

PENGARUH PEMBERIAN MINUMAN KUNYIT TERHADAP KADAR PROSTAGLANDIN DAN INTENSITAS NYERI HAID PADA REMAJA PUTRI (DISMENOIRE PRIMER)**Bq. Yulia Sri Aprian^{1*}, Suharyo Hadisaputro², Lanny Sunarjo³**¹⁻³Magister Terapan Kesehatan Poltekkes Kemenkes Semarang

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Doi: <https://doi.org/10.33024/mahesa.v6i4.22130>**ABSTRACT**

Primary dysmenorrhea is a menstrual disorder often experienced by adolescent girls and is characterized by abdominal pain due to increased levels of prostaglandins that trigger uterine contractions. This condition can disrupt daily activities and reduce quality of life. The use of natural ingredients such as turmeric (*Curcuma longa*) containing curcumin is known to have anti-inflammatory and analgesic effects, and has the potential to reduce prostaglandin levels and the intensity of menstrual pain. This study aims to analyze the effect of providing turmeric drinks on prostaglandin levels and menstrual pain intensity in adolescent girls (primary dysmenorrhea). This research method is a quasi-experimental with a pretest and posttest with a control group design. Through a non-probability sampling technique, 40 respondents were divided into two groups: the intervention group was given a turmeric drink twice a day with a total dose of 30g of turmeric, 2 times a day, 5g dissolved in 200ml of water, given for 3 days, and the control group with warm compresses twice a day for 15 minutes for 3 days. The variables consisted of: the independent variable of turmeric drink, warm compress, the intermediate variable of prostaglandin levels, and the dependent variable of pain intensity. Data analysis used the Levene Test, Mann-Whitney, and Wilcoxon. The results of the study Giving turmeric drink 2 times a day with a total dose of 30gr drunk 2 times a day as much as 5gr dissolved in 200ml of water given for 3 days showed an effect seen from the decrease in the number of Numeric Rating Score NRS scores in the turmeric drink intervention group starting from posttest I, Posttest II and Posttest III which were lower with an average value of 0.25. The average score of prostaglandin levels in the intervention group in the pretest was 147.58 decreased to 94.27 in posttest III. Showing that turmeric drink drunk with a total dose of 30gr drunk 2 times a day as much as 5gr dissolved in 200ml of water given for 3 days has an effect on the intensity of menstrual pain in adolescent girls through prostaglandin levels.

Keywords: Adolescent Girls, Dysmenorrhea, Prostaglandin Level, Turmeric Drink.

INTRODUCTION

Adolescence is a phase of metamorphosis from the world of children to the gates of adulthood, where the body rushes to grow like a

plant watered by light, the mind begins to explore the complexity of logic, emotions churn in search of direction, and awareness of sexual

identity and reproductive function begins to take root in the self (Wahyuni & Zulfahmi, 2021). Menstruation is one of the biological markers that adolescent girls have entered the stage of maturity in sexual and reproductive aspects, marking the readiness of their body system for more complex reproductive functions. Menstruation is a natural process in which the lining of the uterine wall (endometrium) decays, causing bleeding (Sukmawati et al., 2024). Every month the endometrial layer is prepared as a place for the embryo to attach, when no fertilization occurs (Maybin & Critchley, 2015). However, when fertilization does not occur this layer begins to break down resulting in the discharge of blood through the cervix and vagina. This biological phenomenon is known as menstruation, a process that takes place cyclically every month with a normal interval of 28 to 35 days, and the duration of bleeding ranges from 3 to 7 days. In some cases, menstruation can be accompanied by discomfort or pain which is medically called dysmenorrhea (Oktami et al., 2023).

Dysmenorrhea is a sensation of lower abdominal pain before or during menstruation (Indrayani, 2023). Dysmenorrhea is also a common problem in adolescent girls and adult women whose physical symptoms experienced include complaints of cramping, dizziness, diarrhea, fatigue and excessive sweating. In addition, other dysmenorrhea symptoms may include mood swings, abdominal cramps, headaches, back pain, nausea and vomiting (Jayanti et al., 2022).

