

The Effect of Lavender Essential Oil Aromatherapy on Reducing the Risk of Postpartum Blues Among Postpartum Mothers: A Quasi-Experimental StudyHasniah Dina¹, Ari Nofitasari¹, Dedi Krismiadi¹, Yulli Fety¹, Wa Ode Aisa Zoahira¹¹Universitas Mandala Waluya, Kendari, Indonesia**ABSTRACT**

The postpartum period is a phase of physical and psychological adaptation during which mothers are vulnerable to emotional disturbances, including postpartum blues. Non-pharmacological interventions such as lavender aromatherapy have been reported to promote relaxation and may help reduce anxiety and stress among postpartum mothers. This study aimed to determine the effect of lavender essential oil aromatherapy on reducing the risk of postpartum blues among mothers in the working area of the Lameuru Community Health Center. A quasi-experimental study with a pretest–posttest control group design was conducted. A total of 60 respondents were recruited using a total sampling technique and allocated to an intervention group ($n = 30$) and a control group ($n = 30$). The intervention group received lavender essential oil aromatherapy for 14 days, whereas the control group received standard postpartum care, including health education and routine postpartum services. The Edinburgh Postnatal Depression Scale (EPDS) was used to assess the risk of postpartum blues. Data were analyzed using the Wilcoxon signed-rank test and the Mann–Whitney U test. The median EPDS score in the intervention group decreased substantially from 14.00 (IQR: 12.75–15.00) at pretest to 7.00 (IQR: 6.00–8.25) at posttest, while the median EPDS score in the control group decreased from 14.00 (IQR: 13.00–15.00) at pretest to 12.00 (IQR: 11.00–13.00) at posttest. Between-group analysis demonstrated a statistically significant difference in EPDS score changes ($p < 0.001$). These findings indicate that lavender essential oil aromatherapy is more effective than standard postpartum care in reducing the risk of postpartum blues among postpartum mothers.

Keywords: postpartum blues, lavender aromatherapy, postpartum mothers, Edinburgh Postnatal Depression Scale

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INTRODUCTION

The postpartum period is the period from when the baby is born and the placenta is expelled from the uterus, until the next six weeks, accompanied by the recovery of the organs associated with the uterus. During this period, women experience various physiological, psychological, and

social changes that require substantial adaptation (Krismiadi *et al.*, 2023). Although childbirth is often perceived as a positive life event, the postpartum period is also recognized as a psychologically vulnerable phase because mothers must adjust to their new roles and responsibilities, including caring for and breastfeeding their infants (Karagöl & Sözbir, 2026; Yani *et al.*, 2025).

Failure to adapt effectively to these physical and psychological changes may negatively affect maternal mental health (DeFoor & Amiri, 2023). As mothers transition into their new role, they may experience stress, self-doubt, emotional instability, and feelings of inadequacy in caring for their newborns. These emotional responses can contribute to postpartum blues, a common and mild mood disturbance that typically emerges within the first few days after childbirth, peaks between days 3 and 5, and usually resolves within two weeks postpartum (Suryanti *et al.*, 2024; Chechko *et al.*, 2024). Postpartum blues can affect women regardless of ethnicity, race, or parity status; however, primiparous mothers are generally at greater risk due to their limited experience with childbirth and infant care, which may increase anxiety and reduce preparedness for the transition to motherhood (Zhang *et al.*, 2024).

According to data from the World Health Organization (WHO), approximately 10% of pregnant women and 13% of women who have recently given birth experience mental health disorders, particularly depression. Postpartum depression is one of the most common conditions after childbirth and can affect the mother's well-being, the mother–infant relationship, and the child's development if not managed properly (WHO, 2025; Ariasih *et al.*, 2024).

Based on the 2018 Basic Health Research, the prevalence of emotional mental disorders, particularly depression, among individuals aged ≥ 15 years is approximately 6.1% and is distributed across all regions of Indonesia, both in urban and rural areas (Indonesian Ministry of Health, 2018). Mental health problems, including those affecting postpartum mothers, represent a significant issue in Indonesia. This is supported by various studies reporting that the prevalence of postpartum blues in Indonesia ranges from 50–70% among postpartum women after childbirth (Ginting, 2024). Primiparous mothers are the most vulnerable group to experience postpartum depression compared to multiparous mothers. Postpartum blues in primiparous mothers can be triggered by feelings of unpreparedness for the arrival of the baby and the growing awareness of increased responsibilities as a mother (Setyaningrum *et al.*, 2023).

