

Comparison Of Peppermint And Ginger Essential Oil On The Reduction Of Back Pain Intensity In Pregnant Women In The Third Trimester In The Working Area Of Munjul Jaya Community Health Center, Purwakarta Regency, 2025

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Abstract.

Back pain is one of the discomforts most frequently experienced by pregnant women, especially in the third trimester. In Indonesia, the prevalence of back pain among third-trimester pregnant women is reported to be around 70%. Peppermint and ginger contain compounds that can help reduce this problem. This study used a quasi-experimental design with a two group pretest posttest design. The first group was given peppermint essential oil and the second group was given ginger essential oil. A total of 50 respondents were selected using purposive sampling and given the intervention 4 times over a period of 2 weeks.

The Wilcoxon test results showed p-value of 0.000 in both groups, so both peppermint essential oil and ginger essential oil had a significant effect on reducing the intensity of back pain in third-trimester pregnant women. The Mann-Whitney test obtained a p-value of 0.149, indicating no difference between the peppermint essential oil and ginger groups in reducing pain intensity. Thus, peppermint and ginger essential oils are beneficial as non-pharmacological treatments.

Keywords: *Pregnant Women, Third Trimester, Back Pain, Peppermint Essential Oil and Ginger Essential Oil.*

I. INTRODUCTION

Back pain is one of the discomforts most frequently experienced by pregnant women, especially in the third trimester. In Indonesia, the prevalence of back pain in pregnant women is reported to be quite high, ranging from 60%–80%, with about 70% of third-trimester pregnant women experiencing this complaint [1][2]

Back pain complaints in the third trimester are a physiological occurrence in which the mother's abdomen begins to enlarge as the baby grows, causing the back to compensate with a lordotic posture. This lordotic posture causes compression of the nerves and blood vessels along the spine. Pressure on these nerves causes pain or discomfort. Back pain is also caused by dilation of the ligaments supporting the uterus, hypoxia in the shortened uterine muscle cells, and pressure on the surrounding structures. Back pain during pregnancy can cause anxiety in patients, triggering hyperventilation which increases oxygen demand and blood pressure. If left unaddressed and continuing until delivery, this condition can stimulate an increase in catecholamines, which can disrupt uterine contractions, resulting in uterine inertia and a prolonged labor process.

Back pain in third-trimester pregnancy can be reduced using non-pharmacological methods, such as relaxation and breathing techniques, effleurage and sacral pressure, hydrotherapy, Transcutaneous Electrical Nerve Stimulation (TENS), and other techniques such as hypnotherapy, massage, acupressure, aromatherapy, yoga, and therapeutic touch. Non-pharmacological management commonly given includes hydrotherapy, massage therapy, aromatherapy, and behavioral techniques including meditation, autogenic training, guided imagery, and rhythmic breathing [3][4][5].

Aromatherapy is a treatment that uses volatile liquid substances derived from plants that can affect a person's mood, emotions, cognitive function, and health. One aromatherapy that can reduce the discomfort (pain) felt is lavender, which naturally functions to reduce emotion, anxiety, and depression, and to provide a feeling of comfort and calm [6].

Lavender aromatherapy in particular contains linalool and linalyl acetate, which have an analgesic effect and produce a calming effect, which is why several reports and studies recommend aromatherapy to reduce pain, discomfort, and stress during pregnancy and childbirth [7].

In addition to lavender aromatherapy, ginger aromatherapy is also beneficial for reducing back pain in pregnant women. Ginger (*Zingiber officinale*) is known to contain bioactive compounds such as gingerol, shogaol, and zingerone, which have anti-inflammatory and analgesic effects. These compounds work by inhibiting the synthesis of prostaglandins and other inflammatory mediators, thereby reducing the body's perception of pain [8][9]. In addition, the topical use of ginger, such as essential oil or warm compresses, can produce a warming effect that helps improve local blood circulation and reduce muscle tension in the back area.

A study by Bahri et al. (2024) showed that the use of ginger oil in massage therapy (topical application) is effective in reducing back pain through the mechanisms of muscle relaxation and increased blood flow. This indicates that ginger essential oil has potential as an effective complementary therapy for treating musculoskeletal pain, including back pain in pregnant women [10].

II. METHODS

This study used a *quasi-experimental* design with a *two-group pretest–posttest design* to compare the effectiveness of *peppermint essential oil* and *ginger essential oil* in reducing the intensity of back pain in third-trimester pregnant women. The study was conducted in the working area of the Munjul Jaya Community Health Center, Purwakarta Regency, from October 2025 to January 2026. The study population consisted of all third-trimester pregnant women with back pain complaints (N=57). A sample of 50 respondents was selected using *purposive sampling*. This study was divided into 2 groups: the *peppermint essential oil* group (N=25) and the *ginger essential oil* group (N=25). The essential oils were given in the form of a *roll-on blend* to make it easier for pregnant women to use.

