International Journal Of Health, Engineering And Technology (IJHET) *E-ISSN 2829 - 8683*
Volume 5, Number 2, July 2026, *Page. 1323 - 1334*
Email : editorijhess@gmail.com

The Effectiveness Of Administering Turmeric And Tamarind Drink (Sinom) In Reducing The Intensity Of Primary Dysmenorrhea Pain In Adolescent Girls

Ize Listiana Dewi[1)]*, Nila Widya Keswara[2)]
[1,2)] Program Studi Sarjana Kebidanan, Institut Teknologi Sains dan Kesehatan RS dr.Soepraoen

*Corresponding Author
Email : izelistianadewi0314@gmail.com

Abstract

Primary dysmenorrhea is a gynecological complaint frequently experienced by adolescent girls and can disrupt their learning activities and quality of life. One non-pharmacological therapy that is developing in the community is the consumption of turmeric and tamarind drinks (sinom), which contain natural anti-inflammatory and analgesic compounds. This study aims to analyze the effectiveness of turmeric and tamarind drinks (sinom) on reducing the intensity of primary dysmenorrhea pain in adolescent girls at SMAN 1 Krucil. The study used a pre-experimental design with a one-group pretest-posttest approach. The study sample consisted of 41 respondents selected using a purposive sampling technique according to inclusion and exclusion criteria. Pain intensity was measured using the Numeric Rating Scale (NRS), then analyzed using the Wilcoxon Signed-Rank Test. The results showed that before the intervention, the majority of respondents experienced moderate pain (63.4%) and severe pain (19.5%). After administration of sinom, the majority of respondents were in the mild pain category (56.1%), and the proportion of severe pain decreased to 7.3%. The Wilcoxon test showed a Z value of -5.165 with a p-value <0.001, indicating a significant decrease in primary dysmenorrhea pain intensity after administration of the turmeric and tamarind drink (sinom). These findings indicate that sinom is effective as an alternative non-pharmacological therapy in reducing primary dysmenorrhea pain in adolescent girls and has the potential to be developed as a locally-based health intervention that is easily accessible and safe to use.

Keywords: ***Primary dysmenorrhea, Sinom, Adolescent girls, Herbal therapy.***

INTRODUCTION

Primary dysmenorrhea is pain that occurs during menstruation without any underlying organic abnormalities in the reproductive organs. This condition is one of the most common gynecological disorders experienced by adolescent girls and women of reproductive age (Hidayati & Hanifah, 2023; Rezkiyanti & Rusli, 2022; Sari & Mareta, 2020). The pain is typically felt as cramping in the lower abdomen that may radiate to the lower back and thighs. The intensity of the pain varies, ranging from mild to severe, and generally occurs during the first 8–72 hours of menstruation. For some adolescents, the pain not only causes physical discomfort but is also accompanied by other symptoms such as nausea, vomiting, dizziness, diarrhea, fatigue, and emotional distress that impact daily activities (Hafizhah & Ramadhan, 2023; Herawati & Muna, 2022). Primary dysmenorrhea is a significant adolescent reproductive health issue because its prevalence remains very high, including in Indonesia (Saputri et al., 2020). The high incidence rate indicates that dysmenorrhea is not merely a common physiological complaint but a health issue with multidimensional impacts on the quality of life of adolescent girls (Aziza & Ariestantia, 2025; Makiyah & Anggraini, 2023; Ratnasari, n.d.; Rimadani & Latifah, 2025; Torri, 2016). Menstrual pain that recurs every month can lead to impaired concentration during study, reduced academic productivity, limitations in physical activity, and increased absenteeism from school. Many adolescents struggle to fully engage in the learning process due to the pain experienced during menstruation. If this condition persists, it can affect adolescents' physical, psychological, and social well-being.

