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The Effect of Lemongrass, Ginger, Turmeric, and Javanese Ginger Mixture on Reducing Dysmenorrhea Pain

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ABSTRACT

Dysmenorrhea is caused by hormonal imbalances that trigger lower abdominal pain, which may radiate to the suprapubic region, lower back, medial thighs, and perineum. Dysmenorrhea typically occurs 1–2 days before or during menstruation, causing disruptions in concentration and increased anxiety. Non-pharmacological management of dysmenorrhea with SJKT (Lemongrass, Ginger, Turmeric, Curcuma Xanthorrhiza) formulations, containing gingerol, shogaol, essential oils, flavonoids, polyphenols, and curcumin exerts analgesic effects that are effective in reducing pain. To analyze the effectiveness of SJKT formulations in reducing menstrual pain associated with dysmenorrhea. A true experimental design with a two-group pretest-posttest control group design was employed. The intervention group received SJKT formulations, while the control group consumed young coconut water, 300 ml/day for 4 days. The Wilcoxon test for the intervention group yielded a p-value of 0.001, while the control group had a p-value of 0.157. The Mann-Whitney test produced a p-value of 0.022, showing a significant difference between the two groups, as the SJKT formulation is more effective in reducing dysmenorrhea pain compared to young coconut water. SJKT formulation effectively reduces dysmenorrhea pain. Further studies could involve larger samples for more comprehensive results.

Keywords: Dysmenorrhea, Ginger, Turmeric, Lemongrass, Curcuma Xanthorrhiza

INTRODUCTION

Adolescence is a transition period from childhood to adulthood with an age range of 12-21 years, menarche indicates sexual maturity, with dysmenorrhea as a common problem in the form of lower abdominal cramps during menstruation.(Masitah & Sulistya, 2024). Dysmenorrhea is caused by an imbalance of the hormones estrogen, prostaglandin, and progesterone.(Putra et al., 2024). Pain can occur 1-2 days before menstruation, spreading to the suprapubic, waist, thighs, and perineum, and during the first and second days of

menstruation, the pain feels like being stabbed, aching, or cramping.(AA Safitri et al., 2021).

The prevalence of dysmenorrhea is very high, with 90% of adolescent girls in the world experiencing it and in Indonesia, 64.25% of adolescent girls experience dysmenorrhea, the majority of which is primary dysmenorrhea.(Kurniasari, 2024). In East Java, cases of primary dysmenorrhea reached 90.25%(Meinawati, 2021). At STIKES Widyagama Husada Malang, 84 female students experienced dysmenorrhea, most of them with moderate to severe pain.(Sriandini et al., 2021). A preliminary study conducted by researchers at STIKES Widyagama Husada Malang on May 29, 2024, showed that 82.9% (86 female students) from the nursing study program experienced dysmenorrhea.

Non-pharmacological management of dysmenorrhea can be done through herbal drinks. Previous studies have focused more on the use of herbal drinks with single ingredients or simple combinations, such as lemongrass, ginger, Curcuma, turmeric tamarind, or turmeric honey. This opens up opportunities for researchers to develop a more effective combination of herbal ingredients, namely by making a SJKT concoction. The SJKT concoction (Lemongrass, Ginger, Turmeric, Temulawak) is a herbal innovation to overcome dysmenorrhea pain by adding tamarind and honey.

Researchers combined these 6 ingredients because they have active ingredients such as gingerol, shogaol, essential oils, flavonoids, polyphenols, and curcumin, which can provide more effective results than using single ingredients.

METHOD

This study design used a true experimental with a two-group pretest-posttest design control group. The intervention group received an SJKT concoction with an ethical eligibility code (14/EC/KEP-PST/2024) and the control group was given young coconut water, each 300 ml/day for 4 days.

SJKT concoction ingredients such as ginger and turmeric can stimulate the production of stomach acid, so it is better to drink after eating to avoid discomfort. Make sure respondents are not allergic to the ingredients and pay attention to the dosage and their body's reaction. Avoid consuming coffee, coconut water, milk, and tea together with the SJKT concoction, because the neutral nature of these drinks can affect the effectiveness of the SJKT

concoction. Researchers used the Arikunto formula by calculating 25% of the population of 104 and obtained the sample results, namely: (25/104) x 100% = 24.

The selection of samples using the Arikunto formula (25%) and purposive sampling ensured that participants met the research criteria. Although not random, this method is still valid and representative, especially for small populations or resource constraints. The pretest-posttest control group design was used to reduce bias and increase the accuracy of the results. Then each intervention group and control group consisted of 12 samples. The research instrument used the NRS pain scale, observation sheets, and SOP for making SJKT concoctions.