Data from the Southeast Sulawesi Provincial Health Office by Hasda & Kurniawan, (2024) indicate that 4.4% of postpartum mothers experience moderate anxiety and 14.3% experience severe anxiety in the first few days after childbirth. Based on a preliminary survey conducted by the researcher in the working area of Lameuru Health Center, it was found that out of 12 postpartum mothers interviewed, 8 reported not experiencing postpartum blues. This finding is supported by the provision of education regarding postpartum conditions, an understanding of the changes that occur after childbirth, and strong emotional support from husbands and families. Such education helps mothers manage anxiety and better prepare for the postpartum period.

However, four postpartum mothers were found to experience symptoms of postpartum blues. They expressed feelings of sadness that appeared suddenly without a clear cause, as illustrated by the statement: "Sometimes I suddenly cry without knowing why; I feel very sad even though there is no major problem." This condition was exacerbated by a lack of responsive family support toward the mothers' emotional needs, as well as excessive anxiety and worry in carrying out their roles as mothers (Lameuru Community Health Center Health Data Report, 2025)

The number of postpartum mothers in the Lameuru Health Center area is quite significant, making it a potential population for research. The variation in the psychological conditions of postpartum mothers both those who experience and those who do not experience postpartum blues as well as the influencing factors such as education and family support, make the Lameuru Health Center area a relevant and important research setting to further explore the occurrence of postpartum blues (Lameuru Community Health Center Health Data Report, 2025).

Various types of aroma therapy have been used to reduce anxiety, one of which is lavender (*Lavandula angustifolia*). According to a study by Cho *et al.*, (2017) lavender has been reported to reduce stress and improve sleep quality in adult patients treated in the ICU. A combination of lavender and bergamot has also been found to be effective in reducing pain, depression, anxiety, and stress among adults in the community. In addition, another study Nainggolan, (2020) found that inhalation of lavender can help prevent stress, anxiety, and postpartum depression.

Although several studies have reported the beneficial effects of lavender aromatherapy in reducing anxiety, stress, pain, and depressive symptoms in various clinical settings, evidence specifically focusing on postpartum blues remains limited and inconsistent. Most previous studies have examined general anxiety reduction among surgical patients, intensive care patients, or women undergoing medical procedures, rather than addressing the unique emotional and psychological challenges experienced during the early postpartum period (Nouira *et al.*, 2024; Yoo & Park, 2023). Furthermore, postpartum blues is a transient condition characterized by rapid mood fluctuations, emotional lability, crying episodes, and anxiety that differs from general anxiety disorders, suggesting the need for interventions that are specifically evaluated within postpartum populations.

Recent international studies have highlighted the potential role of complementary therapies, including aromatherapy, in improving maternal psychological well-being during the postpartum period. A systematic review by Yang *et al.*, (2023) reported that aromatherapy may contribute to reducing anxiety and improving emotional comfort among postpartum women. Similarly Nouira *et al.*, (2024) found that lavender oil inhalation is effective in reducing pain and anxiety in mothers after cesarean section, further strengthening the evidence of the benefits of lavender during the postpartum period. Another finding Jones *et al.*, (2021) reported that lavender plays an important role in helping to reduce psychological tension that often arises from fear experienced by mothers.

Despite these promising findings, evidence regarding the effectiveness of lavender aromatherapy specifically for preventing or reducing postpartum blues among primiparous mothers remains scarce, particularly in community-based settings and developing countries. In Indonesia, studies investigating non-pharmacological interventions for postpartum blues are still limited, and data from primary healthcare settings are rarely reported.

The effectiveness of lavender aromatherapy is believed to be associated with its active compounds, including linalool and linalyl acetate, which exert anxiolytic and sedative effects through modulation of the central nervous system. These compounds stimulate alpha brain wave activity, suppress sympathetic nervous system responses associated with stress, and enhance parasympathetic activity that promotes relaxation and emotional stability. Lavender aromatherapy has also been reported to increase serotonin and endorphin release, thereby improving mood and reducing emotional tension (Du *et al.*, 2020; Malcolm & Tallian, 2017).

