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The Effectiveness of Lemongrass Aromatherapy in Reducing Dysmenorrhea Pain

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ABSTRACT

Introduction: Dysmenorrhea is a common menstrual complaint among adolescent girls, often impacting daily activities and emotional well-being. Non-pharmacological interventions, such as aromatherapy, are gaining attention for their potential in pain management. Lemongrass (Cymbopogon citratus) contains compounds with analgesic and calming properties that may reduce menstrual pain.
Objective: This study aimed to evaluate the effectiveness of lemongrass aromatherapy in reducing dysmenorrhea pain intensity among adolescents.
Method: An experimental study using a one-group pre-test post-test design was conducted at Al-Riyadl Islamic Boarding School, Cipanas, from March to May 2025. A total of 30 female adolescents were selected through accidental sampling. Pain intensity before and after the aromatherapy intervention was measured using the Numerical Rating Scale (NRS). Data were analyzed using univariate and bivariate methods.
Result: The average pain intensity before aromatherapy was 15.50 (SD = 8.803), which significantly decreased to 1.23 (SD = 7.281) after treatment. Statistical analysis revealed a p-value < .001, indicating a significant reduction in pain.
Conclusion: Lemongrass aromatherapy is effective in significantly reducing dysmenorrhea pain among adolescents. Its natural, accessible, and low-risk characteristics make it a promising complementary therapy, particularly in settings with limited access to conventional medical care.

Keywords: dysmenorrhea, lemongrass aromatherapy, non-pharmacological intervention

Introduction

Dysmenorrhea is one of the common menstrual-related complaints experienced by women. Dysmenorrhea is a menstrual disorder with the highest incidence rate of 89.5%, followed by menstrual discomfort at 31.2%, and prolonged menstruation at 5.3%. Some studies found that the prevalence of dysmenorrhea varies between 15.8% and 89.5% (Aprilia et al., 2022). According to the World Health Organization (WHO), the occurrence of dysmenorrhea reaches 90% (WHO, 2021). Its prevalence is generally higher among young women in the age group of 17 to 24 years, with an estimated range of 60–90% (Iacovides et al., 2015). More than 50% of menstruating women worldwide report experiencing primary dysmenorrhea (Aprilia et al., 2022; Ju et al., 2014). In Indonesia, the prevalence of dysmenorrhea is 107,673 people (64.25%), consisting of 59,671 people (54.89%) who experience primary dysmenorrhea and 9,496 people (9.36%) who experience secondary dysmenorrhea (Oktorika et al., 2020)

Based on data from research conducted in 2020, the incidence of dysmenorrhea in West Java is quite high, with 54.9% of women affected, consisting of 24.5% experiencing mild dysmenorrhea, 21.28% with moderate dysmenorrhea, and 9.36% with severe dysmenorrhea (Andriyani et al., 2020). In Cianjur, the prevalence of mild dysmenorrhea pain reaches 56.6%, while 43.3% experience severe dysmenorrhea. In the Cianjur City health center, there are 95 cases of dysmenorrhea (Herlina, A., 2020). Dysmenorrhea is common among women, which is why most women do not seek medical consultation (Hamzah, 2021).

The impact of menstrual pain on adolescent girls includes discomfort, decreased activity, disrupted sleep patterns, loss of appetite, disrupted interpersonal relationships, and difficulty concentrating on tasks and learning. Pain also affects the emotional status of adolescents experiencing menstrual pain, making them irritable and easily upset. This leads to the restriction of their daily activities, including school work (Puspita, 2019). Non-pharmacological management, such as acupuncture, acupressure, yoga, meditation, and aromatherapy, is often used. One such non-pharmacological approach used in this study for menstrual pain is aromatherapy with lemongrass. Aromatherapy is the use of aromatic essential oils extracted from natural plants to improve physical, mental, and spiritual health. Traditionally, aromatherapy has been used to reduce dysmenorrhea symptoms, relieve uterine cramps, and reduce pain and anxiety after childbirth (Rahayuningsih, 2020; Lee et al., 2011).

Aromatherapy is a non-pharmacological therapy using essential oils or pure plant extracts to maintain or improve health, boost energy, stimulate the healing process, refresh, and calm the mind (Putri & Wulandari, 2019). The direct inhalation method of aromatherapy through the nose works rapidly, as the essential oils stimulate the olfactory bulb and subsequently influence the limbic system—an area of the brain responsible for emotions, memory, and behavior. The nose's ability to recognize thousands of scents allows aromas to significantly impact emotional responses, memory retention, and learning (Yuliana et al., 2019; Cui et al., 2022).

Lemongrass (Cymbopogon citratus) is one of the plants that can be used. The aromatherapy oil produced from lemongrass functions as an antidepressant, reducing stress and depression, which helps induce relaxation both physically and mentally. Lemongrass is believed to contain active compounds that function as analgesics, antipyretics, anti-inflammatory agents, antioxidants, and antidepressants (Putri et al., 2022).

Reproductive Health Education (KRR) for adolescent girls should be prioritized due to the sensitivity of reproductive organs, which require specific hygiene behavior habits. KRR education does not solely aim to prevent diseases or other disorders, but also helps in cultivating good personal hygiene behaviors related to the reproductive system, its functions, and processes. However, KRR education for adolescent girls is rarely discussed in society due to the perception that it is a "taboo" subject, and even in health education in schools, similar perceptions prevail. Good knowledge and care are decisive factors in maintaining reproductive health (Azhari et al., 2022). Similarly, misconceptions or lack of knowledge may lead to suboptimal health behaviors, resulting in inadequate care of the reproductive organs by adolescents (Rahayu et al., 2021).

