KESANS
International Journal of Health and Science

The Effect of Ginger Aromatherapy and Warm Compresses on Primary Dysmenorrhea in Adolescent Girls

[1]Okto Riristina Gultom*, [2]Hamisah, [3]Sofia Mawwadah, [4]Erina Eka Hatini

[1] Bachelor of Midwifery Study Program, Ministry of Health Polytechnic of Health, Palangka Raya, Central Kalimantan, Indonesia*; email: oktoriris@polkesraya.ac.id

[2] Bachelor of Midwifery Study Program, Ministry of Health Polytechnic of Health, Palangka Raya, Central Kalimantan, Indonesia; email: hhamisahhh@gmail.com

[3] Bachelor of Midwifery Study Program, Ministry of Health Polytechnic of Health, Palangka Raya, Central Kalimantan, Indonesia; email: sofizline@gmail.com

[4] Bachelor of Midwifery Study Program, Ministry of Health Polytechnic of Health, Palangka Raya, Central Kalimantan, Indonesia; email: erinaeka@polkesraya.ac.id
*Correspondence

Abstract
Overview: *Dysmenorrhea is the term for severe lower abdominal pain brought on by greater uterine contractions. 64.25% of Indonesian women experience dysmenorrhea, yet many choose not to receive the recommended care. Non-pharmacological treatments, such as warm compresses and ginger aromatherapy, are safer possibilities.* **Objective:** *This study aims to find out how ginger's aromatherapy and warm compression affected primary dysmenorrhoea in adolescent girls* **Method:** *Thirty teenage females with primary dysmenorrhea at SMK Muhammadiyah Palangka Raya participated in this quasi-experimental study. Both pre-test and post-test designs were employed. The sample was chosen and split into two intervention groups using the purposive sampling technique. The Numeric Rating Scale (NRS) was used to test the pain intensity data. The Shapiro-Wilk, Paired Sample t-Test, and Independent Sample t-Test were used to test the analysis results.* **Outcomes:** *The results of the study show that there were differences in primary dysmenorrhea pain levels before and after the intervention. The average pain level was 2.71 (SD = 1.069) for the ginger aromatherapy group and 4.07 (SD = 1.385) for the warm compress group, with a p-value of 0.007 (p < 0.05).* **Conclusion:** *demonstrates that ginger aromatherapy is more effective than warm compresses for reducing primary dysmenorrhea*

The Effect of Ginger Aromatherapy and Warm Compresses on Primary Dysmenorrhea in Adolescent Girls

Introduction

One of the most common menstrual problems experienced by women is dysmenorrhoea. Increased prostaglandin production causes stronger uterine contractions and pain during the first menstrual period. Of the 50 students at SMAN 2 Kahayan Tengah, (Istiningsih et al., 2024) found that 34 experienced dysmenorrhoea with a low level of pain, and 16 others experienced a moderate level of pain. Based on 2018 Riskesdas data, the prevalence of dysmenorrhoea is 64.25%, with 54.89% consisting of primary dysmenorrhoea and 9.36% consisting of secondary dysmenorrhoea.

Pharmacological therapy may include the use of non-steroidal anti-inflammatory drugs (NSAIDs). However, if used in high doses or for prolonged periods, any NSAID can cause digestive problems and serious kidney damage. Non-pharmacological treatment or alternative methods are expected to have minimal side effects. Aromatherapy is an alternative treatment method that uses the aroma or scent of aromatic compounds.

Smells stimulate neurochemical cells in the brain. As a result, pleasant smells encourage the thalamus to release enkephalin, which is a natural drug that calms and reduces pain (Nuraeni & Nurholipah, 2021). The chemical compounds of Zingiber officinale Roscoe, also known as red ginger, including shogaol, gingerol, and zingerone, are known to have pharmacological effects such as analgesic, antioxidant, anti-inflammatory, and anti-carcinogenic properties.