Considering the high prevalence of postpartum blues among Indonesian mothers, the vulnerability of primiparous women, and the limited evidence from primary healthcare settings, further research is needed to evaluate the effectiveness of lavender aromatherapy as a simple, safe, and accessible intervention for reducing the risk of postpartum blues among postpartum mothers in the working area of Lameuru Health Center.

METHODS

This study employed a quasi-experimental design with a pretest–posttest control group approach to evaluate the effect of lavender essential oil aromatherapy on the risk of postpartum blues among postpartum mothers. A total of 60 postpartum mothers participated in the study, comprising 30 mothers in the intervention group and 30 mothers in the control group.

The study was conducted at Lameuru Health Center, Southeast Sulawesi, Indonesia, from July to August 2025. The study population consisted of all postpartum mothers residing within the

working area of the health center during the study period. All eligible postpartum mothers were invited to participate. The inclusion criteria were postpartum mothers on days 1–14 after childbirth, aged ≥ 18 years, able to communicate effectively, and willing to participate by signing informed consent. Exclusion criteria included a history of allergy or hypersensitivity to lavender essential oil, diagnosed psychiatric disorders, severe postpartum complications requiring intensive medical treatment, and withdrawal from the study before completion.

Because random allocation was not feasible, participants were assigned to the intervention and control groups based on the geographical coverage area of maternal health services. Postpartum mothers residing in one service area were allocated to the intervention group, while those residing in another comparable service area were allocated to the control group. This approach was used to minimize contamination and information exchange between participants from different groups. Baseline characteristics, including age, parity, educational level, occupation, mode of delivery, and pretest Edinburgh Postnatal Depression Scale (EPDS) scores, were assessed to determine the comparability of the two groups before the intervention. Statistical analysis showed no significant differences between the intervention and control groups regarding baseline demographic and clinical characteristics ($p > 0.05$), indicating that the groups were comparable prior to the intervention.

Intervention Procedure

The intervention group received lavender essential oil aromatherapy in addition to standard postpartum care. Sweet Gerbera Lavender essential oil (Indonesia) was used as the aromatherapy intervention. Participants were instructed to place seven drops of lavender essential oil onto a clean cotton cloth positioned approximately 10–15 cm from the nose and inhale the aroma through ten slow deep breaths before bedtime each night.

The intervention was administered once daily for 14 consecutive days. To ensure adherence, participants received a daily monitoring sheet and were contacted periodically via telephone or home visits. Compliance was evaluated through self-reported daily logs and direct verification during follow-up visits. Safety monitoring was conducted throughout the intervention period. Participants were instructed to immediately report any adverse effects, including headache, dizziness, nausea, respiratory discomfort, skin irritation, or allergic reactions. No serious adverse events were reported during the study period. The control group received standard postpartum care routinely provided by the health center, including postpartum education, family support, and counseling services, without aromatherapy intervention.

Measurement Instrument

The risk of postpartum blues was assessed using the Edinburgh Postnatal Depression Scale (EPDS), a widely used screening instrument consisting of 10 items with total scores ranging from 0 to 30. Higher scores indicate a greater risk of postpartum blues and postpartum depressive symptoms. The Indonesian version of the Edinburgh Postnatal Depression Scale (EPDS) has been previously validated and demonstrated satisfactory psychometric properties. Previous validation studies reported acceptable item validity, with corrected item-total correlation coefficients exceeding 0.30, and good internal consistency reliability, with Cronbach's alpha values above 0.70. In the present study, the reliability of the EPDS was re-evaluated and yielded a Cronbach's alpha coefficient of (0.78), indicating acceptable internal consistency.

Ethical Considerations

Ethical approval for this study was obtained from the UMW Research Ethics Committee under approval No:95/KEP-UMW/VII/2025. All participants provided written informed consent prior to participation. Confidentiality and anonymity of participant information were maintained throughout the study.