According to the World Health Organization (WHO) 1.2 billion (18%) of the world's population belongs to the adolescent group. Adolescent age is 10-19 years (WHO, 2024). The

prevalence of dysmenorrhea (menstrual pain) in adolescent girls is very high, ranging from 50% to 90%. This figure indicates that the majority of adolescent girls experience menstrual pain, especially in the first few years after menarche (first menstruation) (American College of Obstetricians and Gynecologists, 2018). According to a report from the American Family Physician, the global prevalence of menstrual pain remains high, with an estimated average of more than half of the female population experiencing the condition-ranging from 15.8% to 89.5% in different countries. In the United States, the prevalence rate is estimated at 45-90%, while in India and Egypt it is around 75% each. In Indonesia alone, primary dysmenorrhea is recorded at 54.8%, while secondary dysmenorrhea reaches 9.36% (Wulandari et al., 2016). Based on the findings of the Demographic and Health Survey.

Dysmenorrhea has a major impact on women, namely limitations in daily activities. Lower academic achievement in adolescents and poor sleep quality and has a negative effect on mood, causing anxiety and depression, therefore the management of dysmenorrhea must be done so that young women can find the right treatment so that young women can overcome the problems faced every month on their own.

Dysmenorrhea is caused by an increase in the hormone prostaglandin F_{2a} in menstrual blood is the cause of primary dysmenorrhea. When the enzyme from lysosomes is released, it will carry phospholipase A₂, an enzyme that is responsible for converting phospholipids into arachidonic acid, a kind of main raw material in the pathway of prostaglandin formation. This process is triggered by hormonal

imbalances in the luteal phase, namely increased levels of PGF2 α in the endometrial layer and decreased progesterone, which together cause the lysosomal membrane to become fragile and easily broken. Prostaglandins themselves are quite influential signaling molecules that regulate uterine muscle contraction and play an important role in the process of endometrial shedding during menstruation. However, if their levels spike too high, they can be a source of sharp pain known as primary dysmenorrhea. Meanwhile, secondary dysmenorrhea is not simply a matter of hormones, but rather a symptom of structural disorders or diseases in the pelvic area, such as endometriosis or fibroids (Itani et al., 2022).

Dysmenorrhea management strategies are generally divided into two pathways: pharmacological and non-pharmacological approaches. In the pharmacological route, the use of analgesics is the main choice for pain relief. Although effective in dulling the pain, long-term consumption of these drugs is not without risks. Dependence can appear slowly, and side effects cannot be ignored ranging from gastric irritation, decreased hemoglobin levels to potential damage to kidney function (Hartinah et al., 2023). One of the non-pharmacological therapies that can be used to reduce pain is turmeric drink, the use of natural plants, plant extracts and herbs. Turmeric is also an alternative treatment using turmeric extract which has analgesic, antiparetic, and anti-inflammatory properties (Pertiwi et al., 2024).

Turmeric contains an active compound called curcumin that has the remarkable ability to suppress the activity of the enzyme cyclooxygenase-2 (COX-2), an enzyme that plays a role in triggering

inflammation. By inhibiting this pathway, curcumin not only relieves inflammation, but also reduces the intensity of uterine muscle contractions. This effect occurs because curcumin is able to restrain the surge of prostaglandins released by the uterine epithelial tissue, so that contractions that usually trigger menstrual pain can be suppressed. As a result, dysmenorrhea symptoms are naturally reduced (Rezkiyanti & Rusli, 2022).