Ginger aromatherapy is beneficial for relieving headaches and muscle pain, reducing tension and stress, improving health, relieving muscle spasms, and boosting the immune system (Susanty & Saputra, 2022). It has been found that red ginger aromatherapy, which works through the respiratory tract via the nose, can be used as a non-pharmacological method to reduce pain. An additional study found that ginger aromatherapy helped reduce menstrual pain, with its warming effect relieving pain and its aroma promoting relaxation (Trisnawati et al., 2023). Aromatherapy with ginger is also considered a safer non-pharmacological alternative to medications. Warm compresses are another way to treat primary dysmenorrhoea, and this therapy has long been used to relieve dysmenorrhoea pain. It reduces menstrual pain by improving blood circulation. The heat from the warm compress dilates the blood vessels, helping more blood to enter the tissue. This increases the delivery of acids and nutrients to the cells and improves the removal of waste products. As a result, the blood supply to the endometrium can reduce the pain caused by it (Dukomalamo et al., 2025). Based on this study, the researchers conducted research to find out how ginger's aromatherapy and warm compression affected primary dysmenorrhoea in adolescent girls.

Method

These studies employed a quasi-experimental design to compare two groups before and after testing. Studies were conducted randomly, with two groups selected for treatment. The experimental group with ginger aromatherapy and the experimental group with warm water compresses were observed twice, at the beginning of the activity (pre-test) and at the end of the activity (post-test). This study involved female adolescents studying at SMK Muhammadiyah Palangka Raya. It used non-probability sampling with a purposive technique, which met the inclusion and exclusion criteria. The subjects of this study were female students at SMK Muhammadiyah Palangka Raya who were experiencing primary dysmenorrhoea. The sample in this study consisted of female adolescents experiencing primary dysmenorrhea at SMK Muhammadiyah Palangkaraya. The number of samples in this study was calculated using the Slovin formula. A total of

The Effect of Ginger Aromatherapy and Warm Compresses on Primary Dysmenorrhea in Adolescent Girls

14 adolescent girls were included in the intervention group that received ginger aromatherapy, while 14 other adolescent girls were included in the warm compress intervention group. The study was conducted in May-June 2025. The Numeric Rating Scale (NRS) was used to measure dysmenorrhea in this study. The independent variables in this study were ginger aromatherapy and warm compresses, while the dependent variable was primary dysmenorrhea pain. The warm compress was placed on the lower abdomen or below the waist and the area that felt painful for 15 minutes when experiencing dysmenorrhea pain on the first day of menstruation. Aromatherapy was administered by dripping 5 drops of ginger essential oil onto a clean tissue. The tissue containing the ginger aromatherapy oil was then placed in a medical mask and inhaled for 15 minutes once a day when the respondents felt dysmenorrhoea pain on the first day of menstruation. The characteristics of the respondents studied in this study were age at menarche, menstrual cycle, and family history. The univariate analysis was performed to determine the descriptive statistics of the level of primary dysmenorrhea in adolescent girls before and after the administration of ginger aromatherapy, while the bivariate analysis was used to assess the effect of ginger aromatherapy and warm compresses on the level of primary dysmenorrhea in adolescent girls using a *paired sample t-test.*

Result and Discussion
1. Result

Age at menarche, menstrual cycle, and family history of dysmenorrhoea were characteristics of adolescent girls with primary dysmenorrhoea in these studies. Frequency distribution tables of characteristics of respondents were presented in table 1.

Table 1
Frequency Distribution Based on Research Subject Characteristics

No	Characteristics	Intervention group		Control group	
		N	%	N	%
1	Age of menarche				
	a. Early manarche	0	0.0 %	0	0.0 %
	b. Normal manarche	14	100.0 %	14	100.0 %
	c. Late manarche	0	0.0 %	0	0.0 %
2	Menstrual Cycle				
	a. Regular menstrual cycle	14	100.0 %	14	100.0 %
	b. Irregular menstrual cycle	0	0.0 %	0	0.0 %
3	Family history of dysmenorrhea				
	a. Yes	10	71.4 %	9	64.3 %
	b. No	4	28.6 %	5	35.7 %

Source: primary data 2025

According to table 1, the frequency distributions of respondents' characteristics based on the age of menarche in the warm compress control group and the ginger aromatherapy intervention group were all within the normal age range of 11–13 years. The frequency distribution table of respondent characteristics based on menstrual cycle in both the warm compress group and the ginger aromatherapy groups shows that all respondents have regular menstrual cycles, in the range of 21–35 days. The frequency distribution of characteristics based on family history of dysmenorrhoea in the warm

compress group showed that most respondents answered yes (71.4%) and no (28.6%), while the ginger aromatherapy group answered yes (64.4%) and no (35.7%).