RESULTS

Table 1. Distribution of Respondent Characteristics

Respondent characteristics	Intervention Group		Control Group		P value
	n	%	n	%	
Age (Years)					
<20	3	10	2	6.7	0.820
20–35	22	73.3	24	80	
>35	5	16.7	4	13.3	
Parity					
Primiparous	12	40	14	46.7	0.794
Multiparous	18	60	16	53.3	
Education Level					
Elementary school	6	20	7	23.3	0.949
Junior high school	18	60	17	56.7	
Senior high school	6	20	6	20	

The table 1. shows that the distribution of respondents based on age in both the intervention and control groups is predominantly within the 20–35 years age range, with 22 respondents (73.3%) in the intervention group and 24 respondents (80%) in the control group. Based on parity, the majority of respondents in both groups are multiparous, accounting for 18 respondents (60%) in the intervention group and 16 respondents (53.3%) in the control group. Regarding educational level, most respondents in both groups have a junior high school (SMP) education, with 18 respondents (60%) in the intervention group and 17 respondents (56.7%) in the control group. There were no statistically significant differences in age ($p = 0.820$), parity ($p = 0.794$), or educational level ($p = 0.949$) between the intervention and control groups. These findings indicate that both groups had equal variances (homogeneous), as indicated by a Levene's Test p -value (> 0.05). This result suggests that the two groups possessed similar characteristics and variance distributions.

Table 2. Results of the Shapiro–Wilk Normality Test

Variable	Shapiro-wilk			Interpretation
	Statistic	df	Sig.	
Pretest-intervention	.952	30	.190	Normally distributed
Posttest-intervention	.919	30	.026	Not normally distributed
Pretest-control	.941	30	.095	Normally distributed
Posttest-control	.916	30	.025	Not normally distributed

Table 2 presents the results of the Shapiro–Wilk normality test for the intervention and control groups. The findings showed that the pretest scores in both the intervention group ($p = 0.190$) and the control group ($p = 0.095$) were normally distributed, as the significance values were greater than 0.05. However, the posttest scores in the intervention group ($p = 0.026$) and the control group ($p = 0.025$) were not normally distributed because the significance values were less than 0.05. Therefore, to determine the effect of the intervention, the data were analyzed using a non-parametric statistical test, namely the Wilcoxon signed-rank test.

Table 3. Wilcoxon Signed-Rank Test Results for EPDS Scores in the Intervention and Control Groups

Group	Pretest Median (IQR)	Posttest Median (IQR)	Z	p-value	Effect Size (r)
Intervention	14.00 (12.75-15.00)	7.00 (6.00-8.25)	-4.782	<0.001	0.87
Control	14.00 (13.00-15.00)	12.00 (11.00-13.00)	-2.103	0.035	0.38

Table 3. presents the results of EPDS scores before and after the intervention in both groups. In the intervention group, the median EPDS score decreased substantially from 14.00 (IQR: 12.75–15.00) at pretest to 7.00 (IQR: 6.00–8.25) at posttest. The Wilcoxon test showed a statistically significant reduction in EPDS scores ($Z = -4.782$, $p < 0.001$), with a large effect size ($r = 0.87$), indicating that lavender essential oil aromatherapy had a strong effect on reducing the risk of postpartum blues among postpartum mothers. In the control group, the median EPDS score decreased from 14.00 (IQR: 13.00–15.00) at pretest to 12.00 (IQR: 11.00–13.00) at posttest. This reduction was also statistically significant ($Z = -2.103$, $p = 0.035$), although the effect size was moderate ($r = 0.38$). Compared with the intervention group, the magnitude of change in the control group was considerably smaller, suggesting that the intervention contributed to a greater reduction in EPDS scores.

Table 4. Comparison of Posttest EPDS Scores Between the Intervention and Control Groups Using the Mann–Whitney U Test

Group	Mean Rank	Mann-Whitney U	Z	p-value	Effect Size (r)
Intervention	16.38	26.500	-6.304	0.000	0.81
Control	44.62				

Table 4. presents the results of the Mann–Whitney U test comparing posttest EPDS scores between the intervention and control groups. The analysis revealed a statistically significant difference in posttest EPDS scores between the two groups ($U = 26.500$, $Z = -6.304$, $p < 0.001$).

