), 198–203. https://doi.org/10.3109/0167482X.2011.626093

Floris, & Irion. (2015). Association between anxiety and pain in the latent phase of labour upon admission to the maternity hospital: A prospective, descriptive study. *Journal of Health Psychology*, *20*(4), 446–455. https://doi.org/10.1177/1359105313502695

Haniyah, S., & Setyawati, M. B. (2018). The Effectiveness of Lavender Aromatherapy Technique on Pain Reduction of Post Caesarean Section Patients in Ajibarang Hospital. *Jurnal Keperawatan Soedirman*, *13*(3), 119. https://doi.org/10.20884/1.jks.2018.13.3.831

Hawker, Payne, Kerr, Hardey, & Powell. (2020). *Appraising the evidence: Reviewing disparate data systematically*. *Qualitative Health Research*, *12(9)*, *1284–1299*. *12*(9), 1284–1299. https://doi.org/10.1177/1049732302238251

Kaviani, Azima, Alavi, & Hossein. (2014a). The effect of lavender aromatherapy on pain perception and intrapartum outcome in primiparous women. *British Journal of Midwifery*, *22*(2), 125–128.

Kaviani, M., Azima, S., Alavi, N., & Hossein, M. (2014b). The effect of lavender aromatherapy on pain perception and intrapartum outcome in primiparous women. *British Journal of Midwifery*, *22*(2), 125–128. https://doi.org/10.12968/bjom.2014.22.2.125

Kheirkhah, M., Valipour, N. S., Neisani, L., & Haghani, H. (2013a). A Controlled Trial of the Effect of Aromatherapy on Birth Outcomes Using " Rose Essential Oil " Inhalation and Foot Bath. *J Midwifery Reprod Health*, *1*(2), 77–82.

Kheirkhah, Valipour, Neisani, & Haghani. (2013b). A Controlled Trial of the Effect of Aromatherapy on Birth Outcomes Using " Rose Essential Oil " Inhalation and Foot Bath. *Journal Midwifery Reprod Health*, *1*(2), 77–82.

Mansour, & Lamadah. (2016). The Effect of Aromatherapy Massage Using Lavender Oil on the Level of Pain and Anxiety During Labour Among Primigravida Women. *American Journal of Nursing Science*, *5*(2), 37. https://doi.org/10.11648/j.ajns.20160502.11

Marie, Davim, Vasconcelos, Torres, Saldanha, & Melo. (2007). Rev Latino-am Enfermagem 2007 novembro-dezembro. *Journal of Adolescent Health*, *15*(6), 1150–1156. www.eerp.usp.br/rlaeArtigoOriginal

Olapour, A., Behaeen, K., Akhondzadeh, R., Soltani, F., Razavi, F. A. S., & Bekhradi, R. (2013). The effect of inhalation of aromatherapy blend containing lavender essential oil on cesarean postoperative pain. *Anesthesiology and Pain Medicine*, *3*(1), 203–207. https://doi.org/10.5812/aapm.9570

Raju. (2014a). Effectiveness of Aromatherapy in Reducing Labour Pain and Duration of Labour among Primigravidas: A Pilot Study. *International Journal of Health Sciences and Research*, *4*(2), 124–128. https://d1wqtxts1xzle7.cloudfront.net/33186051/IJHSR-with-cover-page-v2.pdf?Expires=1636906687&Signature=T9KCDM~SqcrJhoIXqKBbErS536B7UYc81FfKlzZl82Nz4vMCf4dawtmze9LtXsg3PKO6FUlzPZwtPTd1AUzmOXhdtLe~Gnz6Bn8XNpFiOptY~pUV0nkbeCfYJ-y2y2XILHxy50O~Z4xcTVUn7Uf9zk

Raju, J. (2014b). Effectiveness of Aromatherapy in Reducing Labour Pain and Duration of Labour among Primigravidas: A Pilot Study. *International Journal of Health Sciences and Research*, *4*(2), 124–128.

Sánchez-Vidaña, Ngai, He, Chow, Lau, & Tsang. (2017). The Effectiveness of Aromatherapy for Depressive Symptoms: A Systematic Review. *Evidence-Based Complementary and Alternative Medicine*, *17*(1), 10–16. https://doi.org/10.1155/2017/5869315

Tabatabaeichehr, M., & Mortazavi, H. (2020). The Effectiveness of Aromatherapy in the Management of Labor Pain and Anxiety: A Systematic Review. *Ethiopian Journal of Health Sciences*, *30*(3), 449–458. https://doi.org/10.4314/ejhs.v30i3.16

Tanvisut, R., Traisrisilp, K., & Tongsong, T. (2018). Efficacy of aromatherapy for reducing pain during labor: a randomized controlled trial. *Archives of Gynecology and Obstetrics*, *297*(5), 1145–1150. https://doi.org/10.1007/s00404-018-4700-1

Vakilian, K., Keramat, A., & Gharacheh, M. (2018). Controlled Breathing With or Without Lavender Aromatherapy for Labor Pain at the First Stage: A Randomized Clinical Trial. *Crescent Journal of Medical and Biological Sciences*, *5*(3), 172–175.

van Wyk, B. E. (2008). A broad review of commercially important southern African medicinal plants. *Journal of Ethnopharmacology*, *119*(3), 342–355. https://doi.org/10.1016/j.jep.2008.05.029

Yazdkhasti, M., & Pirak, A. (2016). The effect of aromatherapy with lavender essence on severity of labor pain and duration of labor in primiparous women. *Complementary Therapies in Clinical Practice*, *25*, 81–86. https://doi.org/10.1016/j.ctcp.2016.08.008

Zahra, A. (2013). Lavender aromatherapy massages in reducing labor pain and duration of labor: A randomized controlled trial. *African Journal of Pharmacy and Pharmacology*, *7*(8), 456–430. https://doi.org/10.5897/ajpp12.391