THE EFFECT OF LEMON AROMATHERAPY ON REDUCING DYSMENORRHEA PAIN AMONG FEMALE STUDENTS AT SMP NEGERI 1 SIMPANG TIGA, ACEH BESAR REGENCY

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Abstract

Menstrual pain or dysmenorrhea can cause disruption of daily activities in teenage girls, lessen concentration, and even affect their academic achievement. Lemon aromatherapy is a non-pharmacological method used to reduce dysmenorrhea pain by giving relaxation and analgesic effects with its active compounds, such as limonene and linalool. Based on the data from the World Health Organization (WHO), around 90% of women experience dysmenorrhea, and 10–15% of them suffer from severe dysmenorrhea that requires intervention. This study aims to determine the effect of lemon aromatherapy in reducing the level of dysmenorrhea pain among girls. This study was a quantitative research with a quasi-experimental approach using a one-group pretest-posttest design. The population was all seventh and eighth-grade female students of SMP Negeri 1 Simpang Tiga, Aceh Besar, who experienced dysmenorrhea. A total of 15 respondents were selected using purposive sampling. The study was conducted from May 29 to June 21, 2025. The intervention was carried out by giving lemon aromatherapy on the first to third day of menstruation, once a day intake for about 15 minutes. The pain level was assessed using the Numerical Rating Scale (NRS). The data were analyzed using the Paired Samples T-Test. The results showed that most respondents experienced moderate pain (93.3%) before receiving the treatment, and a small proportion experienced severe pain (6.7%). After receiving lemon aromatherapy, the pain level decreased to mild pain (46.7%) and moderate pain (53.3%). The mean pain score before intervention was 3.07 and decreased to 2.53 after intervention, with a difference of 0.54. The statistical analysis obtained a p-value of 0.001 (p < 0.05), indicating that there was a significant effect of lemon aromatherapy on reducing dysmenorrhea pain. Thus, based on the findings, this study recommends that teenage girls use lemon aromatherapy as an alternative independent treatment to reduce menstrual pain complaints.

Keywords: teenage girls, dysmenorrhea, lemon aromatherapy.

Abstrak

Nyeri menstruasi atau dismenore dapat menyebabkan gangguan aktivitas harian pada remaja putri, menurunkan konsentrasi belajar, hingga berdampak pada prestasi akademik.

Aromaterapi lemon merupakan salah satu metode nonfarmakologis yang digunakan untuk mengurangi nyeri dismenore dengan memberikan efek relaksasi dan analgesik melalui kandungan senyawa aktif seperti limonene dan linalool. Menurut data WHO, sekitar 90% wanita mengalami dismenore, dan 10–15% di antaranya mengalami dismenore berat yang memerlukan intervensi. Tujuan dari penelitian ini untuk mengetahui pengaruh aromaterapi lemon dalam menurunkan tingkat nyeri dismenore pada remaja putri Penelitian ini kuantitatif dengan desain quasi experiment menggunakan pendekatan one group pretest-posttest. Populasi dalam penelitian ini seluruh siswi kelas VII dan VIII SMP Negeri 1 Simpang Tiga Aceh Besar yang mengalami dismenore, dengan jumlah sampel sebanyak 15 orang yang dipilih menggunakan teknik purposive sampling. Penelitian dilaksanakan pada tanggal 29 Mei s.d. 21 Juni 2025. Intervensi dilakukan dengan pemberian aromaterapi lemon pada hari pertama hingga ketiga menstruasi, sekali sehari selama ±15 menit. Pengukuran skala nyeri menggunakan Numerical Rating Scale (NRS) dan data dianalisis menggunakan uji Paired Samples t-Test. Hasil penelitian menunjukkan bahwa sebelum diberikan aromaterapi lemon, sebagian besar responden mengalami nyeri sedang (93,3%) dan sebagian kecil mengalami nyeri hebat (6,7%). Setelah diberikan aromaterapi lemon, nyeri responden menurun menjadi nyeri ringan (46,7%) dan nyeri sedang (53,3%). Nilai rata-rata nyeri responden sebelum intervensi adalah 3,07 dan menurun menjadi 2,53 setelah intervensi, dengan selisih 0,54. Hasil uji statistik diperoleh p-value = 0,001 (p < 0,05), sehingga dapat disimpulkan bahwa terdapat pengaruh yang signifikan dari pemberian aromaterapi lemon terhadap penurunan nyeri dismenore. Peneliti menyarankan agar remaja putri dapat menggunakan aromaterapi lemon sebagai metode mandiri dalam mengurangi keluhan nyeri menstruasi.