The data collection procedure used primary data obtained through pretest, post-test, and NRS pain observation. Respondents were selected, given informed consent, and received a gift after 4 days of research. The data processing process was done by editing, coding, entry, and tabulating. Univariate analysis was used to describe the characteristics of respondents, including respondent age, semester level, age of menarche, duration of menstruation, family history of dysmenorrhea, day of pain onset, characteristics and nature of pain, quality of pain, and activity barriers due to pain.

Bivariate analysis tested the effect of SJKT concoction on dysmenorrhea pain using paired t-test for pretest-posttest data in the intervention and control groups, or Wilcoxon test if not eligible. For two unpaired groups, an unpaired t-test or Mann-Whitney test was used. The researcher used the Wilcoxon test and Mann-Whitney test because the t-test results showed non-normal data distribution.

RESULTS AND DISCUSSION

Table1. Respondent Characteristics Based on Age

Age	Intervention Group		Control Group	
	f(n)	%	f(n)	%
20 years	1	8.3	2	16.7
21 years	8	66.7	3	25.0
22 years	1	8.3	3	25.0
23 years	2	16.7	1	8.3
24 years old	0	0.0	3	25.0

Total	12	100.0	12	100.0

Table 2. Respondent Characteristics Based on Semester

Semester	Intervention Group		Control Group	
	f(n)	%	f(n)	%
2	1	8.3	1	8.3
4	1	8.3	2	16.7
6	9	75.0	7	58.3
ALJ	1	8.3	2	16.7
Total	12	100.0	12	100.0

Table 3. Respondent Characteristics Based on Age of Menarche

Age of Menarche	Intervention Group		Control Group	
	f(n)	%	f(n)	%
9-11 Years	1	8.3	1	8.3
12-14 Years	10	83.4	6	50.0
15-16 Years	1	8.3	5	41.7
Total	12	100.0	12	100.0

Table 4. Respondent Characteristics Based on Menstrual Duration

Menstrual Duration	Group Intervention		Group Control	
	f(n)	%	f(n)	%
1-3 Days	1	8.3	1	8.3
4-6 Days	5	41.7	1	8.3
7-9 Days	6	50.0	10	83.4
Total	12	100.0	12	100.0

Table 5. Characteristics Based on History of Dysmenorrhea

	Intervention Group	Control Group

History of Dysmenorrhea	f(n)	%	f(n)	%
There is	6	50.0	8	66.7
No	6	50.0	4	33.3
Total	12	100.0	12	100.0

Table 6. Characteristics Based on the Day Dysmenorrhea is Felt

Days Dysmenorrhea Felt	Intervention Group		Control Group	
	f(n)	%	f(n)	%
Pramens	0	0.0	0	0.0
Menstruation	12	100.0	12	12.0
Total	12	100.0	12	100.0

Table 7. Characteristics Based on the Nature of Pain

Nature of Pain	Intervention Group		Control Group	
	f(n)	%	f(n)	%
Disappear and Reappear	12	100.0	11	91.7
Settling	0	0.0	1	8.3
Total	12	100.0	12	100.0

Table 8. Pain Characteristics

Pain Characteristics	Intervention Group		Control Group	
	f(n)	%	f(n)	%
Stomach Pain	3	25.0	8	66.7
Suprapubic Pain	0	0.0	0	0.0
Upper Back Pain	0	0.0	0	0.0
Lower Back Pain	9	75.0	4	33.3
Medial Thigh Pain	0	0.0	0	0.0
Perineal Pain	0	0.0	0	0.0
Total	12	100.0	12	100.0

Table 7. Characteristics Based on Pain Scale Quality

Pain Scale Quality	Intervention Group		Control Group	
	f(n)	%	f(n)	%
No Pain	0	0.0	0	0.0
Light	0	0.0	6	50.0
Currently	9	75.0	6	50.0
Heavy	3	25.0	0	0.0
Total	12	100.0	12	100.0

Table 8. Characteristics Based on Physical Activity Barriers

Barriers to Physical Activity				
	f(n)	%	f(n)	%
Currently	12	100.0	12	100.0
Tall	0	0.0	0	0.0
Total	12	100.0	12	100.0

Table 9. Wilcoxon Test Results for Intervention Group

Pain Scale Quality	Pre Intervention Group		Median Pain	Post Intervention Group		Median Pain	Wilcoxon
	f(n)	%	Scale	f(n)	%	Scale	p-value
No Pain	0	0.0		1	8.3		
Light	0	0.0	Currently	11	91.7	Light	0.001
Currently	9	75.0	(6)	0	0.0	(1.5)	
Heavy	3	25.0		0	0.0		
Total	12	100.0		12	100.0		

Table 10. Wilcoxon Test Results for Control Group

Pain Scale Quality	Pre Control Group		Median Pain	Post Control Group		Median Pain	Wilcoxon
	f(n)	%	Scale	f(n)	%	Scale	p-value
No Pain	0	0.0		0	0.0		
Light	6	50.0	Light	8	66.7	Light	0.157
Currently	6	50.0	(3.5)	4	33.3	(2.5)	
Heavy	0	0.0		0	0.0		
Total	12	100.0		12	100.0		

