How to Cite
Raidanti, D., Wijayanti, R., & Wahidin, W. (2025). The effect of turmeric tamarind drink on pain scale changes in 12th grade female students at Fahd Islamic School Health Vocational High School with primary dysmenorrhea. *International Journal of Health & Medical Sciences*, *8*(1), 8-17. https://doi.org/10.21744/ijhms.v8n1.2362

The Effect of Turmeric Tamarind Drink on Pain Scale Changes in 12th Grade Female Students at Fahd Islamic School Health Vocational High School with Primary Dysmenorrhea

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***Abstract*---*Each woman experiences menstruation differently. Some undergo menstruation without complaints, while others face discomfort, including dysmenorrhea. This study employed a quasi-experimental design with a non-equivalent control group design. The subjects were divided into two groups: the treatment group and the control group, with both groups undergoing pretest and posttest evaluations. The data collection was conducted at SMK Kesehatan Fahd Islamic School during the 2023 period. A total of 32 female students participated in the study, with 16 students assigned to the treatment group and 16 to the control group. The sampling technique used was purposive sampling. The instruments included a general data sheet and the Numeric Rating Scale (NRS) for pain measurement. The general data sheet contained information such as age, age at menarche, menstrual dates, duration of menstruation, menstrual pain, pain duration, family health history, and therapies used. The reliability test results showed a coefficient of 0.820 for the knowledge questionnaire and 0.785 for the attitude questionnaire, indicating that the instruments were reliable. Data analysis was performed using the Wilcoxon Signed Rank Test ($p \leq 0.05$) with SPSS 16 software at a significance level of $\alpha = 0.05$. The analysis revealed a p-value of 0.000 (<0.05), indicating a significant difference in the effect of turmeric tamarind drink therapy between the treatment and control groups on pain scale changes among female students with primary dysmenorrhea at SMK Kesehatan Fahd Islamic School. It is recommended that female students start consuming turmeric tamarind drinks to help alleviate pain during dysmenorrhea.*
Keywords*---*dysmenorrhea, pain scale, toddlers, turmeric tamarind drink.

Introduction

Each individual undergoes adolescence as part of their development, a phase that holds significant importance in human growth. Adolescence is described as a transitional period from childhood to adulthood, accompanied by cognitive, emotional, social, and physical maturation (Marfuah & Mayasari, 2018). According to Regulation of the Minister of Health No. 25 of 2014, adolescence refers to individuals aged 10 to 18 years (Regulation of the Minister of Health of the Republic of Indonesia No. 25 of 2014, 2014). Adolescence is closely associated with the process of physical and psychological maturation. In female adolescents, physical maturation, particularly related to sexual functions, is marked by menstruation (Fatkhiyah et al., 2020). Menstruation is one of the characteristics of female maturity, occurring monthly and lasting for 5 to 7 days. It involves the discharge of blood and endometrial debris

ISSN 2632-9433
Submitted: 09 November 2024 |Revised: 18 December 2024 | Accepted: 27 January 2025

from the uterus in response to ovarian hormone secretion. This process often causes pain, commonly referred to as dysmenorrhea. The prevalence of dysmenorrhea is quite high, with nearly 90% of women experiencing severe dysmenorrhea that can hinder daily activities and negatively impact their quality of life (Astuti et al., 2020).

One billion people in the world, or one in every six people, are adolescents, with 85% of them living in developing countries. According to the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2016, Indonesia's population is 258 million, with 44 million or 17.9% being adolescents aged 10 to 19 years, and 21 million or 8.43% being adolescent females. In Indonesia, the average age for females to experience menarche (the first menstruation) is 12.5 years, ranging from 9 to 14 years. The incidence of primary dysmenorrhea in the United States is almost 95%, in Southeast Asia around 69.4%, and in Indonesia, it reaches 65%. Primary dysmenorrhea in Indonesia shows that 59.2% of adolescent girls experience decreased activity, such as skipping school or work (5.6%), while 35.2% do not experience any disturbances (Kulkarni & Deb, 2019).