Table 2

Average rates of primary dysmenorrhoea in adolescent girls before and after in the intervention and control groups

Tingkat Dismenor Primer Adolescent Girls	Mean	Median	Min	Max	p-Value
Intervention group					
Before treatment	5.57	6.00	3	7	0.000
After treatment	2.71	3.00	1	4	
Control group					
Before treatment	5.43	5.50	3	7	0.000
After treatment	4.07	4.00	2	6	

Source: primary data 2025

Based on the data in table 2, the results show the measurement of primary dysmenorrhoea pain levels in adolescent girls before and after treatment. In the *intervention* group that received ginger aromatherapy, the mean primary dysmenorrhoea score before treatment was 5.57 with a medians dysmenorrhoea scale of 6.00, a minimum dysmenorrhoea scale score of 3 and a maximum dysmenorrhoea scale score of 7. After the ginger aromatherapy intervention, there was a significant decrease in the level of dysmenorrhoea pain. The mean dysmenorrhoea pain decreased to 2.71 with a median pain scale of 3.00, a minimum pain scale of 1, and a maximum pain scale of 4. This decrease was very significant, with a difference between the mean before and after the intervention reaching 2.86 points. Meanwhile, in the control group that was given warm compresses, the mean dysmenorrhoea pain before treatment was 5.43, with a median pain scale of 5.50, a minimum pain scale of 3, and a maximum pain scale of 7. After receiving warm compresses, there was a decrease in the dysmenorrhoea pain scale in the control group to an average of 4.07 with a median pain scale of 4.00, a minimum pain scale of 2, and a maximum pain scale of 6. The decrease of 1.36 points indicates a reduction in pain, although not as significant as in the intervention group. Statistical tests show a p-value of 0.000 in both groups, indicating a value less than the value of alpha 0.05 ($p < 0.05$). This indicates there is a statistically significant difference between the levels of dysmenorrhoea pain before and after treatment in both groups.

Table 3

Primary Dysmenorrhea Rates in Adolescent Girls in the Intervention and Control Groups

Variable	(n)	Mean	SD	p-Value
Post Intervensi	14	2.71	1.069	0.007
Post Kontrol	14	4.07	1.385	

Source: primary data 2025

Based on the data in table 3, the results show a comparison of the level of primary dysmenorrhoea between the intervention group and the control group after treatment. Statistical tests show a p-value of 0.007, meaning less than the alpha value of 0.05 ($p < 0.05$). There were statistically significant differences between the levels of post-intervention dysmenorrhoea pain in the ginger aromatherapy group and the warm compress group. The difference in mean scores between the two groups was 1.36 points.

2. Discussion

Research results based on respondent characteristics indicate that all respondents experienced normal menarche. Normal menarche age generally reflects balanced hormonal and physiological development, as does the respondents' menstrual cycle, which was found to be regular. Therefore, these two factors are not considered to increase the risk of primary dysmenorrhoea. However, based on the characteristics of respondents with a family history of primary dysmenorrhoea, 71.4% of the intervention group had a family history of dysmenorrhoea, while in the control group, 64.3% had a family history of primary dysmenorrhoea. The relatively high proportion of respondents with a family history of primary dysmenorrhoea in both groups is clinically noteworthy, as genetic predisposition is a well-established risk factor for dysmenorrhoea severity through its influence on prostaglandin synthesis and uterine contractility. Although randomization was applied, this distribution may constitute a potential confounding factor, given that respondents with a positive family history may have a lower baseline pain threshold and a higher intrinsic susceptibility to dysmenorrhoea-related pain. Future studies should consider stratifying by family history to better isolate the effect of the intervention