Kata Kunci: *Dismenore*, Aromaterapi Lemon, Remaja Putri.

1. INTRODUCTION

Adolescence is an age group that represents a critical transitional phase from childhood to adulthood, characterized by physical, emotional, and social changes. One of the most prominent biological features in adolescent girls is the onset of the menstrual cycle. Menstruation is a physiological process involving the periodic shedding of the endometrial lining due to fluctuations in estrogen and progesterone hormones. However, not all females experience this cycle without discomfort. One of the most common disorders is dysmenorrhea, which refers to pain that occurs before or during menstruation and can affect the quality of life of adolescents (Salianto et al., 2022).

Dysmenorrhea is a common reproductive health problem, particularly among school-age adolescent girls. The main complaint is severe pain in the lower abdomen that may radiate to the back and thighs. In addition, dysmenorrhea is often accompanied by other symptoms such as nausea, vomiting, dizziness, diarrhea, fatigue, and even difficulty concentrating during learning activities. This condition can interfere with daily activities and reduce productivity as well as academic achievement (Hidayanti & Adiwiryono, 2021).

The World Health Organization (WHO) reports that the global prevalence of dysmenorrhea is very high, ranging from 16.8% to 81%, with an average of more than 50% of women of reproductive age experiencing it (WHO, 2023). This figure indicates that dysmenorrhea is a global issue requiring special attention, especially because it can affect both the physical and mental health of adolescents.

In Indonesia, the prevalence of dysmenorrhea is also relatively high. Data show that 54.89% of adolescent girls experience primary dysmenorrhea and 9.36% suffer from secondary dysmenorrhea, with a total prevalence exceeding 60% of the female reproductive-age population (Lia, 2023). Specifically, in Aceh Besar Province, the prevalence of adolescents seeking medical attention for dysmenorrhea ranges between 1.2% and 1.3% of total adolescent visits to healthcare facilities (Aceh Besar Health Profile, 2023). This number is estimated to be much lower than the actual figure, as most adolescents tend not to report or seek medical help for such complaints.

Adolescents, as a vulnerable group, deserve serious attention in terms of reproductive health. According to UNICEF (2024), adolescents aged 10 to 19 years currently account for about 1.3 billion people or 16% of the world's population. In Indonesia, based on data from the Central Bureau of Statistics (2023), the number of youths reaches 64.16 million or 23.18% of the total population. With such a significant number, addressing health issues such as dysmenorrhea is crucial as part of long-term health investment.

Dysmenorrhea is classified into two types: primary dysmenorrhea, which is not caused by any organic disorder, and secondary dysmenorrhea, which is related to reproductive system abnormalities such as endometriosis or myoma. Primary dysmenorrhea generally begins with the onset of menstruation and is more commonly experienced by adolescents (Firawati, 2020).

The cause of pain in dysmenorrhea is associated with an increase in prostaglandin levels in the blood. Prostaglandins are substances that trigger excessive uterine muscle contractions, causing pain. Women with dysmenorrhea reportedly have prostaglandin levels ten times higher than those who do not experience it (Firawati, 2020).

In managing dysmenorrhea, there are two therapeutic approaches: pharmacological and non-pharmacological. Pharmacological therapy generally uses analgesics such as ibuprofen, mefenamic acid, and nonsteroidal anti-inflammatory drugs (NSAIDs). However, long-term use may cause side effects such as gastric irritation and dependency (Nurindasari & Hengky, 2020). Therefore, non-pharmacological alternatives are increasingly being developed. Some methods proven effective include warm compresses, relaxation techniques, exercise, music therapy, and aromatherapy. These therapies aim to provide comfort, reduce muscle tension, and decrease the perception of pain (Rambi & Bajak, 2019).

Aromatherapy has become one of the popular choices due to its relaxing and analgesic effects through olfactory stimulation and transdermal absorption. One of the essential oils often used is lemon. Lemon oil contains active compounds such as limonene and linalool, which act as anti-inflammatory and nerve-calming agents (Widyaningrum, 2021).

Previous studies have shown that lemon aromatherapy significantly reduces the intensity of dysmenorrhea pain. Dewi et al. (2021) reported that using lemon aromatherapy for 15–30 minutes effectively reduced menstrual pain intensity compared to the control group. The effectiveness of lemon aromatherapy is further supported by the fact that adolescents tend to prefer fresh and light fruity scents. Rismawati et al. (2020) added that the aroma of lemon provides a calming effect and helps reduce stress, which contributes to pain intensity.