Adolescence is a transition period from puberty to adulthood, a process of growth toward maturity, encompassing mental, emotional, social, and physical maturity (Mukhoirotin & Taufik, 2016). One of the signs of puberty in females is the occurrence of the first menstruation (menarche). Every woman experiences menstruation differently. Some women menstruate without complaints, while others experience it accompanied by discomfort such as dysmenorrhea (Setya et al., 2017). Dysmenorrhea is characterized by cramps or stiffness in the lower abdomen that occur before or during menstruation. This problem affects at least 60-85% of women and results in significant absenteeism from school or work (Anurogo & Wulandari, 2017). Menstrual pain in adolescent girls is often reflected in the number of absences from class.

In Indonesia, many women who experience dysmenorrhea do not report it or visit a doctor. It is reported that 90% of Indonesian women have experienced dysmenorrhea (Ramadhani, 2020). The incidence of menstrual pain in the United States is around 60%, while in Sweden it is about 72%. In Indonesia, the incidence rate is approximately 55%. The prevalence of menstrual pain ranges from 45-95% among women of reproductive age. Generally, it is not harmful but is often considered bothersome for those who experience it (Octavia & Iryawan, 2017). In Indonesia, there is no definitive data on the number of women suffering from menstrual pain (Anindita, 2010). In an epidemiological study on adolescents (ages 12-17), the prevalence of dysmenorrhea was found to be 59.7%. Of those who reported pain, 12% described it as severe, 37% as mild, and 49% as moderate. Dysmenorrhea caused 14% of patients to frequently miss school. In a cross-sectional study of 311 female university students in Iran (ages 18-27), the prevalence of primary dysmenorrhea was 89.1% (Dong et al., 2023). There is no precise data on the number of dysmenorrhea sufferers in Indonesia. This is because many women with dysmenorrhea do not report it or seek medical attention. The embarrassment of seeing a doctor and the tendency to downplay certain conditions in Indonesia cannot be determined absolutely. It can be said that 90% of Indonesian women have experienced dysmenorrhea (Anurogo & Wulandari, 2017).

The causes of dysmenorrhea are not only endocrine factors but also include psychological factors, organic disorders, constitutional factors, and allergic factors. Research has shown a relationship between dysmenorrhea and conditions such as urticaria, migraines, and asthma (Ozerdogan et al., 2009; Durain, 2004). Dysmenorrhea management is classified into two types: pharmacological and non-pharmacological treatments. Pharmacologically, dysmenorrhea is treated with chemical pain relievers or analgesics, such as aspirin, phenastine, mefenamic acid, paracetamol, or non-steroidal anti-prostaglandin drugs like indomethacin and ibuprofen. Non-pharmacological treatments include various methods such as warm compresses, acuyoga exercises, massage, rest, and the consumption of herbal plants (Basha et al., 2024). Non-pharmacological treatments for dysmenorrhea that can be performed by nurses include warm compresses, aromatherapy, relaxation techniques like finger grasping and deep breathing, acupressure, and herbal therapies (such as cinnamon, soy, cloves, ginger, and turmeric). Research explains that red ginger contains chemical compounds such as essential oils, oleoresins, gingerol, 1.8-cineole, 10-dehydrogingerdione, 6-gingerdione, arginine, and starch (Ozgoli et al., 2009). It is also mentioned that the gingerol content in red ginger can block the action of prostaglandins, which helps reduce menstrual pain (dysmenorrhea) (Utami, 2011).

Turmeric tamarind is a traditional herbal drink commonly consumed by the public to alleviate pain during menstruation. However, there is limited research supporting the effectiveness of turmeric tamarind in reducing pain associated with dysmenorrhea. Naturally, turmeric is believed to contain active compounds that function as analgesics, antipyretics, and anti-inflammatory agents, while tamarind (Tamarindus indica) contains active substances with anti-inflammatory, antipyretic, and calming properties (Walpurgis et al., 2020).

Based on a preliminary study conducted on 10 female students at Fahd Islamic Health Vocational School, it was found that 7 of them experienced dysmenorrhea, though the specific factors contributing to the occurrence of dysmenorrhea remain unknown. Given the background and phenomenon described above, the researcher is interested

in conducting a study on the effects of turmeric tamarind on primary dysmenorrhea among female students at Fahd Islamic Health Vocational School in 2023.