Warm compresses can reduce pain because they can be applied to the lower abdomen during menstruation to increase blood circulation and capillary pressure (Masniah et al., 2025). In addition, they can relax the uterine muscles and reduce cramps (Khotimah & Lintang, 2022). The consistent efficacy of warm compress therapy in alleviating primary dysmenorrhea pain has been demonstrated across multiple studies (Kirsch et al., 2024; Mukhoirotin & Urifah, 2022). This non-pharmacological intervention offers a safe, accessible, and often preferred alternative for pain management during menstruation (Ummah & Ismarwati, 2024; Wal et al., 2023). The therapeutic mechanism primarily involves local heat delivery, which enhances local skin temperature, relaxes musculature, softens fibrous tissue, and ultimately elevates the pain threshold(Widianti et al., 2021). Furthermore, heat application is thought to mitigate menstrual pain by increasing pelvic blood supply, inhibiting uterine contractions, and stimulating the release of endorphins and serotonin, thereby altering pain signal perception (Itani et al., 2022). Although warm compresses have been shown to be effective in relieving dysmenorrhoea pain through muscle relaxation and increased local blood flow, several limitations need to be considered, such as the limited penetration of heat in cases of more severe or deep-seated dysmenorrhoea. Furthermore, the application of compresses that are too hot has the potential to cause skin irritation and discomfort, thus requiring careful temperature monitoring (Siti Padilah et al., 2022). It is also important to note that the effectiveness of warm compresses may vary between individuals, and not all cases of dysmenorrhoea will be fully resolved by this intervention alone,

Meanwhile, in the ginger aromatherapy intervention group, the average primary dysmenorrhoea pain level before treatment was 5.57 with a median pain scale of 6, a minimum pain scale of 3, and a maximum pain scale of 7. After the intervention, the average dsymenorrhoea pain decreased to 2.71 with a median pain scale of 3, a minimum pain scale value of 1, and a maximum pain scale of 4, which means that most respondents experienced a reduction in pain to a mild level. This degree of reduction exceeds the commonly cited minimum clinically important difference (MCID) of 1.0–2.0 points on a numeric pain rating scale, further strengthening the practical relevance of the finding. The greater reduction in the level of dysmenorrhoea in the intervention group was influenced by the chemical compounds in ginger, such as gingerol, zingerone, and shogaol, which

are known to have pharmacological effects such as analgesic, antioxidant, anti-inflammatory, and anti-carcinogenic properties (Susanty & Saputra, 2022).

One of the most prominent uses of ginger is its essential oil. One of the most important benefits of ginger is its oil. This essential oil comes from active compounds such as gingerol, which has a calming effect (Wiranti et al., 2024). According to a theory proposed by Maharianingsih & Poruwati 12 in 2021, (Maharianingsih & Poruwati, 2021) aromatherapy inhaled through breathing works through the olfactory and circulatory systems. When aromatherapy is inhaled into the nasal cavity through breathing, it is interpreted by the brain as smell; the nerves then receive the aromatherapy molecules and send them to the olfactory centre at the back. The neuronal cells understand the aroma and pass it on to the limbic system. From there, they are sent to the hypothalamus to release the hormone serotonin, which improves mood. In addition, endorphins, which are natural painkillers, create a relaxed, calm and happy mood, which can affect the intensity of primary dysmenorrhoea. Ginger aromatherapy in particular can help relieve headaches and muscle aches, reduce tension and stress, improve health, relieve muscle spasms and boost the immune system (Susanty & Saputra, 2022).

Ginger essential oil contains active compounds such as gingerol, which has anti-inflammatory and muscle relaxant properties, making it more effective at relieving pain than warm compresses, which work physically by transferring heat. Significant pain remained after both treatments, but ginger aromatherapy was considered more effective and worked faster. Ginger has medicinal properties as an antibacterial, antiviral, diuretic, sedative, and adrenal stimulant (Wiranti et al., 2024). In addition, ginger essential oil consists of various active ingredients, such as zingiber and zingiberol, which have calming and positive effects (Khodaveisi et al., 2019)

Ginger's active compounds have analgesic effects, which can reduce menstrual pain. In addition, the compound eugenol has the ability to stop the prostanoid system, which is responsible for making prostaglandins, contributing to the reduction of menstrual pain. Because the red ginger aromatherapy inhalation method works through the respiratory tract entering through the nose, it can be used as a non-pharmacological method to reduce pain. Red ginger contains essential oils that are delivered to the brain receptors, which then provide a calming and positive effect. With these positive and calming effects, dysmenorrhoea pain can be reduced.