Turmeric is a storehouse of bioactive compounds that have been widely studied for their therapeutic potential. Various components such as epigallocatechin gallate (EGCG), carnosol, hydroxytyrosol, curcumin, resveratrol, kaempferol, and genistein show promising biological activities, ranging from antioxidant, antitumor, antidiabetic, to liver protection and Alzheimer's antidote. Many of these compounds have also been linked to the treatment of arthritis. Curcumin, the main compound in turmeric, consists of three active derivatives namely curcumine, demethoxy-curcumine, and bisdemethoxy-curcumine. Animal studies have shown that curcumin is able to relieve inflammation, especially in the swelling of rat tarsal joints. The mechanism is by inhibiting the enzyme Cyclooxygenase-2 (COX-2), which plays a role in the synthesis of prostaglandins, which are molecules that trigger inflammation. By suppressing COX-2 activity, curcumin indirectly reduces prostaglandin production. Not only that, the essential oil from turmeric also contributes to lowering the levels of TNF- α , one of the inflammatory mediators that belong to the prostaglandin family. This combination of compounds makes turmeric a very potential natural anti-inflammatory agent (Mukhoirotin et al., 2025).

Based on the findings of Matilda's research, turmeric shows enzymatic activity in the form of oxygenation which plays a role in reducing pain due to dysmenorrhea. The curcumin content in it is able to suppress the work of the enzyme Cyclooxygenase-2 (COX-2), which is the main trigger of the inflammatory process and uterine contractions. By inhibiting this pathway, curcumin effectively reduces the intensity of menstrual pain that comes from uterine muscle contractions. Consumption of turmeric and tamarind-based traditional drinks proved statistically superior in reducing the scale of primary menstrual pain. The analysis showed a significance value of $p = 0.01$, indicating that the effect was much more effective than the other beverages tested. Thus, it can be concluded that turmeric and tamarind is a natural intervention that has strong potential in relieving primary dysmenorrhea (Hasanah et al., 2023).

A study conducted by Sutrisno, found that the majority of adolescent girls experienced menstrual pain that was quite disturbing before regularly consuming sour turmeric drink. As many as 69.20% experienced severe pain, while 30.80% felt moderate pain. However, after the intervention with regular consumption of the drink, there was a significant decrease in pain intensity, with 50% of respondents reporting mild to moderate pain. Statistical tests showed a p value = 0.001, which is well below the significance threshold of $\alpha = 0.05$, indicating that consumption of tamarind turmeric has a real effect in relieving dysmenorrhea. Discomfort during menstruation that is not properly managed has a wide-ranging impact on adolescents' daily activities. Impaired concentration in

class was experienced by 59% of respondents, decreased sports participation by 51%, class absenteeism by 50%, obstacles in social interaction by 36%, difficulty completing homework by 35%, decreased test performance by 36%, and even decreased academic grades by 29% (Sutrisno, 2020). In handling dysmenorrhea, some adolescents use pharmacological therapy which can cause dependence if consumed continuously, so that non-pharmacological treatments that are safe for long-term use and are used regularly in adolescent girls, one of which is herbal turmeric drink (Agustina, 2023).

LITERATURE REVIEW

Menstruation is a biological phenomenon that marks an important transition in a woman's life but is also closely related to fertility, reproductive health, and the body's regenerative processes. The arrival of menstruation is often considered a marker of early adulthood, which generally appears between the ages of 9 and 12. However, it is not uncommon for the process to begin between the ages of 13 and 15, depending on genetic and environmental factors. Physiologically, about two weeks before the next menstrual cycle, the body prepares itself by forming a new layer in the endometrium to replace the old tissue that has shed. This process reflects the body's ability to rhythmically renew and adjust itself every month (Nainar et al., 2024). Signs and symptoms that are expressed before and after the onset of menstruation, such as heartburn, heat and nausea, body feeling unfit, fever, headache and dizziness, pain swelling of the breasts, unstable emotions, lower abdominal pain and pain in the lower back area During menstruation,

there is a disruption of the menstrual cycle in every woman which is usually called dysmenorrhea (Ramadani, 2013).