Physiologically, primary dysmenorrhea is associated with increased prostaglandin production in the endometrium during the late luteal phase of the menstrual cycle. Elevated prostaglandin levels, particularly prostaglandin F2α and prostaglandin E2, lead to excessive uterine contractions and vasoconstriction of the uterine blood vessels. Intense and continuous contractions result in reduced blood flow to the myometrial tissue, triggering ischemia and causing pain (Azrah et al., 2022; Selina & Lismayanti, 2025). The higher the levels of prostaglandins produced, the stronger the uterine

contractions and the more severe the pain experienced. This mechanism is what makes primary dysmenorrhea a condition closely associated with inflammatory processes and the body's pain response. In addition to physiological factors, various risk factors can increase the incidence of primary dysmenorrhea in adolescent girls. These factors include early menarche, prolonged menstrual duration, irregular menstrual cycles, abnormal body mass index, lack of physical activity, psychological stress, poor sleep patterns, and a family history of dysmenorrhea (Lisani & Hudaya, 2021; Simanjuntak, 2021; Susanti & Wulandari, 2022). Genetic factors have a significant influence, as adolescents whose mothers or sisters have a history of dysmenorrhea tend to have a higher risk of experiencing a similar condition. Additionally, an unhealthy lifestyle—such as a high-fat diet, lack of exercise, and high levels of academic stress—can also exacerbate the intensity of menstrual pain in adolescents.

Management of primary dysmenorrhea is generally carried out through pharmacological therapy using analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs) to reduce pain and suppress prostaglandin production. While these medications have proven effective in relieving menstrual pain, long-term use or uncontrolled administration may lead to various side effects, particularly gastrointestinal disturbances such as nausea, gastritis, stomach irritation, and, in certain cases, the risk of impaired kidney function (Fadhillah & Futriani, 2025). Furthermore, not all adolescents have adequate access to pharmacological treatments, whether due to economic factors, limited health knowledge, or concerns about medication side effects. This situation has driven an increasing need for safer, more accessible, cost-effective, and culturally acceptable non-pharmacological therapy alternatives. One form of non-pharmacological therapy that has become widespread in Indonesian society, particularly in East Java, is the consumption of turmeric-tamarind drink, known locally as sinom. This traditional beverage is made from the main ingredients of turmeric rhizome (*Curcuma longa L.*) and tamarind (*Tamarindus indica L.*), which have long been believed to possess benefits for maintaining women's reproductive health and alleviating menstrual pain. The use of sinom as a traditional remedy demonstrates the integration of modern health knowledge with local wisdom passed down through generations within Javanese culture (Sari & Mareta, 2020; Torri, 2016).

Scientifically, turmeric contains the active compound curcumin, which has anti-inflammatory, analgesic, and antioxidant properties. Curcumin works by inhibiting the activity of the cyclooxygenase-2 (COX-2) enzyme and reducing the production of prostaglandins, which play a role in excessive uterine contractions during menstruation (Rezkiyanti & Rusli, 2022; Sari & Mareta, 2020). This mechanism reduces the intensity of uterine muscle contractions, thereby alleviating menstrual pain. Additionally, the antioxidants in turmeric help reduce oxidative stress associated with inflammatory processes. Meanwhile, tamarind contains various bioactive compounds such as tartaric acid, malic acid, flavonoids, and phenolics, which possess muscle-relaxing, antioxidant, and natural analgesic effects. The combination of these two ingredients makes sinom a potential herbal beverage capable of naturally helping to reduce primary dysmenorrhea pain with relatively minimal risk of side effects. Although the use of sinom has long been part of traditional health practices in the community, scientific evidence examining its effectiveness in reducing primary dysmenorrhea pain remains limited, particularly among school-age adolescents.

Most of the current use of sinom is still based on the community's empirical experience and has not been extensively supported by standardized clinical measurement-based research. However, scientific validation of traditional herbal therapies is crucial to ensure *their* effectiveness, safety, and potential for development as *evidence-based* complementary health interventions. This study is important because primary dysmenorrhea remains a reproductive health issue with a high prevalence among adolescent girls, directly impacting their quality of life and academic performance. Additionally, research on the use of sinom as a non-pharmacological therapy holds strategic value in supporting the development of traditional medicine rooted in local wisdom—which is affordable, easily accessible, and aligned with Indonesian cultural norms. Through this study conducted at SMAN 1 Krucil, it is hoped that scientific evidence will be obtained regarding the effectiveness of sinom in reducing the intensity of primary dysmenorrhea pain in adolescent girls. The results of this study are

expected not only to contribute to the advancement of adolescent reproductive health science but also to serve as a foundation for the broader, safer, and more measured utilization of traditional herbal therapies within both community settings and educational institutions.

