

THE EFFECT OF LAVENDER AROMATHERAPY ON DYSMENORRHOEA STUDENTS IN INSTITUTE OF HEALTH SCIENCE MEDICA PERSADA BALI

AA Sg Dewi Pradnya Pramita^{1*}, IA Manik Partha Sutema¹, Dhiancinantyan Windydaca Brata Putri¹

Institute of Health Sciences, Medica Persada Bali, Bali-Indonesia

Corresponding author e-mail: ichiwiqz1008@gmail.com

ABSTRACT

Background: Menstrual pain (dysmenorrhoea) is a symptom characterized by discomfort in the abdomen during menstruation. Lavender aromatherapy is beginning to be sought as one of the non-pharmacological therapies because the use of NSAIDs is reported to cause many side effects. The main components of lavender, linalool (35%) and linalyl acetate (51%) are efficacious as analgesics and maximally absorbed through the skin. **Objective:** This study aims to determine the effect of lavender aromatherapy on the menstrual pain of female college students at the Persada Medika Institute of Bali. **Methods:** Quasy experimental with one group pre-posttest design. The study was followed by 38 female students with moderate to severe pain using the random sampling technique. Data were analyzed using the non-parametric Wilcoxon test with $p < 0.05$. **Results:** The results prior to lavender aromatherapy showed moderate pain at 73.7% and severe pain 26.3%. After lavender aromatherapy was administered, they showed moderate pain at 21% and mild pain at 79%. The Wilcoxon test indicated that the value of $p = 0,000$, where $p < 0.05$. **Conclusion:** There is an effect of lavender aromatherapy to decrease menstrual pain (dysmenorrhoea) of female college students at the Persada Bali Institute of Health Sciences.

Keywords: Aromatherapy Lavender, Dysmenorrhoea, Pain Scale, Linalool, Linalyl Acetate

INTRODUCTION

Menstruation is a process of bleeding that occurs to the uterus periodically or cyclic, caused by decay or removal of the uterine wall (endometrium) with an average cycle length of 28 days.^[1] During menstruation, women commonly experience dysmenorrhea, which is menstruation accompanied by pain, caused by excessive release of prostaglandins in the body, resulting in contractions of uterine muscles.^[2] In Indonesia, the incidence of dysmenorrhea in women is around 54.89%, ranging from mild (24.25%), moderate (21.28%) and severe (9.36%).^[3]

Dysmenorrhea will indirectly have an impact on productivity and affect various aspects of life. For example, in terms of education, there is a decrease in the concentration of learning because of the perceived discomfort. NSAIDs as initial therapy of dysmenorrhea work by reducing the activity of the cyclo-oxygenase pathway so that it can inhibit prostaglandin production.^[4] However, the use of NSAIDs has been reported to have many side effects, especially problems with GI (11-14%) and mild neurological (headache, drowsiness, dizziness and dry mouth).^[5,6]

Aromatherapy refers to non-pharmacological treatment using essential oils, which have a stimulating and relaxing effect on the mind and body that can help reduce pain.^[7,8] lavender is one of the plants that is approved and categorized safe by the United States Food and Drug Administration (FDA).^[7] The main components of lavender, namely linalool (35%) and linalyl acetate (51%) are efficacious as analgesics and are absorbed maximally through the skin.^[9,10] Based on quasi-experimental studies on 44 dysmenorrhea students in Turkey who were given a massage with aromatherapy (lavender oil) and placebo during 3 menstrual cycles, showed a decrease in pain scale from 82.38% to 51.13% after massage with lavender aromatherapy and 74.31% after massage with placebo.^[11]

Based on these descriptions, the authors wish to conduct research to determine the effect of lavender aromatherapy on the intensity of menstrual pain intensity of the students of the Medica Sciences Institute of Persada Bali.

METHODS

A. Research design and sample

Quasi-experimental with one group pre-post test design. Experimental research requires a minimum sample of 15-30 respondents for each group^[13,14] so that the sample used in this study is a minimum of 30 female students.

B. Research inclusion and exclusion criteria

Aged 17-20 years (unmarried), they were experiencing primary dysmenorrhea (moderate to a severe degree), willing to be given lavender aromatherapy intervention, not taking analgesics during the study and menstruation no longer than 7 days. Exclusion criteria in this study were female students who disliked and were allergic to lavender aromatherapy.