Despite the promising findings, several potential confounding factors warrant acknowledgment. First, individual pain thresholds vary substantially between respondents and were not objectively measured in this study; respondents with higher baseline pain tolerance may have reported lower post-intervention scores regardless of treatment. Second, physical activity levels and sleep patterns were not controlled for, despite evidence that regular exercise and adequate sleep are independently associated with reduced dysmenorrhoea severity. Third, anxiety and psychological stress which are known to amplify pain perception through the central sensitization pathway were not assessed, and differences in respondents' stress levels across the measurement period may have influenced pain scores. Fourth, dietary factors such as caffeine consumption, which is associated with increased uterine contractility and heightened dysmenorrhoea severity, were not standardized. Finally, concomitant use of analgesic medications or herbal remedies was not systematically monitored, raising the possibility that some respondents may have used supplementary pain relief during the observation period, which could have confounded the post-treatment scores in either group. These limitations should be addressed in future randomized controlled trials through the use of validated screening

tools for anxiety, standardized dietary guidelines, and a medication diary to ensure the integrity of the intervention effect

Conclusion

Based on the research findings, all respondents had experienced menarche and had normal menstrual cycles; therefore, these two factors did not contribute to an increased risk of primary dysmenorrhoea. However, the proportion of respondents with a family history of primary dysmenorrhoea was relatively high in both groups, which may act as a confounding factor due to a genetic predisposition towards a lower pain threshold. Ginger aromatherapy demonstrated a more significant reduction in pain compared to warm compresses. This is attributed to the presence of active compounds such as gingerol, shogaol, and zingerone, which possess analgesic, anti-inflammatory, and muscle-relaxing effects. Thus, it can be concluded that ginger aromatherapy is more effective than warm compresses in reducing the level of pain associated with primary dysmenorrhoea, although both are equally safe and beneficial as non-pharmacological methods.

Okto Riristina Gultom, Hamisah, Sofia Mawwadah, Erina Eka Hatini/**KESANS**
The Effect of Ginger Aromatherapy and Warm Compresses on Primary Dysmenorrhea in Adolescent Girls

Reference

Dukomalamo, P., Safitri, R., & Khoirunnisa, A. (2025). Efektivitas Terapi Kompres Hangat Terhadap Penurunan Nyeri Dismenore Pada Remaja Putri Di Puskesmas Kota Jailolo. *JIDAN (JURNAL ILMIAH KEBIDANAN)*, *5*(1), 8–15. https://doi.org/10.51771/jidan.v5i1.1156

Istiningsih, T., Meyasa, L., & Mariyah, H. I. (2024). Latihan Senam Dismenore Dalam Upaya Mengurangi Nyeri Haid Remaja Siswi Sma-2 Kahayan Tengah Kabupaten Pulang Pisau Kalimantan Tengah. *Jurnal Abdimas ITEKES Bali*, *3*(2), 75–80. https://doi.org/10.37294/jai.v3i2.538

Itani, R., Soubra, L., Karout, S., Rahme, D., Karout, L., & Khojah, H. M. J. (2022). Primary Dysmenorrhea: Pathophysiology, Diagnosis, and Treatment Updates. *Korean Journal of Family Medicine*, *43*(2), 101–108. https://doi.org/10.4082/kjfm.21.0103

Khodaveisi, Z., Borzou, S., Mohammadi, Y., & Azizi, A. (2019). The Effect of Inhalation of Ginger Extract on Postoperative Nausea, Retching and Vomiting after Laparoscopic Cholecystectomy: A Randomized Clinical Trial. *Journal of Health and Care*, *21*(2), 126–134. https://doi.org/10.29252/jhc.21.2.126

Khotimah, H., & Lintang, S. S. (2022). Terapi Non-Farmakologi untuk Mengatasi Nyeri Dismenore pada Remaja. *Faletehan Health Journal*, *9*(3), 343–352. https://doi.org/10.33746/fhj.v9i3.499