RESEARCH METHODS

Research Design

This study employs *a* pre-experimental design using *a one-group pretest-posttest* approach to assess changes in the intensity of primary dysmenorrhea pain before and after the administration of the turmeric-tamarind drink (sinom) intervention (Hirose & Creswell, 2023; Massazza et al., 2022; Pilcher & Cortazzi, 2024). This design was chosen because it allows researchers to directly measure the respondents' conditions before the intervention (*pretest*) and after the intervention is administered (*posttest*) within the same group, enabling a more focused observation of the changes that occur. Through this approach, each participant serves as their own control, allowing the difference in pain levels after the intervention to be compared with the initial condition before treatment was administered (Cerchione et al., 2025; Do-Thi & Do, 2022; Noor & Fuzi, 2025). The use of a *one-group pretest-posttest* design is also considered appropriate for the research objective, which focuses on measuring the initial effectiveness of turmeric-tamarind drink (sinom) as a non-pharmacological therapy in reducing the intensity of primary dysmenorrhea pain in adolescent girls. This design provides empirical evidence regarding changes in pain intensity following sinom consumption through repeated measurements using the same instrument.

Population and Sample

The population in this study consists of all adolescent girls at SMAN 1 Krucil who experience primary dysmenorrhea. The selection of the study location was based on the high prevalence of menstrual pain complaints among the students and the suboptimal utilization of herbal-based non-pharmacological therapies within the school environment. The study focused on adolescent girls because the adolescent age group is the most vulnerable to primary dysmenorrhea due to hormonal maturation and a reproductive system that is not yet fully stable. The sampling technique used *purposive sampling*, a method of determining the sample based on specific considerations and characteristics relevant to the research objectives. This technique was chosen to ensure that the respondents involved truly met the criteria relevant to the study regarding the effectiveness of turmeric and tamarind drink (sinom) in reducing the intensity of primary dysmenorrhea pain. After the selection process was conducted according to the research criteria, a final sample of 41 respondents was obtained who were eligible to participate in the entire research process.

The inclusion criteria for this study were: adolescent females aged 15–19 years; experiencing primary dysmenorrhea regularly during each menstrual cycle; willing to participate in the study by signing an *informed consent* form as a form of agreement to participate; and not taking analgesic, anti-inflammatory, or hormonal medications during the study period. The establishment of these inclusion criteria aims to obtain participants with homogeneous characteristics so that the study results can more accurately depict the effects of the intervention. Meanwhile, the exclusion criteria include: participants with a history of secondary dysmenorrhea due to clinically diagnosed reproductive organ disorders; a history of allergy to the main intervention ingredients, namely turmeric or tamarind ; and participants who were absent or did not complete all measurement stages during the study. The establishment of exclusion criteria was conducted to minimize confounding factors that could influence the study results, while ensuring the safety and validity of the research data. Through this selection process, it is hoped that the sample obtained is truly representative in illustrating the effectiveness of sinom administration in reducing the intensity of primary dysmenorrhea pain in adolescent girls.