C. Sampling technique

Random or probability sampling with stratified random sampling technique.

D. Research variable

The independent variable in this study is lavender aromatherapy and the dependent variable is the pain scale of female students experiencing dysmenorrhea at the Institute of Health Sciences, Medika Persada Bali.

E. Research material

Aromatherapy lavender (pure 100% lavender essential oil).

F. Research instrument

Questionnaire (an adaptation of research conducted by Yuli SBR Sitorus, Sri Rahayu Sanusi and Maya Fitria)^[15] and the Wong-Baker Pain Rating Scale.

G. Research procedure

1. Data collection for sample selection
Request a letter of request to the Health Sciences Institute of Medika Persada Bali to conduct research, data collection on student populations and the management of ethical clearance. Students who are willing to become research samples will be asked to sign an informed consent and fill out a questionnaire for further analysis.
2. Lavender aromatherapy intervention
Respondents were given lavender aromatherapy accompanied by pain scale measurement sheets, where measurements were made before and after lavender aromatherapy. Measurements were taken for 3 days, starting from the first day of menstruation with a dose of 2-4 drops once a day topically in the lower abdomen and massaged for ± 10 minutes. Pain intensity scale data before and after the administration of lavender aromatherapy obtained will be tested by the Kolmogorov Smirnov normality test. If the data is normally distributed, then it will be continued

with paired T-Test, whereas if the data is not normally distributed, then it will be continued Wilcoxon.

H. Research ethical clearance

This research has obtained ethical eligibility issued by the Research Ethics Commission of the Faculty of Medicine, Udayana University/Sanglah Central General Hospital, Denpasar, with the number 2018.01.2.1255 dated January 28, 2019.

RESULTS

Based on table 1, it can be seen that the majority of respondents were 20 years old, with a total of 17 respondents (44.7%). The majority of respondents who experienced menstrual pain or dysmenorrhea for 1-2

days, as many as 35 respondents (92.1%). A total of 36 respondents (94.7%) experienced menstrual pain or dysmenorrhea with a moderate degree and as many as 21 respondents (55.3%) did not use or take drugs when experiencing menstrual pain or dysmenorrhea.

Based on table 2, it can be seen that the results of normality test data on menstrual pain intensity scale before and after the administration of lavender aromatherapy produce probabilities of 0.001 and 0.009 so that the data can be declared not normally distributed.

Based on table 3 it can be seen that the most analgesic use is paracetamol as many as eight respondents (47.06%) and mefenamic acid as many as 7 respondents (41.18%).

Table 1. Respondents Characteristics

No	Characteristics	Amount (n)	(%)
1	Age		
	a. 17 years	0	0
	b. 18 years	8	21.1
	c. 19 years old	13	34.2
	d. 20 years	17	44.7
	Total	38	100
2	Prolonged menstrual pain or dysmenorrhea		
	a. 1-2 days	35	92.1
	b. ≥ 3 days	3	7.9
	Total	38	100
3	The degree of menstrual pain or dysmenorrhea		
	a. Is	36	94.7
	b. Weight	2	5.3
	Total	38	100
4	Actions to manage menstrual pain or dysmenorrhea (before research)		
	1. Using drugs	17	44.7
	2. Do not use drugs		
	a. Warm water compress	8	21.1
	b. Get enough exercise and rest	13	34.2
	Total	38	100
5	The level of knowledge of respondents related to menstrual pain or dysmenorrhea		
	a. Good	38	100
	b. Not good	-	-
	Total	38	100
6	Respondents' attitudes related to menstrual pain or dysmenorrhea		
	a. Good	29	77.3
	b. Not good	9	22.7
	Total	38	100

Table 2. Data Normality Test Results

Dysmenorrhea Pain Intensity Scale	Kolmogorov Smirnov	Probability
Before giving lavender aromatherapy	0.222	0.001
After giving lavender aromatherapy	0.167	0.009

Table 3. Levels of Analgesic Use in Treating Menstrual Pain

No.	Analgesics	Amount (n)	(%)
1	Paracetamol	8	47.06
2	Mefenamic acid	7	41.18
3	Feminax (Paracetamol + hyoscyamine extract)	2	11.76
Total		17	100

Table 4. Pre-Test and post-test period for Lavender Aromatherapy (Post-Test)