Dysmenorrhea is a painful menstrual condition that naturally appears in the form of cramps in the lower abdominal area. Clinically, dysmenorrhea is divided into two types: primary and secondary. Primary dysmenorrhea, also known as spasmodic dysmenorrhea, is closely related to the ovulation cycle and is triggered by contractions of myometrial smooth muscle in the uterus. Secondary dysmenorrhea, meanwhile, stems from structural or pathological disorders such as endometriosis, adenomyosis or uterine myoma, and is often accompanied by pelvic pain radiating to the lower back or thighs. The symptoms that accompany dysmenorrhea are not only local, but also systemic. These include fatigue (67%), headache (59%), back pain (56%), nausea (55%), vomiting (24%), and additional symptoms such as tachycardia, diarrhea and tremors. Pain usually occurs with the onset of menstruation and can last between 8 to 72 hours, depending on the intensity and type of dysmenorrhea experienced (Itani et al., 2022).

The pain that arises during dysmenorrhea is closely related to the spike in prostaglandin hormone levels in the body. These prostaglandins trigger intense contractions of the uterine muscle (myometrium), which not only cause painful sensations, but also inhibit blood flow and oxygen supply to the uterine tissue. The type of prostaglandin that first forms in the endometrial lining is $\text{PGF}_2\alpha$, which acts as the main trigger for uterine muscle contractions. $\text{PGF}_2\alpha$ is recognized as a major mediator in the mechanism of dysmenorrhea. It triggers a local inflammatory response that causes uterine muscle

spasm, and contributes to systemic symptoms such as nausea, vomiting, abdominal bloating and headaches. This combination of contraction and inflammation makes dysmenorrhea a condition that is not only physically disruptive, but also affects overall well-being (Mukhoirotin et al., 2024).

In addition, endometrial stromal cells also produce prostacyclin and thromboxane in response to estrogen, while in the myometrium produce prostacyclin which results in prostaglandin hormones working in the uterine work system (Guimarães & Póvoa, 2020).

Primary dysmenorrhea can be treated with non-pharmacological therapy, namely with turmeric drinks, the use of natural plants, plant extracts and herbs. turmeric is also an alternative treatment using turmeric extract which has analgesic, antiparetic, and anti-inflammatory properties (Pertwi et al., 2024).

Turmeric contains three main components, namely curcumin, demethoxycurcumin, and bisdemethoxycurcumin, which have anti-inflammatory effects and can inhibit the enzyme cyclooxygenase (COX). The COX enzyme plays a role in prostaglandin synthesis, so inhibition of this enzyme will reduce prostaglandin levels in the body. This decrease in prostaglandin levels can further reduce pain intensity in patients with primary dysmenorrhea.

Turmeric has long been an integral part of everyday life as a natural colorant in culinary delights, a spice that enriches flavor, as well as a basic ingredient in beauty treatments such as scrubs and cosmetics. In fact, in traditional practices, turmeric is often used to increase children's appetite. In the realm of health, turmeric exhibits a

wide spectrum of benefits. It is known as an antioxidant, antitumor, anticancer, antimicrobial, anti-inflammatory and antidote agent. Its traditional uses include the treatment of various diseases such as diabetes mellitus, typhoid, appendicitis, dysentery, vaginal discharge, menstrual disorders, open wounds, diarrhea, abdominal pain, indigestion, hepatitis, mouth ulcers, rheumatism, and lowering cholesterol levels. Not only that, traditional turmeric-based therapies also include unique methods such as inhaling smoke from the burnt rhizome to relieve nasal congestion. The flowers also have their own properties, which are processed into a paste and used as a remedy for worms, treatment of skin diseases, and even venereal diseases such as gonorrhea and dysmenorrhea

(Rohmah, 2024).

RESEARCH METHODOLOGY

The type of research used is Quasy experiment with pretest and posttest with control group design. Through non-probability sampling technique, 40 respondents were obtained which were divided into two groups, the intervention group given turmeric drink 2 times a day with a total dose of 30gr turmeric 2 times a day as much as 5gr dissolved in 200ml of water for 3 days and the control group with warm compresses 2 times a day with a duration of 15 minutes for 3 days. Variables consist of: independent variable of turmeric drink, warm compress, intermediate variable of prostaglandin level and dependent variable of pain intensity. Data analysis using Levene Test, Mann-Whitney, Wilcoxon.