Method

This study uses a Quasi-Experiment method with a non-equivalent control group design. In this design, subjects are divided into two groups: the treatment group and the control group, with both groups undergoing pretest and posttest. Data collection will take place at Fahd Islamic Health Vocational School during the 2023 period. The target population for this study consists of 51 female students experiencing primary dysmenorrhea. The sample size is determined using the Federer formula, with a total of 32 female students. The treatment group will consist of 16 students, and the control group will also consist of 16 students. The sampling technique used in this study is Purposive Sampling, which involves selecting samples based on inclusion and exclusion criteria.

The inclusion criteria are: students who are aware of their menstrual cycle based on the last 3 months' menstruation dates, students who experience moderate dysmenorrhea during menstruation, and students who are willing to participate as respondents. Exclusion criteria include students who are taking analgesic medications during dysmenorrhea, students who have gynecological diseases, and those who are not suffering from any reproductive organ abnormalities, who are not experiencing stress or pressure recently, and who do not smoke. The instruments used in this study include general data sheets and the Numeric Rating Scale (NRS) pain scale measurement sheet. General data includes age, age at menarche, menstrual dates, menstrual duration, menstrual pain, pain duration, family health history, and therapy undergone. The reliability test results for the knowledge questionnaire were 0.820, and for the attitude questionnaire, 0.785, indicating that the questionnaires are reliable. The data collected from the pretest and posttest will be analyzed using the Wilcoxon Signed Rank Test ($p \leq 0.05$) with SPSS 16 software and a significance level of α: 0.05.

Result and Discussion

Tabel 1
Distribution of Menstrual Pain Scale Pre and Post in the Treatment Group of Female Students at Fahd Islamic Health Vocational School

Pain Scale	Pre	Post
Mean	4.94	1.75
Median	5.00	2.00
Mode	5	3
Standard Deviation	0.772	1.291
Min-Max	4-6	0-3
Wilcoxon Sign Rank Test		0.000

In the pre-treatment pain scale measurement, the results showed that out of 16 respondents, the average pain level was 4.94, with a median of 5.00. The most common pain level was 5, with the lowest pain at 4 and the highest at 6. In the post-treatment pain scale measurement, the average pain level was 1.75, with a median of 2.00. The most common pain level was 3, with the lowest pain at 0 and the highest at 3. The Wilcoxon Signed Rank Test for the treatment group showed a p-value of $0.000 < \alpha = 0.05$. This means that H0 is rejected and H1 is accepted, indicating a significant difference in the pain scale after the administration of turmeric tamarind drink.

Table 2
Distribution of Menstrual Pain Scale Pre and Post in the Control Group of Female Students at Fahd Islamic Health Vocational School

Pain Scale	Pre	Post
Mean	5.25	3.75
Median	5.00	4.00
Mode		4
Standard Deviation	0.577	1.183
Min-Max	4-6	1-5
Wilcoxon Sign Rank Test		0.000

Source: Source: Pain Scale Measurement Sheet (2018)

in the pre-treatment pain scale measurement, the results showed that out of 16 respondents, the average pain level was 5.25, with a median of 5.00. The most common pain level was 5, with the lowest pain at 4 and the highest at 6. In the post-treatment pain scale measurement, the average pain level was 3.75, with a median of 4.00. The most common pain level was 4, with the lowest pain at 1 and the highest at 5. The Wilcoxon Signed Rank Test for the control group showed a p-value of $0.000 < \alpha = 0.05$. This means that H0 is rejected and H1 is accepted, indicating a significant difference in the pain scale before and after the administration of turmeric tamarind drink in the control group. The conclusion from the statistical test is that there is an effect of turmeric tamarind drink on the pain scale change in female students with primary dysmenorrhea in the control group.

Table 3
Difference Test of Pain Scale Pre and Post Administration of Turmeric Tamarind Drink in the Treatment Group and Control Group at SMK Kesehatan Fahd School

Group	N	Average Pretest Score	Average Posttest Score	Difference
Treatment	16	4.94	1.75	3,19
Control	16	5.25	3.75	1,5

Based on Table 3, it can be seen that the mean difference between the pretest and posttest in the treatment group is 3.19, meaning that the turmeric tamarind drink has a significant impact on the change in pain scale for primary dysmenorrhea. In the control group, the mean difference between the pretest and posttest is 1.5, indicating that, even without the administration of the turmeric tamarind drink, there is still a slight change in the pain scale.