Degrees of Menstrual Pain (Pre-Test)	Amount (n)	(%)	Degrees of Menstrual Pain (Post-Test)	Amount (n)	(%)	P-value
Is (5-6)	28	73.7	Is	4	10.5	0.001
			Light	24	63.2	
Weight (7-10)	10	26.3	Is	4	10.5	
			Light	6	15.8	
Total	38	100	Total	38	100	

Based on table 4 it can be seen that as many as 28 respondents (73.7%) experienced moderate pain and 10 respondents (26.3%) experienced severe pain during menstruation and prior to lavender aromatherapy intervention. After giving the intervention, there were four respondents (10.5%) who experienced moderate pain and 24 respondents (63.2%) who experienced mild pain in the moderate pain pre-test group. A total of 4 respondents (10.5%) experienced a decrease in pain levels from severe to moderate, and six respondents (15.8%) became mild pain in the severe pain pre-test group. If the value of $p \leq \alpha$ (5%) indicates that there are differences in the degree of menstrual pain before and after the administration of aromatherapy, where the p value obtained in this study is 0.001.

Based on table 5, the data were tested using non-parametric analysis, namely the Wilcoxon test, with a probability of 0.001. If the probability \leq level of significance ($\alpha = 5\%$), then H_0 is rejected so that it can be stated that there is a significant effect on the administration of lavender aromatherapy to the intensity scale of menstrual pain or

dysmenorrhea. This can be seen from the average scale of menstrual pain intensity or dysmenorrhea obtained, where the pain scale before giving lavender aromatherapy has a higher value than the average pain scale after lavender aromatherapy.

DISCUSSION

1. Characteristics of respondents

Based on the results of the study, the average age of female students who experience menstrual pain or dysmenorrhea at the Medica Sciences Institute of Persada Bali is 19 years. This is consistent with cross-sectional studies in Sweden conducted on 600 women aged 19 years, of which 72% reported experiencing dysmenorrhea.^[15] This was also mentioned in the Mahmudiono study (2011) where the incidence of primary dysmenorrhea in adolescent girls in Indonesia occurred at the age of 14-19 years with a percentage of 54.89%.^[16,17] In the longitudinal study of a representative cohort in women in Sweden also found a prevalence of dysmenorrhea of 90% in women aged 19 years.^[18]

Table 5. Test Results of the Effect of Lavender Aromatherapy on the Intensity Scale for Menstrual Pain or Dysmenorrhea

Dysmenorrhea Pain Intensity Scale	Average	Wilcoxon Test	Probability
Before giving lavender aromatherapy	5.921		
After giving lavender aromatherapy	3.395	-5.438	0.001

Adolescence is the most age of experiencing dysmenorrhea (60-80%) due to the development of reproductive organs and significant hormonal changes. Dysmenorrhea in adolescents is also caused by a low pain threshold, so it is easier to feel pain.^[17] In addition, differences in endorphin levels also make the condition of a person's body different from one another, where endorphins function to regulate various physiological functions of pain transmission, emotions and hormone secretion. High levels of endorphins will make the pain felt by someone will be less and vice versa.^[17]

The duration of menstrual pain or dysmenorrhea felt by students of the Medica Sciences Institute of Medika Persada Bali is 1-2 days. This is consistent with the theory that dysmenorrhea lasts briefly, which occurs within the first 1-3 days of menstruation, where the common symptoms complained of are pain or cramps in the pelvic area.^[18,19] pain in menstruation usually starts right before or during bleeding begins and gradually decreases for 1-3 days.^[11]

A total of 21 respondents (55.3%) did not use drugs when experiencing menstrual pain or dysmenorrhea. Based on the questionnaire data, the treatment carried out by respondents was to use warm water compresses (21.1%) and adequate exercise and rest (34.2%). A compress can have a relaxing effect on the muscles and nervous system and cause vasodilation in blood vessels so that it can increase blood flow to the diseased body.^[5] Sufficient exercise and rest can reduce menstrual pain levels by increasing blood flow in the pelvis and stimulating the release of the hormone β -endorphins, which act as natural pain killers.^[4,5]