RESEARCH RESULTS

Table 1. Frequency Distribution of Respondent Characteristics

Respondent Characteristi cs	Intervention Group		Control Group	
	<i>n</i>	%	<i>N</i>	%
Menarche Age				
1. Prekok	4	20	5	25
2. Normal	16	80	12	60
3. Tarda	0		3	15
Total	20	100.0	20	100.0
Menstrual Length				
1. Short	5	25	7	35
2. Normal	13	65	8	40
3. Long	2	10	5	25
Total	20	100.0	20	100.0
Family History				
1. Any History	6	30	9	45
2. No History	14	70	11	55
Total	20	100.0	20	100.0

Seen in table 4.1 in the intervention group, the age of menarche of SMA 2 Ungaran adolescent girls was mostly classified as normal as many as 16 people (80%) and the least classified as precocious as many as 4 people (20%) while in the control group the most were classified as normal as 12 people (60%) and the least were classified as tarda as many as 3 people (15%). The length of menstruation of adolescent girls in the intervention group is

more classified as normal as many as 13 people (65%) and the least classified as long as 2 people (10%) while in the control group which is classified as normal as 8 people (40%) and the least classified as long as 5 people (25%). In the intervention group, 14 adolescent girls (70%) did not have a family history of disease and likewise in the control group where 11 adolescent girls (55%) did not have a family history of disease.

Table 2. Frequency Distribution of Pain Categories in the Intervention Group and Control Group

Observation Time	Intervention Group		Control Group	
	N	%	N	%
Prettest				
No Pain	0	0%	0	0%
Mild Pain	0	0%	0	0%
Moderate Pain	12	60%	12	60%
Severe Pain	8	40%	8	40%
Total	20	100.0	20	100.0
Posttest I				
No Pain	0	0%	0	0%
Mild Pain	10	50%	4	20%
Moderate Pain	9	45%	15	75%
Severe Pain	1	5%	1	5%
Total	20	100.0	20	100.0
Posttest II				
No Pain	0	0%	0	0%
Mild Pain	19	95%	15	75%
Moderate Pain	1	5%	5	25%
Severe Pain	0	0%	0	0%
Total	20	100.0	20	100.0
Posttest III				
No Pain	15	75%	3	15%
Mild Pain	5	25%	17	85%
Moderate Pain	0	0%	0	0%
Severe Pain	0	0%	0	0%
Total	20	100.0	20	100.0

Table 2 shows the development of categories based on pain in the intervention and control groups during the four observation times (pretest to posttest III). At pretest, both groups had similar initial conditions, with 60% of respondents experiencing moderate pain and 40% severe pain. At posttest I, the intervention group showed a decrease in pain, with 50% experiencing mild pain, 45% moderate pain, and only 5% severe pain. In contrast, the control group was still dominated by moderate pain (75%), mild pain (20%), and severe pain (5%). Posttest II showed

an increase in improvement in the intervention group, where 95% of respondents experienced mild pain and 0% had moderate or severe pain. In the control group, 75% experienced mild pain and 25% moderate pain. In posttest III, 75% of respondents in the intervention group were pain-free and 25% still had mild pain. In the control group, 85% of respondents were in mild pain and only 15% were pain-free. Overall, the intervention group experienced a faster and more significant decrease in pain intensity than the control group, showing the effect of the intervention provided.

Table 3. Analysis of Pain Reduction Before and After Treatment of Intervention group and control group

Measurement	Intervention Group				Control Group			
	Before	After	Δ Mean	p value	Before	After	Δ Mean	P value
Pretest 0 >> Posttest 1	6,45	3,65	2,80	0,001*	5,95	4,70	1,25	0,000*
Pretest 0 >> Posttest 2	6,45	1,80	4,65	0,000*	5,95	2,75	3,20	0,000*
Pretest 0 >> Posttest 3	6,45	0,25	6,20	0,000*	5,95	1,80	4,15	0,000*
Posttest 1 >> Posttest 2	3,65	1,80	1,85	0,001*	4,70	2,75	1,95	0,000*
Posttest 1 >> Posttest 3	3,65	0,25	3,40	0,001*	4,70	1,80	2,90	0,000*
Posttest 2 >> Posttest 3	1,80	0,25	1,55	0,000*	1,80	1,80	0,95	0,001*