Table 4
Test of Differences in the Effect of Turmeric Tamarind Drink on Changes in Pain Scale in the Treatment and Control Groups at SMK Kesehatan Fahd Schoo

Group	Mean Rank	Sum OfRanks	Z	p-Value
Treatment	23,22	371,50	-4.177	0,000
Control	9,78	156,50		

Based on the Mann-Whitney test, a p-value of 0.000 (<0.05) was obtained, which means that H0 is rejected and H1 is accepted. This indicates a significant difference in the effect of the turmeric tamarind drink on the change in the pain scale between the treatment group and the control group in female students with primary dysmenorrhea at Fahd Islamic School Health Vocational High School.

Pain Scale Before Administration of Turmeric Tamarind Drink in the Treatment and Control Groups of Female Students with Primary Dysmenorrhea at Fahd Islamic School Health Vocational High School

Based on the research results, the pain scale before the administration of therapy using the Numeric Rating Scale (NRS) pain measurement in female students at Fahd Islamic School Health Vocational High School shows objective signs from respondents in the treatment group, with an average pain level of 4.94. The pain is described as cramps in the lower abdomen extending to the waist, sometimes reaching the knees, with a decreased appetite, difficulty in controlling emotions, and interfering with concentration during study and activities. In the control group, the average

pain level was 5.25, with objective signs of pain in the lower abdomen radiating to the waist, decreased physical activity, reduced appetite, and irritability (Wieser, 2007).

From the research findings, it is concluded that the pain experienced by respondents is categorized as moderate pain, with objective signs aligning with the study (View of Effectiveness of Pain Relief Package for Adolescents with Dysmenorrhea.pdf, n.d.), on a scale of 4-6 (moderate pain). The symptoms felt by the respondents include cramps in the lower abdomen, pain radiating to the waist, loss of appetite, disturbed activities, and difficulty concentrating.

The study also found that 20 students (62.5%) experienced menstrual pain during menstruation, while 12 students (37.5%) reported pain before menstruation. These results indicate that primary dysmenorrhea commonly occurs during menstruation, particularly on days 1 to 3. This is in line with Kristina's (2010) opinion, which states that primary dysmenorrhea is most prevalent during the first day of menstruation and intensifies on the second and third days due to increased progesterone production. According to theory, primary dysmenorrhea occurs on days 1-3 of menstruation due to increased prostaglandin production, which causes pain. Additionally, continuous uterine contractions also restrict blood flow to the uterus temporarily, leading to primary dysmenorrhea (Scartezzini & Speroni, 2000).

Based on the results of this study, the duration of menstruation in most respondents was more than 7 days, with 19 students (59.4%), and a smaller portion experienced menstruation for ≤ 7 days, with 13 students (40.6%). From this data, it can be concluded that the duration of menstruation is one of the risk factors for primary dysmenorrhea. This is in line with the opinion of Dita & Ari (2011), which states that the normal duration of menstruation is usually 7 days. Menstruation causes uterine contractions, and when it lasts longer, the uterus contracts more frequently, resulting in an increased release of prostaglandin hormones. Excessive prostaglandin production can cause pain, while continuous uterine contractions restrict blood flow to the uterus, leading to dysmenorrhea.

Pain Scale After the Administration of Tamarind Turmeric Drink on the Treatment and Control Groups in 8th Grade Students with Primary Dysmenorrhea

Based on the results of the study involving 16 students in the treatment group, prior to the administration of the turmeric tamarind drink, the average pain score was 4.94, and after being given the drink, the average pain scale decreased to 1.75. The objective signs observed in the respondents included the ability to communicate well, reduced pain, and the ability to engage in activities comfortably. This change indicates that the turmeric tamarind drink had a significant impact on the pain scale of students with primary dysmenorrhea. This aligns with Ningsih et al. (2013), who explained that a pain scale of 1-3 is categorized as mild pain, with symptoms including cramps in the lower abdomen, which can still be tolerated, allowing the individual to continue activities and concentrate on learning.

Various methods are employed to reduce primary dysmenorrhea, including pharmacological and non-pharmacological therapies. One non-pharmacological technique is the use of the turmeric tamarind drink. This therapy is cost-effective and easily accessible, as it is simple to prepare and the ingredients are readily available around us. The turmeric tamarind drink has basic properties as an analgesic and anti-inflammatory. The active agent in turmeric that functions as an anti-inflammatory and antipyretic is curcumin (Gloth III et al., 2001). Meanwhile, curcumenol serves as the analgesic. Tamarind fruit contains the natural active agent anthocyanin, which acts as an anti-inflammatory and antipyretic. Additionally, tamarind fruit also contains tannins, saponins, sesquiterpenes, alkaloids, and phlobotannins that help reduce nervous system activity (Hatcher et al., 2008).