The intervention group had a substantially lower mean rank (16.38) than the control group (44.62), indicating lower EPDS scores among postpartum mothers who received lavender essential oil aromatherapy. Furthermore, the effect size was large ($r = 0.81$), demonstrating a strong effect of the intervention. These findings suggest that lavender essential oil aromatherapy was significantly more effective than standard postpartum care in reducing EPDS scores and lowering the risk of postpartum blues among postpartum mothers.

DISCUSSION

The present study demonstrated that lavender essential oil aromatherapy significantly reduced EPDS scores among postpartum mothers. Beyond statistical significance, the findings also indicate important clinical relevance. The median EPDS score in the intervention group decreased from 14.00 to 7.00, representing a reduction from a level associated with a high risk of postpartum blues to a score below the commonly used screening threshold for clinically relevant depressive symptoms. This finding suggests that lavender aromatherapy may not only improve maternal emotional well-being but also contribute to preventing the progression of postpartum blues into more severe postpartum mood disorders. Therefore, the intervention may have practical implications for postpartum care, particularly in primary healthcare settings where access to mental health services is often limited.

The significant reduction observed in the intervention group can be explained through the neurophysiological effects of lavender essential oil. Lavender contains linalool and linalyl acetate, which are known to exert anxiolytic and sedative effects by modulating the autonomic nervous system and influencing neurotransmitters involved in mood regulation, including serotonin and gamma-aminobutyric acid (GABA). Through olfactory stimulation, aroma molecules rapidly reach the limbic system, a brain region responsible for emotional processing, thereby promoting relaxation and reducing psychological distress (Malloggi *et al.*, 2022). These findings are consistent with international research Kianpour *et al.*, (2016) which reported that lavender aromatherapy significantly reduces postpartum depression scores compared to the control group. Another study by Yang *et al.*, (2023) also demonstrated that the use of lavender aromatherapy during the postpartum period can significantly decrease levels of stress, anxiety, and depression among postpartum mothers. These mechanisms may explain the substantial reduction in EPDS scores observed among mothers who received the intervention. A study by Dencik, (2024), showing that the administration of lavender aromatherapy for seven days in postpartum mothers significantly reduced EPDS scores ($p < 0.001$).

An important finding of this study is that the control group also experienced a statistically significant reduction in EPDS scores, although the magnitude of change was considerably smaller than that observed in the intervention group. This phenomenon may reflect the natural course of postpartum adaptation. Postpartum blues is generally a transient condition that commonly occurs during the first days after childbirth and often improves spontaneously as mothers gradually adapt to hormonal fluctuations, infant care responsibilities, and changes in family roles. In addition, mothers in the control group continued to receive routine postpartum care and family support, which may have contributed to psychological recovery over time. Therefore, the significant decrease observed in the control group should not necessarily be interpreted as evidence of treatment effectiveness but rather as part of the normal recovery process during the postpartum period.

Several potential confounding factors should also be considered when interpreting the findings. Most participants were multiparous mothers within the healthy reproductive age range and had a secondary educational background. The healthy reproductive age range (20–35 years) is considered an optimal period for women to undergo pregnancy and childbirth, as the risk of complications is relatively lower compared to those aged <20 years or >35 years. However,

despite being in the ideal age group, postpartum mothers remain at risk of experiencing psychological disturbances such as postpartum blues due to hormonal changes, fatigue, and adaptation to their new role as mothers. This is consistent with findings from recent studies Safaringga *et al.*, (2023) which state that the postpartum period is a transitional phase characterized by significant biological, psychological, and social changes, thereby increasing mothers' vulnerability to emotional disturbances such as postpartum blues. Furthermore, drastic hormonal changes following childbirth are known to contribute to emotional instability, which may trigger postpartum blues, particularly when accompanied by fatigue and a lack of social support (Sari & Sansuwito, 2025).