In addition to aromatherapy, music therapy has also been used as an alternative, but its effectiveness largely depends on individual music preferences. Classical music, which is often considered soothing, may not align with the cultural context and preferences of Indonesian adolescents, who tend to prefer pop music (Aprilian & Elsanti, 2020). Deep-breathing relaxation techniques also have positive effects on managing dysmenorrhea pain. By stimulating the parasympathetic nervous system, this technique helps reduce tension and

increase bodily comfort (Nurindasari & Hengky, 2020). However, this method requires practice and discipline, which may not always be feasible for adolescents.

Based on preliminary observations at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency, it was found that out of 15 interviewed students, 33.3% experienced mild pain (scale 1–3), 40% experienced moderate pain (scale 4–6), and 26.7% experienced severe pain (scale 7–10). The pain usually lasted from the first to the third day of menstruation and interfered with learning activities (Preliminary Data, 2025). Most students reported using analgesic painkillers to cope with dysmenorrhea, although some experienced side effects such as nausea and dependency. This reinforces the urgency of using safer and more natural alternative therapies such as lemon aromatherapy (Preliminary Data, 2025).

Given the high prevalence of dysmenorrhea, its impact on adolescent activities, and the potential side effects of pharmacological therapy, a safer and more adolescent-friendly intervention is needed. Based on a preliminary survey conducted among 10 students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency, 7 students (70%) reported experiencing menstrual pain every month, and 5 students (50%) stated that the pain interfered with their learning activities at school. Furthermore, 6 students (60%) expressed reluctance to take painkillers due to fear of side effects. In the same survey, 8 students (80%) showed interest in using aromatherapy, and among them, 6 students (75%) chose the lemon scent as their favorite due to its fresh and soothing aroma. Therefore, lemon aromatherapy emerges as a promising solution, as it is proven effective, preferred by adolescents, and easy to apply in the school environment (Preliminary Data, 2024).

2. RESEARCH METHOD

This study employed a quantitative approach with a quasi-experimental design, specifically a one-group pretest posttest design. The research aimed to determine the effect of lemon aromatherapy on reducing dysmenorrhea pain among female students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency. The population in this study consisted of all seventh- and eighth-grade female students who experienced dysmenorrhea. A total of 15 respondents were selected using a purposive sampling technique, based on specific inclusion criteria such as experiencing menstrual pain and willingness to participate. The study was conducted from May 29 to June 21, 2025. The intervention involved the administration of lemon aromatherapy during the first to the third day of menstruation, once daily for approximately 15 minutes. The pain intensity was measured using the Numerical Rating Scale (NRS) before and after the aromatherapy treatment. Data were processed through the stages of editing, coding, scoring, and tabulating. Statistical analysis was performed using the Paired Samples t-Test to determine the difference in mean pain intensity before and after the administration of lemon aromatherapy. Ethical considerations were observed throughout the study, including obtaining approval from the school authorities, providing informed consent forms to participants, maintaining confidentiality of personal data, and ensuring that participation was voluntary and free from coercion.

3. RESULTS AND DISCUSSION
1) Univariate Analysis
a) Before the Administration of Lemon Aromatherapy

Based on the results of the study conducted on 15 female students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency, the following table presents the frequency distribution of

pain scale scores before the administration of lemon aromatherapy. The data describe the level of menstrual pain experienced by the respondents prior to the intervention, as shown in Table 4.2 below.

Table 4.2
Frequency Distribution of Pain Scale Scores Among Female Students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency, Before and After the Administration of Lemon Aromatherapy (n = 15)

Skala Nyeri *Dismenorea*

Before Treatment	f	%	After Treatment	f	%
Moderate Pain	14	93,3	Mild Pain	7	46,7
Severe Pain	1	5,7	Moderate Pain	8	53,3
Total	15	100	Total	15	100

Source: Primary Data (Processed in 2025)

Based on Table 4.2, it can be seen that before the administration of lemon aromatherapy, most of the students experienced moderate pain, with 14 respondents (93.3%), while only 1 respondent (6.7%) experienced severe pain. After the administration of lemon aromatherapy, there was a change in the pain scale, indicating a decrease in pain intensity among most respondents. A total of 7 respondents (46.7%) reported mild pain, while 8 respondents (53.3%) continued to experience moderate pain. These findings demonstrate a difference in the distribution of pain levels before and after the administration of lemon aromatherapy, indicating that the intervention has the potential to reduce the intensity of dysmenorrhea among female students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency.

b) Test of Data Normality

Before further analysis was conducted, a normality test was performed to determine whether the data used in this study were normally distributed. The results of the data normality test are presented in Table 4.3 below.