2. The use of analgesics in treating menstrual pain or dysmenorrhea

A total of 17 respondents (44.7%) of the total of 38 respondents used analgesics in overcoming dysmenorrhea. Paracetamol is a p-aminophenol derivative that produces analgesic/antipyretic activity but does not have anti-inflammatory activity. Paracetamol can produce analgesia with central inhibition of prostaglandin synthesis and is safe to use when in therapeutic doses with good GI tolerance and has no effect on homeostasis.^[20]

However, RCT studies suggest that paracetamol is no better than a placebo.^[21] Based on the literature, NSAIDs can be the most effective therapy for dysmenorrhea when treatment begins before the onset of pain and menstrual blood flow compared with paracetamol.^[6,18] NSAIDs are the best initial therapy (with a strength of recommendation A) to treat dysmenorrhea that has direct analgesic effects by inhibiting prostaglandin synthesis and reducing the volume of menstrual blood flow.^[18] In a review of 63 RCTs in women with primary dysmenorrhea, NSAIDs were found to be significantly more effective for pain relief compared to placebo, although their side effects were also significantly more common such as gastrointestinal intolerance (11-14%) and headaches.^[6, 21]

3. Degree of menstrual pain or dysmenorrhea before lavender aromatherapy (pre-test)

Based on the results of the study, the average value of menstrual pain or dysmenorrhea of students of the Health Sciences Institute of Medika Persada Bali before being given lavender aromatherapy was 5.921. The majority of menstrual pain or dysmenorrhea before lavender aromatherapy is moderate pain, that is 28

respondents (73.75%). Research by Chasanawati and Rohmawati in Pustikawaty (2016) also provided the most respondents with moderate pain before lavender aromatherapy (52.4%).^[1,22,23]

The occurrence of moderate pain in college girls is caused by various factors, one of which is a subjective assessment of pain because, based on the IASP, pain is an unpleasant emotional feeling and experience associated with actual or potential tissue damage. Brain involvement helps explain the different interpretations of pain stimulus so that individual pain perceptions differ from one another.^[24] Pain responses are also influenced by certain conditions, such as unpleasant past experiences or trauma, cultural or triggered by stress.^[25]

Stress conditions in a person can affect menstrual pain, where this is supported by previous research conducted by Priyanti in Pustikawaty (2016), where the higher the level of stress experienced by a person will increase the menstrual pain they experience.^[1,26] If someone experiences stress, the body will produce excess hormones estrogen and adrenaline, where the hormone estrogen can increase uterine contractions, and adrenaline can cause the body's muscles to become tense, including the uterine muscles, causing pain during menstruation.^[1]

4. The degree of menstrual pain or dysmenorrhea after the administration of lavender aromatherapy (post-test)

Based on the results of the study, the average value of menstrual pain or dysmenorrhea of students of the Health Sciences Institute of Medika Persada Bali after being given lavender aromatherapy was 3.395. The majority of menstrual pain or dysmenorrhea after lavender aromatherapy is mild pain in 30 respondents (79%). The results of this study are also supported by Chasanawati's research in Pustikawaty (2016), whereafter the administration of aromatherapy, there

was a decrease in pain scale, i.e., 81% of respondents experienced mild pain, and 19% of respondents did not experience pain.^[1,22] This is consistent with the literature where lavender aromatherapy has a stimulating and relaxing effect on the mind and physicality of the body that can reduce a person's pain.^[7,8] This relaxing effect will provide a sense of comfort, even some respondents to fall asleep because of this lavender aromatherapy. If relaxation is done well and supported by a calm environment, it will have an effect on reducing the intensity of one's pain.^[1]

This is also in line with the quasi-experimental study conducted on 44 students in Turkey who experience dysmenorrhea. Each sample was given a massage with aromatherapy (lavender oil) and placebo for 3 menstrual cycles that were randomly applied, where this study showed a decrease in pain scale from 82.38% to 51.13% after massage with lavender aromatherapy and 74.31% after placebo massage.^[11]

5. The effect of lavender aromatherapy on the intensity of menstrual pain or dysmenorrhea

The Wilcoxon test results for this study were -5,438, with a probability of 0,000. If the probability value \leq level of significance ($\alpha = 5\%$), then H_0 is rejected, and H_1 is accepted. This means that there is a significant effect on the administration of lavender aromatherapy to the scale of menstrual pain or dysmenorrhea of the students of the Medica Sciences Institute of Persada Bali. The results of this study are in accordance with research conducted by Pustikawaty (2016), which obtained the results of $p = 0,000$ in the Paired T-Test, which means that there is an effect of lavender aromatherapy on menstrual pain scale on class X students of SMAN 1 Sungai Ambawang, Kubu Raya Regency.^[1] This is also reinforced by research conducted by Apay et al. (2010) comparing the lavender and placebo aromatherapy massage groups.