Objective

This study aims to evaluate the effectiveness of lemongrass (Cymbopogon citratus) aromatherapy in reducing dysmenorrhea pain intensity among adolescents.

Method

This study employed an experimental method with a one-group pre-test post-test design to examine the effectiveness of lemongrass aromatherapy in reducing dysmenorrhea among adolescent girls at Al-Riyadl Islamic Boarding School, Cipanas, in 2025. The research was conducted from March to May 2025, involving a population of female adolescents selected through accidental sampling, with a total of 30 participants. Data were analyzed using univariate and bivariate methods. Univariate data included age at menarche, family history, menstrual cycle, and duration of menstruation, while bivariate data focused on the intensity of dysmenorrhea pain before and after the administration of lemongrass aromatherapy.

Result

Table 1. Average Distribution of Lemongrass Aromatherapy Administration Based on First and Second Measurements

Variable	Mean	SD	SE	P Value	N
Measurement I	15.50	8.803	1.216	<.001	30
Measurement II	1.23	7.281	0.430		

The mean score of lemongrass aromatherapy administration at the first measurement was 15.50 with a standard deviation of 8.803. At the second measurement, the mean was 1.23 with a standard deviation of 7.281. The mean difference between the first and second measurements was 14.267 with a standard deviation of 8.761. Statistical analysis yielded a p-value of 0.001, indicating a significant relationship between the administration of lemongrass aromatherapy and the reduction of dysmenorrhea pain at Al-Riyadl Islamic Boarding School, Cipanas.

Discussion

The severity of dysmenorrhea among adolescent girls can vary significantly, and this variability is influenced by several physiological, psychological, and environmental factors. In

this study, pain levels were assessed using the Numerical Rating Scale (NRS), a standardized and validated instrument for evaluating subjective pain intensity.

The findings of this study are aligned with previous research conducted by Rambi (2019), who examined the effects of lemon citrus aromatherapy on reducing dysmenorrhea pain among adolescent girls. In Rambi's study, 24 participants reported a decrease in pain intensity to a level of 3, while 8 participants scored 4, 6 participants scored 5, and 2 participants scored 6 on the NRS. These findings suggest that citrus-based aromatherapy, including lemongrass, may contribute significantly to pain management. Similar trends observed in the current study reinforce the hypothesis that natural essential oils can provide therapeutic relief by interacting with the limbic system in the brain, which governs emotions and pain perception.

From the results obtained, it can be concluded that there is a statistically significant relationship between the use of lemongrass aromatherapy and the reduction in dysmenorrhea pain intensity. The majority of respondents experienced a marked decrease in pain following the intervention, reinforcing the potential of aromatherapy as an effective non-pharmacological alternative for managing menstrual pain (Putri & Wulandari, 2019). Its accessibility, affordability, and minimal side effects make aromatherapy a promising option, particularly for adolescent girls in boarding schools or rural areas where access to medical facilities is limited (Rahmawati et al., 2019).

Lemongrass (*Cymbopogon citratus*) is a tropical plant widely used in traditional and complementary medicine. The essential oil extracted from lemongrass contains several bioactive compounds, including citral, myrcene, and limonene, which possess therapeutic properties such as analgesic, anti-inflammatory, antipyretic, antioxidant, and antidepressant effects (Rahmawati et al., 2019). When inhaled, the volatile compounds in lemongrass oil are believed to interact with olfactory receptors and influence the central nervous system, thereby inducing a state of relaxation, reducing stress levels, and potentially altering pain perception pathways (Kurniawan et al., 2019). The mechanism by which aromatherapy reduces menstrual pain may involve the modulation of neurotransmitters such as serotonin and endorphins, which are associated with mood regulation and pain inhibition (Sari & Handayani, 2019).

Furthermore, the calming effect of lemongrass aromatherapy may help reduce the psychological stress that often accompanies menstruation. Psychological stress is known to exacerbate the perception of pain, and by reducing stress, aromatherapy indirectly contributes to pain relief (Putri & Wulandari, 2019). In this context, the dual action of lemongrass as both a physical and psychological relaxant enhances its efficacy as a holistic remedy (Sari & Handayani, 2019). The implementation of aromatherapy also promotes autonomy and self-care among adolescents, empowering them to manage their menstrual health independently and proactively (Yuliana et al., 2019).

The practical implications of these findings are significant, especially in educational and community health settings. Schools, particularly those with residential programs such as Islamic boarding schools (*pesantren*), can incorporate aromatherapy sessions as part of their adolescent health programs. This intervention can be easily administered, does not require specialized equipment or training, and can be tailored to individual preferences and cultural values (Ramadhani & Astuti, 2019). Additionally, educating adolescents about the safe use of essential oils fosters health literacy and encourages the adoption of healthy lifestyle practices (Nugraheni et al., 2019).

Conclusion

Lemongrass aromatherapy is effective as a complementary intervention for managing dysmenorrhea pain in adolescents. It is recommended as a safe, non-pharmacological approach that can be easily implemented at home or in school settings.

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Not applicable.

Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

The researchers stated that there is no conflict of interest related to the implementation and publication of the results of this research. The entire research process, from planning, data collection, analysis, to report preparation, was carried out independently without any influence or pressure from any third party. A commitment to research ethics is upheld throughout the research process, ensuring transparency, accuracy and honesty in reporting results. Respondents' participation was voluntary with informed consent, and their confidentiality and privacy were maintained in accordance with applicable research ethics standards. With this statement, researchers hope that the research results can be trusted and used as a valid reference for the development of science and health practices related to ethnomedicine and reproductive health.

Ethical consideration

Not applicable.

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