Kirsch, E., Rahman, S., Kerolus, K., Hasan, R., Kowalska, D., Desai, A., & Bergese, S. (2024). Dysmenorrhea, a Narrative Review of Therapeutic Options. *Journal of Pain Research*, *Volume 17*, 2657–2666. https://doi.org/10.2147/JPR.S459584

Maharianingsih, N. M., & Poruwati, N. M. D. (2021). Pengaruh Pemberian Aromaterapi Kayu Manis terhadap Intensitas Nyeri Dismenore Primer pada Remaja. *Jurnal Ilmiah Medicamento*, *7*(1), 55–61. https://doi.org/10.36733/medicamento.v7i1.1262

Masniah, I., Jayatmi, I., & Munawaroh, M. (2025). Pengaruh Kompres Air Hangat dan Pemberian Minuman Kunyit Asam Pada Remaja Untuk Mengurangi Nyeri Haid (Desminorhea) Di Wilayah Kerja PMB I Tahun 2024. *Journal of Innovation Research and Knowledge*, *4*(9).

Mukhoirotin, M., & Urifah, S. (2022). Using warm compresses to reduce IL-1β levels in dysmenorrhea: An evaluation of quasy experimental study. *Journal of Holistic Nursing Science*, *9*(1), 38–43. https://doi.org/10.31603/nursing.v9i1.6858

Nuraeni, R., & Nurholipah, A. (2021). Aromaterapi Lavender terhadap Intensitas Nyeri Haid (Dysmenorrhea) pada Mahasiswi Tingkat II. *Jurnal Keperawatan Silampari*, *5*(1), 178–185. https://doi.org/10.31539/jks.v5i1.2834

Siti Padilah, N., Suhanda, Nugraha, Y., & Fitriani, A. (2022). Intervensi Kompres Hangat Untuk Menurunkan Intensitas Nyeri Pada Pasien Gastritis: Sebuah Studi Kasus. *INDOGENIUS*, *1*(1), 23–33. https://doi.org/10.56359/igj.v1i1.58

Susanty, S. D., & Saputra, H. A. (2022). Pengaruh Pemberian Aromaterapi Red Ginger (Jahe Merah) Terhadap Nyeri Haid Pada Remaja. *Jurnal Public Health*, *8*(2), 83–91.

Trisnawati, Y., Sulistyowati, N., & Pujiati, W. (2023). Efektivitas Massage Effleurage, Aromaterapi Ginger dan Kombinasi Terhadap Pengurangan Nyeri Haid. *Jurnal Kebidanan*, *XV*(02), 168–181.

Okto Riristina Gultom, Hamisah, Sofia Mawwadah, Erina Eka Hatini/**KESANS**
The Effect of Ginger Aromatherapy and Warm Compresses on Primary Dysmenorrhea in Adolescent Girls

Ummah, T., & Ismarwati. (2024). The impact of complementary therapies on dysmenorrhea in young women. *Majalah Obstetri & Ginekologi*, *32*(1), 29–38. https://doi.org/10.20473/mog.V32I12024.29-38

Wal, P., Gupta, D., Wal, A., Pandey, S. S., & Krishnan, K. (2023). A Wholistic Approach to Non-Pharmacological Intervention for Primary Dysmenorrhea. *Current Women s Health Reviews*, *20*(1). https://doi.org/10.2174/1573404819666230109105829

Widianti, W., Nurazizah, Y. S., Nurkania, V., Fauzi, A., Hidayat, A., Herdiawan, Y., Nugraha, T. S., & Roslianti, E. (2021). The Effect of Warm Compress on Lowering Dysmenorrhea Pain. *Genius Journal*, *2*(2), 54–60. https://doi.org/10.56359/gj.v2i2.22

Wiranti, A. D., Marhamah, E., & Bagus, K. (2024). Application of Ginger Aromatherapy to Overcome Main Problems Post Operative Nausea and Vomiting (PONV) in Patients Post Appendictomy. *Proceeding of the International Conferenceon Health Sciences and Nursing*, *1*(2), 43–54.