Previous childbirth experience may facilitate maternal adaptation, as multiparous mothers are generally more familiar with the challenges of the postpartum period and the responsibilities associated with infant care. However, parity alone does not guarantee protection against emotional disturbances. Recent studies have shown that psychosocial factors, particularly perceived social support, play a crucial role in determining maternal psychological well-being during the postpartum period. Previous childbirth experience may facilitate maternal adaptation, as multiparous mothers are generally more familiar with the challenges of the postpartum period and the responsibilities associated with infant care. However, parity alone does not guarantee protection against emotional disturbances. Recent studies have shown that psychosocial factors, particularly perceived social support, play a crucial role in determining maternal psychological well-being during the postpartum period. Adequate social support from partners, family members, and the surrounding community has been associated with lower levels of postpartum stress and better mental health outcomes. Conversely, mothers who receive insufficient emotional, informational, and practical support remain at increased risk of experiencing postpartum blues and other postpartum psychological disorders, regardless of their previous childbirth experience. Therefore, the quality of perceived social support is often considered a stronger predictor of maternal psychological well-being than obstetric characteristics alone (Wang *et al.*, 2023). This finding is consistent with the study by Ginting, (2024) which demonstrated that perceived social support was significantly associated with reduced postpartum stress through improved marital satisfaction and stronger mother–infant attachment.

Educational level may also influence maternal mental health outcomes. Mothers with higher educational attainment generally possess better health literacy, enabling them to access health information, recognize emotional symptoms, and adopt adaptive coping strategies more effectively. In addition, educational level is associated with healthier behaviours through increased self-efficacy and improved self-management skills (Chen *et al.*, 2025). Nevertheless, education should not be viewed as an independent protective factor because its influence is often mediated by socioeconomic conditions, access to healthcare resources, and social support networks. Consequently, the observed improvement in EPDS scores may result from a complex interaction between the intervention and these contextual factors.

The findings of this study are consistent with previous international research demonstrating the beneficial effects of lavender aromatherapy on maternal mental health. Kianpour *et al.*, (2016) reported that postpartum women receiving lavender aromatherapy experienced significantly lower depression scores compared with controls. Similarly with Yang *et al.*, (2023) found that lavender aromatherapy effectively reduced anxiety, stress, and depressive symptoms during the postpartum period. Lavender aromatherapy is considered a non-pharmacological intervention that is safe, simple, and has a moderate effect in reducing depressive symptoms in general (Cho & Kim, 2023). More recent evidence suggests that aromatherapy interventions may improve psychological well-being through both physiological relaxation responses and enhanced perceptions of comfort and self-care. The large effect size observed in the present study ($r = 0.81$) further supports the potential clinical utility of lavender aromatherapy as a complementary intervention for postpartum mental health management.

Despite these promising findings, several limitations should be acknowledged. The quasi-experimental design limits the ability to establish causality because unmeasured factors such as family support, marital relationships, sleep quality, and socioeconomic status may have influenced psychological outcomes. Furthermore, the relatively short follow-up period does not allow evaluation of the long-term sustainability of the intervention effect. Future studies employing randomized controlled trial designs, larger sample sizes, and longer follow-up periods are recommended to confirm the effectiveness of lavender aromatherapy and to identify factors that may enhance or moderate its benefits.

Overall, the present study suggests that lavender essential oil aromatherapy is a safe, simple, and clinically meaningful complementary intervention for reducing postpartum blues symptoms. The substantial reduction in EPDS scores and the large effect size indicate that its benefits extend beyond statistical significance and may contribute to improved maternal psychological well-being during the postpartum period.

CONCLUSION

The results of the study showed that lavender essential oil aromatherapy was effective in reducing EPDS scores among postpartum mothers. This was evidenced by a significant decrease in scores in the intervention group compared to the control group, as demonstrated by both the Wilcoxon test and the Mann–Whitney test. These findings are consistent with various national and international studies conducted over the past five years, which indicate that lavender aromatherapy is an effective complementary therapy for managing postpartum blues.

RECOMMENDATION

Based on the results of this study, lavender essential oil aromatherapy can be recommended as a complementary non-pharmacological intervention to reduce the risk of postpartum blues in postpartum mothers. Health workers are encouraged to apply lavender aromatherapy in postpartum care and provide education on its safe use. Future studies are recommended to involve larger samples and broader variables, such as anxiety, stress, sleep quality, and social support, to further examine its effectiveness.

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