The results of the analysis in Table 3 show that the intervention group who consumed turmeric drinks experienced a significant decrease in pain at each measurement stage, from 6.45 at pretest to 0.25 at posttest III ($p < 0.05$). The control group also showed a decrease, but

with a smaller mean, from 5.95 to 1.80. The decrease in pain was greater and more consistent in the intervention group, so it can be concluded that turmeric drink is effective in reducing the intensity of menstrual pain.

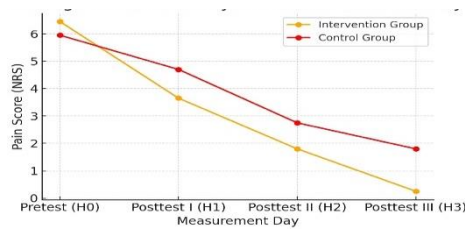


Figure 1. Average Pain Reduction of Dysmenorrhea Pain Intensity

Based on Figure 1, it can be seen that in the pretest observation before the treatment is given, both the intervention group and the control group have not shown a decrease in the NRS score. However, after the treatment was applied for 3 days and evaluated at posttest I, posttest II and posttest III, there was

a significant decrease in Numeric Rating Scale (NRS) scores in the intervention group, where the intervention group showed a greater decrease than the control group. The decrease in the Numeric Rating Scale (NRS) score in the intervention group even reached the optimal value of 0.25.

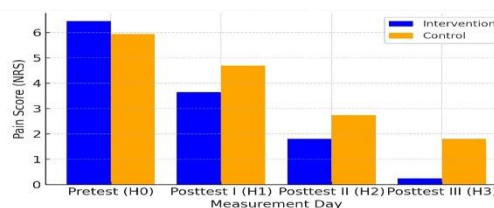


Figure 2. Comparison Of Pain Reduction Between Intervention Group And Control Group

Figure 2 shows a comparison of the decrease in dysmenorrhea pain intensity based on the Numeric Rating Scale (NRS) score between the intervention group and the control group during the pretest to posttest III observation period. At the beginning of the measurement (pretest), both groups had relatively high pain scores, namely 6.45 in the intervention group and 5.95 in the control group. However, after the treatment, there was a significant decrease in the intervention group. In posttest I, the pain score in the intervention group dropped to 3.65,

while the control group only decreased to 4.70. The decrease continued until posttest II, where the intervention group's pain score was recorded at 1.80, lower than the control group which was at 2.75. The most significant decrease was seen in posttest III, where the intervention group's pain score was almost close to zero, at 0.25, while the control group still showed a pain score of 1.80. This graph visually confirms that the intervention group experienced a faster and greater reduction in pain than the control group.

Table 4. Analysis of Prostaglandin Levels Before and After between Intervention and Control Groups

Variable	Intervention Group				Control Group			
	Before	After	Δ Mean	p value	Before	After	Δ Mean	P value
Prostaglandin Levels	147,585	94,27	53,31	0,000	159,69	131,25	28,44	0,100

Based on Table 4, it is known that in the intervention group, prostaglandin levels before treatment amounted to 147.59 decreased to 94.27 after intervention, with an average difference (Δ mean) of 53.31. The Wilcoxon test results showed a value of $p = 0.000$ ($p < 0.05$), which means there is a significant difference between prostaglandin levels before and after treatment. This indicates

that the administration of turmeric drink has a significant effect in reducing prostaglandin levels. Meanwhile, in the control group, prostaglandin levels also decreased from 159.69 to 131.25 with an average difference of 28.44, but the Wilcoxon test results showed a p value = 0.100 ($p > 0.05$), so there was no significant difference between before and after in the control group.