The mechanism by which the turmeric tamarind drink reduces pain is based on the natural ingredients in the drink, which can alleviate primary dysmenorrhea symptoms through different pathways. Curcumin and anthocyanin work by inhibiting the cyclooxygenase reaction, thereby reducing inflammation, which in turn reduces or even prevents uterine contractions (Siega-Riz et al., 2010). The mechanism of uterine contraction inhibition by curcumin occurs by decreasing calcium (Ca2+) influx into calcium channels in the uterine epithelial cells. The contents of tannins, saponins, sesquiterpenes, alkaloids, and phlobotannins affect the autonomic nervous system, influencing the brain to reduce uterine contractions. As an analgesic agent, curcumenol inhibits the excessive release of prostaglandins (Almada, 2010).

In the control group, results showed that the average pain score was 5.25 on the first day, and by the third day, the average pain scale had decreased to 3.75. Objective signs observed in the respondents included frequent grimacing, slight pain in the lower abdomen, the ability to engage in physical activity, and an increased appetite. These changes indicate that, even without the administration of the turmeric tamarind drink, there was a change in pain scale in students with primary dysmenorrhea. This aligns with Ningsih et al. (2013), who explained that a pain scale of 3.75

is categorized as mild pain, with symptoms such as cramps in the lower abdomen, which can still be tolerated, allowing the individual to engage in activities and concentrate on learning.

The study found that pain decreased, even without any intervention, because by the third day, the increasing levels of progesterone began to decrease, and the body had adapted to the pain, meaning students were already accustomed to experiencing it. This is consistent with Price (2006), who explained that a common symptom of primary dysmenorrhea is pain starting at the onset of menstruation. Sometimes, this pain lasts for more than one day but rarely exceeds 72 hours. According to Dita & Ari (2011), dysmenorrhea occurs on the first and second days of menstruation, with pain decreasing after a significant amount of blood is released, and from an endocrine perspective, prostaglandin levels rise before menstruation and decrease during menstruation..

Differences in Pain Scale Before and After Consumption of Turmeric Tamarind Drink in the Treatment and Control Groups of Grade 8 Students with Primary Dysmenorrhea at Fahd Health Vocational School

Based on Table 3, it is observed that the mean difference between pretest and posttest in the treatment group is 3.19, while in the control group, the mean difference is 1.5. Both groups experienced changes in pain scale, although the treatment group showed a greater change compared to the control group, as the treatment group received an intervention, namely the turmeric tamarind drink. The turmeric tamarind drink contains compounds such as curcuminoids, essential oils, flavonoids, and others, which are beneficial as analgesics (pain relievers), anti-inflammatory agents, and so on. Therefore, the pain experienced during menstruation can decrease by regularly consuming turmeric tamarind brew. This aligns with Marlina (2016), who states that turmeric contains curcuminoids, a type of antioxidant with properties including bacteriostatic, spasmolytic, antihepatotoxic, and anti-inflammatory effects. Tamarind, on the other hand, is a fruit with high antioxidant content, and its antioxidant properties increase when combined with other spices. Tamarind helps to improve blood circulation, thus preventing the constriction of blood vessels during dysmenorrhea (Astawan, 2009).

In the control group, pain was experienced due to the decrease in prostaglandin levels on the third day, which led to a reduction in the pain scale. This is in line with Dita & Ari (2011), who explain that dysmenorrhea occurs on the first and second days of menstruation, and the pain decreases after a sufficient amount of blood is released. From an endocrine perspective, the increase in prostaglandin hormone levels before menstruation and its decrease during menstruation contributes to the reduction in pain.