Pain intensity was measured using the *Numeric Rating Scale (NRS)* before and after the intervention over 2 weeks. Univariate analysis was used to describe respondent characteristics. A normality test was conducted prior to bivariate analysis. Since the data were not normally distributed, pretest–posttest differences within each group were analyzed using the *Wilcoxon* test, while the comparison of effectiveness between groups was analyzed using the *Mann–Whitney* test with a significance level of $p < 0.05$. Respondents in this study provided *informed consent* prior to data collection.

III. RESULT AND DISCUSSION

Respondent Characteristics

Table 1. Respondent Characteristics

No	Category	Peppermint		Ginger	
		N	%	N	%
Age					
1	20-35 years	14	56%	14	56%
2	<20 or >35 years	11	44%	11	44%
Total		25	100%	25	100%
Parity					
1	Primigravida	14	56%	11	44%
2	Multigravida	8	32%	11	44%
3	Grand multipara	3	12%	3	12%
Total		25	100%	25	100%
Occupation					
1	Not Working	17	68%	18	72%
2	Working	8	32%	7	28%
Total		25	100%	25	100%

Based on Table 1, regarding age characteristics, most respondents were aged 20–35 years, namely 14 respondents (56%) in both the peppermint and ginger essential oil groups, while respondents aged <20

or >35 years numbered 11 respondents (44%) each. Based on parity characteristics, the peppermint essential oil group had the most primigravida mothers with 14 respondents (56%), while in the ginger essential oil group primigravida and multigravida mothers each numbered 11 respondents (44%). The least common parity data was grand multipara pregnant women, with 3 respondents (12%) in each group. Based on occupation characteristics, the majority in both groups were not working, with 17 respondents (68%) in the peppermint group and 18 respondents (72%) in the ginger group.

The age of 20–35 years is considered a safe reproductive age for pregnant women because within this age range the reproductive organs have developed optimally, and the mother's physical and psychological readiness is relatively better compared to being too young or too old. At this age, mothers are also better able to adapt to the physiological changes during pregnancy, including postural changes that can trigger back pain [11].

Parity is the number of pregnancies a woman has experienced up to the age of fetal viability. In primigravida mothers, back pain occurs more frequently because the body has not yet experienced adaptation to postural and hormonal changes during pregnancy. Primigravida mothers also tend to experience higher anxiety, which can increase the perception of pain [12].

Employment status can affect the physical activity of pregnant women related to the onset of back pain. Pregnant women who are not working tend to have lighter physical activity, but lack of activity and prolonged sitting or lying positions can also cause back muscle stiffness. Conversely, mothers who work with heavy activity may experience increased pressure on the spine [13].

Univariate Analysis

Table 2. Frequency Distribution of Back Pain Intensity *Pretest* and *Posttest* Intervention

Variable	N	Median	Min	Max	Std. Deviation
Pretest Peppermint	25	5	2	7	1.288
Posttest Peppermint	25	3	0	6	1.291
Pretest Ginger	25	5	2	7	1.599
Posttest Ginger	25	2	0	5	1.370

Based on Table 2, in the pretest data, the peppermint and ginger essential oil groups had the same median, minimum, and maximum values, namely a median of 5, minimum of 2, and maximum of 7. In the posttest data, the peppermint essential oil group had a median value of 3, minimum of 0, and maximum of 6. In the posttest data, the ginger essential oil group had a median value of 2, minimum of 0, and maximum of 5.

Bivariate Analysis

Table 3. Normality Test

Variable	N	Sig.*	Description
Pretest <i>Peppermint</i>	25	0.031	Not Normal
Posttest <i>Peppermint</i>	25	0.036	Not Normal
Pretest <i>Ginger</i>	25	0.005	Not Normal
Posttest <i>Ginger</i>	25	0.012	Not Normal

*Test: Shapiro Wilk

Based on Table 3, the normality test results using Shapiro-Wilk show that all variables of back pain intensity scores had a p-value < 0.05, indicating a non-normal distribution. Therefore, the bivariate analysis was continued using a non-parametric test. To examine the difference in scores before (pretest) and after (posttest) the intervention within each group, the Wilcoxon test was used, while to compare between groups (peppermint essential oil and ginger) the Mann-Whitney test was used. With this bivariate analysis, the researcher can assess whether there is a difference in back pain intensity scores before and after the intervention.

Variable	N	Sig.*
Peppermint Essential Oil	Pretest Posttest	25 25
Ginger Essential Oil	Pretest	25
		0.000 0.000

Table 4.