Table 11. Mann-Whitney Test Results for Intervention and Control Groups

Pain Scale Quality	Post Intervention Group		Wilcoxon	Post Control Group		Wilcoxon	Mann Whitney
	f(n)	%	p-value	f(n)	%	p-value	p-value
No Pain	1	8.3		0	0.0		
Light	11	91.7	0.001	8	66.7	0.157	0.022
Currently	0	0.0		4	33.3		
Heavy	0	0.0		0	0.0		
Total	12	100.0		12	100.0		

Table 1 shows the age range of late adolescence according to(Nisman et al., 2024)namely at the age of 20-24 years. The majority of respondents were 21 years old when the body's hormones are mature and pain sensitivity is high. At this age, the menstrual cycle is regular with the release of prostaglandins still quite high, so menstrual pain tends to be significant(Nisman et al., 2024). According to research(Masitah & Sulistya, 2024)stated that the age of 21 years is susceptible to dysmenorrhea due to high prostaglandin activity, less than optimal hormone adaptation, and the influence of stress and unhealthy eating patterns.

Table 2 shows that the differences between students each semester lie in their level of maturity, academic experience, and study load.(Leon-Larios et al., 2024). The majority of respondents were in their 6th semester, where academic burdens and demands such as final assignment preparation are higher. This pressure can trigger an increase in stress hormones, such as cortisol and adrenaline, which amplify the perception of pain and worsen dysmenorrhea symptoms.(Fitrianatanti & Anjar, 2024). According to research(Safitri et al., 2024)stated that stress increases the sensitivity of dysmenorrhea pain in final semester female students due to hormonal changes and poor lifestyle.

Table 3 shows that according to(Karout et al., 2021)Menarche is classified as early (9–11 years), normal (12–14 years), and late (15–16 years). The majority of respondents in this study experienced menarche at the age of 12–14 years, or the young age category. Hormonal changes trigger the maturation of reproductive organs and the menstrual cycle through increased estrogen and progesterone. (Karout et al., 2021). According to research(Diana et al., 2023)stated that early menarche increases the risk of primary dysmenorrhea due to increased levels of estrogen and prostaglandins which strengthen uterine contractions.

Table 4 shows that according to(Correyero-León et al., 2024)Menstrual duration is categorized as short (1–3 days), medium (4–6 days), and long (7–9 days). The majority of respondents have a menstrual period of 7–9 days. A longer menstrual period can trigger an increase in prostaglandins and more intense uterine contractions, making dysmenorrhea pain worse.(Correyero-León et al., 2024). According to(Mawarni & Izalika, 2023)Research suggests that longer periods carry the risk of causing more severe dysmenorrhea due to increased prostaglandins and longer uterine pressure, worsening the pain.

Table 5 shows that the majority of respondents in this study had a family history of dysmenorrhea. A family history of dysmenorrhea increases the risk and severity of pain through genetic factors that affect pain sensitivity and variations in pain receptors as well as the nervous system, immune system, and reproductive hormones.(Saragih et al., 2024). According to research(Salamah et al., 2024)stated that parents' pain experiences influence children's perceptions of menstrual pain, either by normalizing or increasing pain sensitivity.

Table 6 shows that according to(Mitsuhashi et al., 2023)Dysmenorrhea pain consists of two types, namely premenstrual pain that occurs before menstruation due to hormonal fluctuations, and menstrual pain that occurs during menstruation and is often more intense. The majority of respondents in this study experienced dysmenorrhea during menstruation. According to the study(Kahanjak, 2024)stated that uterine contractions due to increased hormones during menstruation are more painful than premenstrual pain, while dysmenorrhea on the first day is caused by high levels of prostaglandins that trigger uterine contractions.

Table 7 shows that according to(Triwahyuningsih et al., 2024)Dysmenorrhea pain is classified based on intensity and duration, with pain patterns that can be intermittent or persistent. The majority of respondents in this study experienced intermittent pain. According to the study(Rogers et al., 2024)stated that dysmenorrhea pain is caused by increased prostaglandins, with the intensity of the pain coming and going due to rhythmic contractions of the uterine muscles which vary depending on the prostaglandin levels and individual response.

Table 8 shows that according to (Correyero-León et al., 2024) Dysmenorrhea pain is localized in the lower abdomen and can spread to several other areas such as the suprapubic, lower back, medial thighs, and perineum. The majority of respondents in this study experienced lower back pain. According to a study(Rinawati et al., 2024)states that dysmenorrhea can cause intense pain and muscle spasms that can spread, especially to the waist, caused by uterine contractions triggered by prostaglandins, then prostaglandins press on the pelvic nerves and reduce blood flow to the uterus, worsening the pain.