The Difference in the Effect of Turmeric Tamarind Drink on Pain Scale Changes in 8th Grade Female Students with Primary Dysmenorrhea at Fahd Health Vocational High School

Based on the results of the pain scale differences after being given turmeric tamarind drink and using the Mann Whitney test, a p-value of 0.000 (< 0.05) was obtained. Therefore, it can be concluded that H0 is rejected and H1 is accepted, which means there is a significant difference in the effect of turmeric tamarind drink on the change in pain scale in 8th grade female students with primary dysmenorrhea at Fahd Health Vocational High School. Based on the analysis, it was found that the average reduction in pain scale for the treatment group was 23.22, and the reduction in pain scale for the control group was 9.78. These results indicate that turmeric tamarind drink has a greater contribution in reducing the pain scale compared to no intervention (without turmeric tamarind drink).

The results of the difference in pain scale after being given turmeric tamarind drink using the Mann Whitney test obtained a p-value of 0.000 (< 0.05), which means that H0 is rejected and H1 is accepted. This indicates that there is a difference in the effect of turmeric tamarind drink therapy compared to no turmeric tamarind drink therapy on the change in pain scale in female students with primary dysmenorrhea at Fahd Health Islamic School. The difference in the effect between the turmeric tamarind drink and no treatment at all occurs because the turmeric tamarind drink contains curcumin, anthocyanin, curcumenol, tannins, saponins, sesquiterpenes, alkaloids, and phlobotamins. On the other hand, when no treatment is given, pain will still decrease because the body can tolerate the pain, but the change in the pain scale is not significant. This is because, without any intervention, the pain scale can still change due to the decrease in prostaglandin hormones on day 3 of menstruation (Suwarsih & Astuti, 2022).

This is in line with Almada (2010), who explained that the curcumin content in turmeric and the anthocyanin content in tamarind inhibit the inflammatory process by acting as an enzyme cyclooxygenase (COX) inhibitor. The most important biochemical mechanism inhibited by curcumin is the influx of calcium ions into the epithelial cells of the uterus. If this inhibition of ion influx occurs in the epithelial cells of the uterus, uterine contractions can be reduced or even eliminated, preventing primary dysmenorrhea (Thaina et al., 2009). This is consistent with the theoretical review mentioned earlier regarding the active ingredients found in turmeric and tamarind. Both turmeric tamarind serve as anti-inflammatory, analgesic, and antipyretic agents, as well as calming agents that can prevent

sympathetic nerve stimulation from the stress often experienced by young women due to their daily activities. Based on the results above, it can be concluded that there is a difference in the effect of turmeric tamarind drink therapy compared to no turmeric tamarind drink therapy on the change in pain scale in female students with primary dysmenorrhea (Harel, 2006).

This is in line with a study conducted by Shinta Amelia et al., titled "The Effect of Tamarind Turmeric Consumption on Menstrual Pain Intensity Reduction" in 2023. The results of the non-parametric Wilcoxon statistical test showed a p-value of 0.001 < α (0.05) on the first, second, and third days. This indicates that there is a significant effect on the menstrual pain scale before and after the consumption of tamarind turmeric, suggesting that tamarind turmeric is effective in reducing menstrual pain scale. This occurs because, before tamarind turmeric consumption, menstrual pain is natural and normal. Menstrual pain occurs due to prostaglandin release during the menstruation phase, causing uterine contractions, as well as causing the uterine wall to contract and surrounding blood vessels to compress (constriction), leading to tissue ischemia. Consuming tamarind turmeric is one of the interventions among many relaxation techniques during menstruation to reduce menstrual pain intensity. These relaxation techniques can help reduce pressure and symptoms in women experiencing menstrual problems by consuming foods that stimulate the release of endorphins and serotonin (Effect+Of+Tamarind+ Turmeric+To+Decrease+The+Intensity+Of+ Menstrual+ Pain, n.d.).

This study is in line with the research conducted by Ika Nur Saputri et al., titled "The Effect of Tamarind Turmeric Consumption on Menstrual Pain Intensity in Adolescent Girls" in 2020. The results showed a decrease in menstrual pain intensity, allowing the participants to carry out their activities as usual. Based on the menstrual pain scale, 23 people selected pain scale 3, 11 people selected pain scale 4, and only 2 people selected pain scale 5. A comparison of pre- and post-intervention revealed a shift from severe to moderate pain and from moderate to mild pain. The researchers assume that the curcumin and essential oils in turmeric, combined with the anthocyanins and tannins in tamarind, work by inhibiting prostaglandin production, thereby reducing menstrual pain (Saputri et al., 2020).