Posttest

25

Wilcoxon**Test**

*Test: Wilcoxon

Based on Table 4, it shows that the *p-value* in the *peppermint essential oil* group was 0.000, so it can be concluded that there is an effect of *peppermint essential oil* on back pain in third-trimester pregnant women in the Working Area of the Munjul Jaya Community Health Center, Purwakarta. In the *ginger essential oil* group, the same result was obtained, namely a *p-value* of 0.000, so it can be concluded that there is an effect of *ginger essential oil* on back pain in third-trimester pregnant women in the Working Area of the Munjul Jaya Community Health Center, Purwakarta.

Back pain in third-trimester pregnant women is a common complaint resulting from physiological changes during pregnancy. Uterine enlargement shifts the body's center of gravity, changing the mother's posture and placing greater pressure on the lower back muscles. In addition, increased relaxin hormone levels loosen the ligaments, triggering discomfort and pain.

According to Price and Wilson (2019), biomechanical changes during pregnancy cause stretching of the back muscles and ligaments, which can cause pain, especially in the third trimester. Weight gain in pregnant women also contributes to increased pressure on the lumbar spine. [14][15].

Peppermint essential oil contains menthol, which has an analgesic and muscle-relaxing effect; in addition, menthol provides a cooling sensation that helps reduce muscle contractions and increase comfort. *Peppermint aromatherapy* also works through the olfactory system, which stimulates the limbic system in the brain, producing a relaxation effect and reducing pain perception.

This finding is consistent with a study by Wahyuni et al. (2024), which stated that aromatherapy could significantly reduce back pain in third-trimester pregnant women, with a *p-value* of 0.000. That study explained that aromatherapy helps increase relaxation and reduce back muscle tension [16].

In addition to *peppermint*, ginger is a herbal plant containing gingerol and shogaol, which help inhibit the production of prostaglandins that trigger pain and inflammation. In addition, the warming effect produced by ginger helps improve blood circulation and reduce muscle tension in the back area.

This finding is supported by studies by Sinaga et al. (2023) and Retni et al. (2024), which stated that ginger compresses are effective in reducing lower back pain in third-trimester pregnant women. These studies showed that ginger helps reduce back pain in pregnant women through a vasodilation mechanism that increases blood flow and muscle relaxation [17][18].

Table 5. Mann Whitney Test

Variable	N	Mean Rank	Sig.*
Peppermint Essential Oil	25	22.78	0.149
Ginger Essential Oil	25	28.22	

*Test: Mann-Whitney

Table 5 shows that the *p-value* was 0.149, indicating no difference between the administration of *peppermint essential oil* and *ginger essential oil* on back pain in third-trimester pregnant women. *Peppermint essential oil* and *ginger essential oil* have an equal effect on reducing back pain intensity, so both can be used to reduce back pain. In the mean rank results, the *peppermint essential oil* score was lower than that of *ginger essential oil*, so *peppermint essential oil* is more effective in reducing back pain in third-trimester pregnant women, although the difference in results is not significant.

According to the gate control theory proposed by Melzack and Wall, sensory stimulation such as warmth, cold, and relaxation can inhibit the transmission of pain impulses to the brain, thereby reducing pain perception. *Peppermint* provides a cooling sensation through its menthol content, while *ginger* provides a warming sensation through its gingerol content. Both effects equally help reduce muscle tension and increase comfort in pregnant women.

Studies by Rustiningsih et al. (2022) and Nengsih et al. (2022) noted that complementary therapies such as aromatherapy and relaxation can help reduce back pain in third-trimester pregnant women by increasing relaxation and the body's adaptation to biomechanical changes during pregnancy [19][20].

Based on the research findings, theory, and other supporting studies, it can be concluded that peppermint essential oil and ginger essential oil are equally effective in reducing back pain in third-trimester pregnant women, so both can be used as non-pharmacological complementary therapies in midwifery care.

IV. CONCLUSION

The administration of *essential oil* peppermint and *essential oil* ginger had a significant effect on reducing the intensity of back pain in third-trimester pregnant women. This is evidenced by the results of the *Wilcoxon* test with a *p-value* of 0.000 in both groups, so both interventions can be used as effective complementary therapies in reducing back pain in the final trimester of pregnancy.

The results of the *Mann–Whitney* test showed a *p-value* of 0.149, which means there was no significant difference in effectiveness between peppermint essential oil and ginger essential oil in reducing back pain intensity in third-trimester pregnant women. Nevertheless, the mean rank value indicates that *peppermint essential oil* tends to be more effective than *ginger essential oil*, although the difference in effectiveness is relatively small.

Thus, the administration of *lavender essential oil* and *ginger essential oil* is beneficial for reducing back pain in third-trimester pregnant women.