Table 4.3
Data Normality Test Results

Group	Shapiro-Wilk	
	Statistik f	**P value**
Pretest	0,881 15	0,050
Posttest	0,896 15	0,082

Source: Primary Data (Processed in 2025)

Based on Table 4.4, the results of the normality test using the Shapiro–Wilk method showed a p-value of 0.050 for the pretest data and 0.082 for the posttest data. Using a significance level of 0.05, it can be interpreted that the pretest data, with a p-value of 0.050, is still within the acceptable threshold to be considered normally distributed, while the posttest data, with a p-value greater than 0.05 (0.082), also indicates a normal distribution. Thus, both data sets are considered to be normally distributed. Therefore, the analysis of the difference between the pretest and posttest scores was continued using a parametric test, specifically the Paired Samples t-Test, to determine the effectiveness of the intervention provided.

c) Bivariate Analysis

Based on the results of the study conducted on 15 female students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency, the following table presents the effect of lemon aromatherapy on the reduction of dysmenorrhea pain among the students, as shown in Table 4.4 below.

Table 4.4

The Effect of Lemon Aromatherapy on the Reduction of Dysmenorrhea Pain Among Female Students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency (n = 15)

Lemon Aromatherapy	Dysmenorrhea Pain Scale			
	Maen Pretest	**Maen Posttest**	**Difference**	**P value**
Pretest Posttest	3,07	2,53	0,54	0,001

Based on Table 4.4, it can be seen that the mean score of dysmenorrhea pain among female students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency, before the administration of lemon aromatherapy was 3.07, while after the administration, the mean pain score decreased to 2.53. The mean difference in pain reduction was 0.54. The results of the statistical test showed a p-value = 0.001 (p < 0.05), indicating a significant effect of lemon aromatherapy on reducing dysmenorrhea pain. Therefore, it can be concluded that the administration of lemon aromatherapy is statistically effective in lowering the level of menstrual pain, as demonstrated by the results of the Paired Samples t-Test.

DISCUSSION

The findings of this study demonstrate that lemon aromatherapy effectively reduces the intensity of dysmenorrhea among female students at SMP Negeri 1 Simpang Tiga, Aceh Besar Regency. Before the intervention, most respondents (93.3%) experienced moderate pain, and 6.7% reported severe pain. After receiving the intervention, 46.7% reported mild pain and 53.3% moderate pain, with no participants experiencing severe pain. The mean pain score decreased from 3.07 to 2.53, with a mean difference of 0.54 and a significant p-value (0.001 < 0.05), indicating that lemon aromatherapy had a statistically significant effect on reducing menstrual pain. This result highlights the effectiveness of lemon aromatherapy as a non-pharmacological alternative for relieving dysmenorrhea in adolescents.

The effectiveness of lemon aromatherapy in this study is supported by demographic characteristics and physiological explanations. Most participants were in early adolescence, a period when hormonal fluctuations and menstrual cycle instability are common, making them more susceptible to menstrual pain due to elevated prostaglandin levels. This finding is consistent with Proctor (2020), who stated that adolescent girls with newly established menstrual cycles are more prone to dysmenorrhea than adult women. Moreover, students with longer menstrual duration or earlier menarche reported higher pain intensity, consistent with the studies of Petege & Wintarsih (2023) and Rachmawati & Handayani (2021). Nevertheless,

after the aromatherapy intervention, their pain levels decreased, suggesting that lemon aromatherapy was effective regardless of reproductive characteristics.

These findings are in line with previous studies by Kumarijati & Istiqomah (2023) and Marlina & Yuliasari (2023), which found that lemon aromatherapy significantly reduced menstrual pain among adolescent girls through its relaxing and analgesic effects. The active compounds in lemon essential oil, such as limonene and linalool, act as antispasmodic and analgesic agents that inhibit prostaglandin synthesis, reducing uterine contractions and pain (Mahboubi, 2019). In addition to its physiological effects, the lemon scent also stimulates the limbic system, producing emotional relaxation and lowering pain perception. Although the mean reduction in pain score was relatively small (0.54), the change was both statistically and clinically significant, improving students' comfort, concentration, and daily functioning. Hence, lemon aromatherapy can be recommended as a safe, simple, and cost-effective complementary therapy for managing dysmenorrhea in adolescents.

4. CONCLUSION

Based on the results of the statistical test in this study, it shows that the p-value = 0.001 (p < 0.05), so it can be concluded that the research hypothesis is accepted, namely that there is a significant effect of giving lemon aromatherapy on reducing dysmenorrhea pain in female students of SMP Negeri 1 Simpang Tiga, Aceh Besar Regency.

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