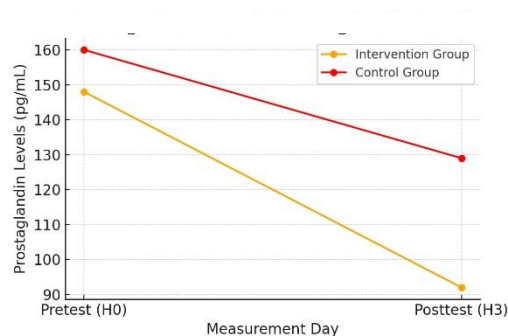


Figure 3. Average Decrease Based on Prostaglandin Levels

Figure 3 shows the decrease in prostaglandin levels at pretest and posttest III in the intervention group and control group. It can be seen that the intervention group experienced a greater decrease in prostaglandin levels, from the initial value of 147.58 pg/mL to 94.27 pg/mL posttest III. Meanwhile, the control group also showed a decrease in prostaglandin levels, but more slowly, from 159.68 pg/mL to 131.25 pg/mL. This graph illustrates the effect of the intervention in

reducing prostaglandin levels significantly. The sharper decrease in prostaglandin levels in the intervention group is a strong indicator that the intervention is effective in reducing the biological response to dysmenorrhea pain. The difference in the slope of the line between the two groups further strengthens the finding that the intervention group received greater physiological benefits than the control group.

DISCUSSION

Mechanism of Turmeric Drink in the Process of Decreasing Dysmenorrhea Pain Based on Numeric Rating Scale (NRS) Score

Dysmenorrhea pain characterized by painful menstrual cramps is a common condition that affects women's quality of life.

Based on the results of observations on pretest, posttest I, posttest II and posttest III, it is known that before being given treatment, the majority of adolescent girls in both groups, both the intervention group (turmeric drink) and the control group (warm compress) are still classified as experiencing severe pain on the Numeric Rating Scale (NRS) score (7-10) and moderate pain on the Numeric Rating Scale (NRS) score (4-6) on the first day of menstruation.

Based on the Wilcoxon test results, turmeric drink significantly reduced dysmenorrhea pain intensity from pretest to posttest III, with $p < 0.05$ at all measurement points. The decrease in Numeric Rating Scale (NRS) scores in the intervention group showed a consistent trend, from an average of 6.45 at pretest to only 0.25 at posttest III. This decrease was sharper than the control group (warm compress) which only

decreased from 5.95 to 1.80.

In line with the research of Sartiwi & Hasrinal (2020) that consuming turmeric-acid drinks significantly reduces dysmenorrhea pain with a decrease in pain intensity from an average score of 5.00 to 1.63 after consuming the drink. Turmeric drinks reduce dysmenorrhea pain by containing curcumin which acts as a muscle relaxant, reducing tension and consequently reducing the intensity of menstrual pain experienced (Sartiwi & Hasrinal, 2020). Turmeric drink reduces pain in dysmenorrhea mainly due to curcumin which has antioxidant, anti-analgesic, and anti-inflammatory properties. These properties help reduce inflammation, oxidative stress, and modulate pain perception, thus helping to relieve menstrual pain by reducing inflammation and oxidative stress, contributing to a lower pain scale in individuals experiencing dysmenorrhea pain (Rezkiyanti & Rusli, 2022).

Researcher Mukhoirotin et al. (2024) demonstrated the effectiveness of turmeric in reducing the intensity and duration of dysmenorrhea. For example, a systematic review found that curcumin significantly reduced

menstrual pain and improved symptoms (Mukhoirotn et al., 2024).

There was a difference in the decrease in the number of Numeric Rating Scale (NRS) scores between the turmeric drink intervention group and the warm compress control group in posttest II and posttest III seen from the average value of the Numeric Rating Scale (NRS) score in the turmeric drink intervention group experienced a lot of decline compared to the warm compress control group, which means that the intervention group giving turmeric drink is proven to improve the healing of dysmenorrhea pain in adolescent girls. In line with the research of Supatmi et al. (2024) that 80% of participants reported a decrease in menstrual pain intensity, an average reduction of 3 points on a scale of 0-10.54. Other researchers also suggested that participants experienced a decrease in pain intensity from moderate to mild after consuming turmeric and honey decoction, with statistically significant results ($p = 0.000$) (Panggabean et al., 2022).