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REFERENCES

- [1] Handayani, S., & Putri, R. M. (2020). Hubungan usia kehamilan dengan kejadian nyeri punggung pada ibu hamil trimester III. *Healthy Care Journal*, 2(1), 45–52. <https://journal.ufdk.ac.id/index.php/hcj/article/view/53>
- [2] Hidayati, N., & Sari, D. P. (2021). Prevalensi nyeri punggung pada ibu hamil di Indonesia. *Prosiding Seminar Nasional Kesehatan*, 3(1), 112–118. <https://prosiding.hip.ac.id/index.php/prosiding/article/view/105>
- [3] Field, T. (2019). Massage therapy research review. *Complementary Therapies in Clinical Practice*, 34, 165–171. <https://doi.org/10.1016/j.ctcp.2018.12.005>.
- [4] Smith, C. A., Levett, K. M., Collins, C. T., & Armour, M. (2020). Relaxation techniques for pain management in labour. *Cochrane Database of Systematic Reviews*, 3(3), CD009514. <https://doi.org/10.1002/14651858.CD009514.pub2>.
- [5] Kementerian Kesehatan Republik Indonesia. (2020). Pedoman pelayanan antenatal, persalinan, nifas, dan bayi baru lahir di era adaptasi kebiasaan baru. Kemenkes RI. <https://kesmas.kemkes.go.id>
- [6] Putri DMP, Amalia RN. *Terapi komplementer: Konsep dan aplikasi dalam keperawatan*. Yogyakarta: Pustaka Baru Press; 2019.
- [7] Sagita & Martina. (2019). Pemberian Aroma Terapi Lavender untuk Menurunkan Intensitas Nyeri. *Wellness And Healthy MagazinE* vol 1 No 2, 151-156
- [8] , M., et al. (2024). Effect of oral and topical ginger on primary dysmenorrhoea: A systematic review. *Journal of Herbal Medicine*, 46, 100890. <https://doi.org/10.1016/j.hermed.2024.100890>.
- [9] Marx, W., et al. (2024). The use of ginger bioactive compounds in pregnancy: An evidence scan and umbrella review of existing meta-analyses. *Advances in Nutrition*, 15(11), 100308. <https://doi.org/10.1016/j.advnut.2024.100308>.
- [10] Bahri, S., et al. (2024). The effect of Swedish massage using ginger oil on chronic low back pain. *Indonesian Journal of Research in Physical Education, Sport, and Health*, 2(1), 1–6. <https://doi.org/10.17977/um086v2i12024p1-6>.

- [11] Lean, S. C., Derricott, H., Jones, R. L., & Heazell, A. E. P. (2018). Advanced maternal age and adverse pregnancy outcomes: A systematic review and meta-analysis. PLOS ONE.
- [12] Yazir, A. N., Rahmadhani, R., Setiawati, D., & Inayah Sari, J. (2022). The relationship between gestational age, parity, nutritional status with the incidence of low back pain in pregnant women. Media Publikasi Promosi Kesehatan Indonesia (MPPKI).
- [13] Arummega, M. N, Rahmawati, A., Meiranny, A., (2022). Faktor-Faktor yang Mempengaruhi Nyeri Punggung Ibu Hamil Trimester III: Literatur Review. Oksitosin: **Jurnal Ilmiah Kebidanan**
- [14] Price, S. A., & Wilson, L. M. (2019). Patofisiologi: Konsep klinis proses-proses penyakit (10th ed.). EGC.
- [15] Fatimah, S., & Nuryaningsih. (2021). Asuhan kehamilan. Salemba Medika.
- [16] Wahyuni, C. O., Lestari, D., & Fitriani, R. (2024). Massage effleurage kombinasi aromaterapi lavender berpengaruh terhadap nyeri punggung ibu hamil. **Journal of Midwifery**, 12(1), 55–63. **Journal of Midwifery**
- [17] Retni, A., Nurhayati, S., & Puspitasari, D. (2024). Penerapan pemberian kompres jahe untuk menurunkan nyeri punggung bawah pada ibu hamil trimester III. **Jurnal Keperawatan Muhammadiyah**, 9(1), 88–95. **Jurnal Keperawatan Muhammadiyah**
- [18] Sinaga, T. H., Juliarti, W., & Triana, A. (2023). Kompres hangat air jahe untuk mengurangi nyeri punggung pada ibu hamil. **Jurnal Kebidanan Terkini**, 3(1), 15–22. Jurnal Kebidanan Terkini
- [19] Rustiningsih, T., Asih, F. R., & Solihin, S. (2022). Prenatal yoga menurunkan keluhan nyeri punggung bawah pada ibu hamil. Jurnal Kebidanan Malakbi, 3(2), 75–82. **Jurnal Kebidanan Malakbi**
- [20] Nengsih, D. P., Syamsiah, S., & Suciawati, A. (2021). The effectiveness of pregnancy exercise in relieving back pain during third trimester of pregnancy at BPM Nurhidayah Cisarua Bogor in 2021. **Strada Jurnal Ilmiah Kesehatan**, 10(1), 1234–1241. **Strada Jurnal Ilmiah Kesehatan**