Menstrual pain or dysmenorrhea is caused by myometrial activity, which results in reduced blood flow to the uterus (ischemia), causing pain. Myometrial activity is modulated by prostaglandin synthesis, which results in uterine contractions. These contractions will last for a few minutes and cause pressure of > 60 mmHg.^[21] Giving aromatherapy lavender in menstrual pain or dysmenorrhea is believed to stimulate the activity of brain cells that work similar to sedatives. Molecules from essential oils can interact in the blood with hormones or enzymes to reduce pain. The combination of lavender aromatherapy with massage techniques or massage helps to reduce menstrual pain, where the therapeutic effect of essential oils can penetrate the skin and enter the body, affecting the internal tissues and organs of the body.^[27] The combination of massage therapy and the use of essential oils is very beneficial and more synergistic than compared to use separately.^[11]

Massage is a step that is applied to soft tissue with various techniques (friction, vibration or pressure) to restore and support health, where massage can ease the mind and muscles and can increase the pain threshold. Massage 2-3 times a week can help manage pain by moving fluid, actively reducing the sympathetic autonomic nervous system and providing a relaxing experience. Through massage, peripheral receptors in the body will be stimulated, and stimulants reach the brain through the spinal cord. This can cause a pleasant feeling in someone and proven effective in the management of pain so it is used as a non-pharmacological therapy. This non-pharmacological therapy as an adjunct or complementary in dealing with pain, both moderate to severe pain, where this therapy can improve control of individual feelings, reduce stress, anxiety, and pain behavior as well as reduce the dose of analgesic drugs needed so as to reduce the side effects of treatment. In a randomized controlled study, a massage was performed to reduce

anxiety and pain during labor and show a decrease in pain reaction.^[25]

The results of this study indicate that the administration of lavender aromatherapy has an effect on reducing the scale of menstrual pain or dysmenorrhea in the students of the Medica Sciences Institute of Persada Bali. This is because when massage with aromatherapy is done, essential oils will be absorbed quickly through the skin and indirectly, this aromatherapy will be inhaled, and volatile molecules from the oil will be carried to the receptor cells in the nose and attached to the hair -smooth hair. An electrochemical reaction occurs which will be transmitted through the olfactory channel to the brain and then to the limbic system which will stimulate the hypothalamus to release the hormones serotonin and endorphins, where the function of the hormone serotonin is that it can improve mood and endorphins as natural painkillers resulting in feelings of relaxation, calm and pleasure. When aromatherapy lavender is inhaled for 15-30 minutes, it can relax the muscles that are experiencing tension and open a narrow blood flow so that menstrual pain can be reduced.^[1] In addition, several factors in massage can affect the decrease in pain scale associated with tissue relaxation that triggers the transfer of fluid and blood from the massaged area, namely quality of touch, pressure, consistent speed, rhythm (regularity), frequency (repetition) and duration (duration of use in the same location).^[28] When aromatherapy lavender is inhaled for 15-30 minutes, it can relax the muscles that are experiencing tension and open a narrow blood flow so that menstrual pain can be reduced.^[1] In addition, several factors in massage can affect the decrease in pain scale associated with tissue relaxation that triggers the transfer of fluid and blood from the massaged area, namely quality of touch, pressure, consistent speed, rhythm (regularity), frequency (repetition) and duration (duration of use in the same location).^[28] When aromatherapy lavender is inhaled for 15-30 minutes, it can relax the

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CONCLUSION

There is an influence of the administration and use of lavender aromatherapy with massage methods on the scale of menstrual pain or dysmenorrhea of students of the Health Sciences Institute of Medika Persada Bali. It is hoped that this research can provide new knowledge related to the use and use of natural products in the management of dysmenorrhea therapies that are safe, inexpensive and easy to use and can minimize the level of analgesic use and avoid the undesirable effects of the use of chemical drugs.

CONFLICT OF INTEREST

No conflict of interest in this paper. This paper was written independently without being affiliated by another party.

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