Table 9 shows that according to(Triwahyuningsih et al., 2024)The NRS pain scale classifies pain into four categories, namely, scale 0 (no pain), 1-3 (mild), 4-6 (moderate), and 7-10 (severe). The majority of respondents in this study experienced moderate pain. According to the study(Harahap et al., 2024)stated that moderate dysmenorrhea pain is caused by increased prostaglandins, which are influenced by psychological factors. In addition, rhythmic contractions of the uterine muscles and nerve sensitization also play a role in strengthening the perception of pain.

Table 10 shows that the barriers to physical activity according to(Triwahyuningsih et al., 2024) consist of a moderate category that allows female students to study despite having difficulty concentrating, while the high category often results in absenteeism and hinders

learning activities. The majority of respondents experienced moderate category obstacles. According to the study(Salamah et al., 2024)stated that intense dysmenorrhea pain on the first day of menstruation can interfere with physical activity, while moderate dysmenorrhea can cause discomfort and cramps that interfere with focus.

Table 11 shows that there was a significant decrease in the dysmenorrhea pain scale in the intervention group, where the pain that was initially dominated by the moderate and severe categories changed to the mild category after the intervention was carried out. The results of the Wilcoxon test showed that the intervention was effective in reducing pain intensity, with a p-value = 0.001, indicating a statistically significant difference. These results indicate that the SJKT concoction is effective in managing dysmenorrhea pain, helping respondents experience a significant decrease in pain after treatment.

This is in line with research(Astuti et al., 2020)which proves that giving turmeric and tamarind herbal medicine is effective in reducing the pain scale in respondents after the intervention was carried out. According to the research(Fatmawati & Muliawati, 2023)also proved that giving ginger, lemongrass, and dates was proven to reduce the pain scale of respondents from severe to moderate thanks to the anti-inflammatory, analgesic, and muscle relaxation effects that help relieve menstrual pain.

Table 12 shows that before treatment, the majority of respondents in the control group were in the mild and moderate categories. After treatment, several respondents in the mild category experienced a decrease of one level, while most respondents in the moderate category remained in the same category with a slight improvement in scores. The Wilcoxon test with a p-value of 0.157 which is greater than 0.05 indicates that the difference in pain scores between the pretest and posttest was not significant, which means that giving young coconut water was less effective in reducing pain in the control group.

This is in line with research(Diyana et al., 2024)which proves that young coconut water can reduce the pain scale in some respondents but its benefits are limited to hydration and electrolytes, so it is less significant in reducing dysmenorrhea pain. The study (Pratiwi & Mouliza, 2024) also proved that giving young coconut water can help reduce dysmenorrhea pain because of the electrolyte, magnesium, potassium, and vitamin content that can relieve uterine muscle contractions due to prostaglandins.

Table 13 shows that the treatment in the intervention group was more effective in reducing pain, indicated by a significant decrease in pain scores in the intervention group compared

to the control group. The results of the Mann-Whitney test with a p-value of 0.022 confirmed that the difference between the two groups was statistically significant. This is in line with research(Sari et al., 2024)which proves that giving boiled red ginger water is more effective than young coconut water in reducing the intensity of dysmenorrhea pain, with a difference in pain reduction of 1 scale between the two groups.

Research (E. Fatmawati & Muliawati, 2023) shows that lemongrass ginger date drink is effective in reducing dysmenorrhea pain, reducing pain from severe to moderate and from moderate to mild due to flavonoid compounds that help relieve pain. The intervention group (SJKT) showed a decrease in the median pain score from 6 to 1.5, indicating a clinically significant reduction in pain, so that respondents could be more active and feel more comfortable.

Meanwhile, in the control group, there was a decrease in the median pain score from 3.5 to 2.5, indicating minimal and clinically insignificant changes, so respondents still felt discomfort during activities. The results of this study indicate the effectiveness of providing interventions because the compounds in the natural ingredients used can relieve pain. Factors such as the right dose, respondent characteristics, and testing methods also contribute to these results. This combination proves that pain reduction in this study can occur after treatment.

CONCLUSION AND SUGGESTIONS

Before the intervention, most respondents experienced dysmenorrhea pain in the moderate category and after the intervention, the pain level decreased significantly, the majority of respondents were in the mild category and one respondent reached the no pain category. The Wilcoxon test showed a value of p = 0.001 for the intervention group and p = 0.157 for the control group, indicating the effectiveness of the intervention. The Mann-Whitney test with p = 0.022 confirmed that this difference was statistically significant, indicating a better impact of the intervention. The researcher can conclude that the SJKT concoction has a positive effect in reducing dysmenorrhea pain, as evidenced by the lower pain score after the intervention. It is recommended that further research involve larger and more diverse samples to increase the validity and generalization of the results.

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