Mechanism of Turmeric Drink in the Process of Decreasing Dysmenorrhea Pain Based on Prostaglandin Levels

Primary dysmenorrhea is generally associated with increased production of prostaglandins, especially prostaglandin F₂α (PGF₂α), which plays a role in stimulating uterine muscle contractions. These contractions can reduce blood flow to the uterus, triggering pain. The severity of pain in dysmenorrhea varies from woman to woman, depending on the amount of prostaglandins produced. Excessive prostaglandin production in the endometrial layer can cause stronger and more intense uterine contractions, thus exacerbating the

pain felt (Wiyatagati & Suprayogi, 2025).

Turmeric contains the active compound curcumin, which has been shown to effectively reduce dysmenorrhea pain through several mechanisms. Curcumin in turmeric inhibits cyclooxygenase-2 (COX-2) activity and reduces the production of prostaglandins, which are compounds that cause uterine contractions and pain during menstruation. In addition, curcumin's antioxidant properties help reduce oxidative stress and maintain hormonal balance, which further reduces menstrual pain. Turmeric increases serotonin and dopamine levels, which may contribute to its antidepressant and sedative effects, further aiding in the reduction of dysmenorrhea symptoms (Shabanian Boroujeni et al., 2024). In addition to curcumin, turmeronol A and B compounds in turmeric have been shown to inhibit the production of prostaglandin E₂ and other inflammatory mediators in macrophages, suggesting a potential role in managing chronic inflammatory diseases. Curcumin is also thought to have an effect on the central nervous system by inhibiting the transmission of pain impulses through its effect on serotonin and dopamine receptors. This strengthens the mechanism that turmeric not only works peripherally, but also centrally in reducing pain perception. It is this combination of anti-inflammatory, antioxidant and neuromodulatory properties that explains the effectiveness of turmeric drink in significantly reducing the pain intensity of primary dysmenorrhea (Siyami et al., 2025).

Researchers took blood samples to check prostaglandin levels at pretest before being given the intervention of turmeric drinks and warm compresses. Then given

the intervention at posttest I, posttest II and posttest III, after which further blood samples were taken to measure prostaglandin levels after being given the intervention for 3 days as a posttest.

Based on the results of the Wilcoxon test in the intervention group, the value of $p < 0.05$ ($p = 0.000$) was obtained, which means that there is a difference in prostaglandin levels in the results of pretest and posttest III measurements. In the control group, the $p > 0.05$ value ($p = 0.100$) means that there is no significant difference in the measurement of prostaglandin levels in Pretest and posttest III. Measurement of prostaglandin levels has a difference in the average value of the difference in the intervention group of 53.31 and in the control group 28.43.

The Mann-Whitney test results showed a $p > 0.05$ value ($p = 0.914$) which means that there was no difference in the measurement of prostaglandin levels in the pretest of the intervention group and the control group. The results of posttest III measurements showed a value of $p < 0.05$ ($p = 0.002$) which means that there are differences in prostaglandin levels in the intervention group and control group.

In line with the research of Siyami et al. (2025), namely turmeric acid drinks have been shown to significantly reduce menstrual pain in adolescent girls by reducing the release of prostaglandins, which are the main cause of dysmenorrhea (Siyami et al., 2025).

CONCLUSION

The administration of turmeric drink with a total dose of 30 grams taken 2x a day in the morning and

night as much as 5 grams dissolved in 200ml of water was given for 3 days to adolescent girls with primary dysmenorrhea. Affected in reducing prostaglandin levels in adolescent girls who experience primary dysmenorrhea and menstrual pain intensity based on measurements with the NRS Scale.

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