This study aligns with research conducted by Selvy Afrioza et al., titled "The Effect of Tamarind Turmeric Drink to Relieve Menstrual Pain in Adolescents in Sukasari Village." Based on the analysis in the table above, it shows that 46 participants in this study experienced a reduction in menstrual pain scale after being given tamarind turmeric drink intervention in Sukasari Village, Rajeg Sub-district, Tangerang Regency. The results were obtained from the observation data of adolescents who experienced menstrual pain, which was analyzed using the SPSS program. The pre-intervention pain scale was 3.41, and the post-intervention pain scale was 1.86, resulting in a decrease of 1.55 in the pain scale. The results of the Wilcoxon Signed Rank Test showed a p-value of 0.00 ($p<0.05$), indicating a significant effect between the pain scale before and after the tamarind turmeric drink intervention (Afrioza & Srimulyati., 2022).

This study aligns with the research conducted by Sri Mulia Sar et al., titled "The Effect of Tamarind Turmeric Drink on Menstrual Pain Reduction in Adolescent Girls at MAN 3 Palembang in 2019." Based on the research results using the Paired Sample T-Test, it was found that the pain scale measurements before and after the tamarind turmeric drink intervention in 15 respondents yielded a significant result with a p-value of 0.000 < (α 0.05), meaning the alternative hypothesis (Ha) was accepted. The researcher concluded that there was a significant effect of the tamarind turmeric drink intervention before and after consumption on adolescent girls at MAN 3 Palembang in 2019. The mechanism of action of tamarind turmeric, which contains curcumin, increases cholesterol 7a-hydroxylase activity and enhances cholesterol catabolism in the liver microsomal tissue. The compounds demethoxycurcumin, bisdemethoxycurcumin, and acetylcurcumin inhibit lipid peroxidase activity (299-Article Text-855-1-10-20210208, n.d.). Tamarind turmeric is a commonly used herbal remedy for menstrual pain, containing simple active ingredients with analgesic, anti-inflammatory, and anti-spasmodic (muscle relaxant) properties. Ethanol turmeric extract functions as an analgesic to reduce dysmenorrhea complaints, while the anthocyanin content in tamarind inhibits the cyclooxygenase (COX) process, and compounds like tannins, saponins, sesquiterpenes, alkaloids, and phlobatamins affect the autonomic nervous system to reduce uterine contractions (299-Article Text-855-1-10-20210208, n.d.).

The benefits of tamarind turmeric as an herbal remedy include its active ingredients that function as analgesics (pain relievers), antipyretics (fever reducers), and anti-inflammatory agents. Tamarind also has active ingredients that function as anti-inflammatory, antipyretic, and calming agents. The combination of these two natural ingredients has been proven to be safe and does not cause poisoning when consumed together. The benefits of tamarind turmeric include pain relief, antioxidant effects, and potential weight loss (299-Article Text-855-1-10-20210208, n.d.). Research conducted by the Health Polytechnic of the Ministry of Health Malang also confirms the effectiveness of tamarind turmeric in alleviating pain. This study involved 20 respondents who experienced menstrual pain and were

given tamarind turmeric extract daily during their first menstruation. The results were satisfactory, as a reduction in pain was observed in the participants during menstruation (299-Article Text-855-1-10-20210208, n.d.).

Conclusion

Based on the discussion presented earlier in the study conducted on the students at SMK Kesehatan Fahd School, it can be concluded that there was a change in the pain scale before and after the administration of tamarind turmeric drink in the treatment group, as well as a change in the pain scale before and after the administration of the tamarind turmeric drink in the control group. There was a difference in pain levels before and after the administration of tamarind turmeric drink. Furthermore, there was a significant difference between the treatment and control groups regarding the change in pain scale among the 8th-grade students with primary dysmenorrhea. It is recommended that students begin drinking tamarind turmeric to alleviate pain during dysmenorrhea

Acknowledgments

The authors would like to express their sincere gratitude to SMK Kesehatan Fahd Islamic School for their support and cooperation during the data collection process. Special thanks to all the female students who participated in this study, as well as the school staff and administrators who facilitated the research. We also extend our appreciation to our colleagues for their valuable insights and guidance throughout this research. Lastly, we acknowledge the contributions of all individuals who assisted in data analysis and manuscript preparation.

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