Intervention

The intervention in this study involved administering a turmeric and tamarind drink (sinom) to all participants experiencing menstrual pain on the first or second day of their menstrual cycle. The

timing of the intervention was chosen because this period is the phase when the intensity of primary dysmenorrhea pain is generally at its highest due to increased uterine contractions and prostaglandin production. The intervention was administered directly to the participants to ensure consumption was carried out in accordance with the established research procedures. The sinom drink was prepared in a standardized manner to maintain consistency in the composition and quality of the intervention for all participants. The main ingredients used consisted of 10 grams of fresh turmeric rhizome, 5 grams of tamarind, 15 grams of palm sugar, and 200 mL of water. All ingredients were washed beforehand to ensure cleanliness and hygiene, then boiled for approximately 15 minutes until the turmeric and tamarind extracts were fully dissolved into the boiling water. After boiling, the solution was strained to separate the solids and served warm for the participants' comfort. The sinom was administered once when participants began experiencing menstrual pain. After the intervention was administered, participants were asked not to take any pain relievers or undergo other interventions that could affect the study results during the observation period. Post-intervention pain intensity measurements (*posttest*) were taken 3 hours after consuming the sinom using the same instrument as the initial measurement. This time interval was chosen to allow the active compounds in turmeric, particularly curcumin and phenolic compounds, to begin working to reduce the inflammatory response and the intensity of menstrual pain. With this standardized intervention procedure, it is hoped that the study results can objectively and measurably illustrate the effect of sinom administration on the reduction of primary dysmenorrhea pain.

Measurement Instruments

Pain intensity in this study was measured using the *Numeric Rating Scale* (NRS) with a score range of 0–10. This scale was used to assess the level of pain perceived by respondents subjectively based on the number that best described their pain condition. The score categories on the NRS consist of a score of 0 indicating no pain, scores 1–3 categorized as mild pain, scores 4–6 as moderate pain, and scores 7–10 as severe pain. The use of this numerical scale makes it easier for respondents to identify and express the level of pain they experience in a simple and easily understandable manner. The Numeric Rating Scale was chosen because it is a widely used pain measurement tool in clinical research and has been proven to have good validity and reliability, particularly in adolescent populations. In addition to being practical and efficient, the NRS also has sufficiently high sensitivity in detecting changes in pain intensity before and after the intervention, making it suitable for evaluating the effectiveness of administering turmeric-tamarind drink (sinom) in reducing primary dysmenorrhea pain. Pain intensity was measured twice for each respondent. The first measurement (*pretest*) was conducted before the intervention to determine the initial level of pain experienced during menstruation. Subsequently, the second measurement (*post-test*) was conducted 3 hours after the participants consumed the sinom drink to assess changes in pain intensity following the intervention. This time interval was chosen to allow the active compounds in sinom to take effect in the body, thereby enabling a more optimal observation of the pain-reducing effects. The entire measurement process was conducted using the same instrument to ensure the consistency and objectivity of the research data.

Statistical Analysis

Data analysis in this study consisted of univariate and bivariate analyses. Univariate analysis was performed to describe the respondents' characteristics descriptively, including age, age at menarche, duration of menstruation, and body mass index (BMI). Additionally, this analysis was used to determine the distribution of primary dysmenorrhea pain intensity before (*pretest*) and after (*posttest*) the administration of the turmeric-tamarind drink (sinom). The results of the univariate analysis are presented in in the form of frequency distributions, percentages, mean values, and specific categories to allow for a more systematic understanding of the respondents' characteristics and changes in pain levels. Before conducting bivariate analysis, a normality test was first performed using the *Shapiro–Wilk* test. This test was selected because the study sample size was less than 50 respondents, making it more appropriate and sensitive for testing data distribution in small samples. The results of the normality test indicated that the pain intensity data were not normally distributed,

with a significance level of $p < 0.05$. Therefore, the analysis of differences in pain intensity before and after the intervention was performed using the nonparametric *Wilcoxon Signed-Rank Test*. *The Wilcoxon Signed-Rank Test* was used to analyze differences between two paired data sets within the same group, namely the respondents' pain scores before and after Sinom administration. This test was chosen because it is suitable for both ordinal-scale data and numerical data that do not meet the assumptions of a normal distribution. The significance level used in this study was $\alpha = 0.05$. Thus, if a p-value < 0.05 is obtained, it can be concluded that there is a significant difference between the pain intensity of primary dysmenorrhea before and after the administration of the turmeric and tamarind drink (sinom).

Research Ethics

This study was conducted in accordance with the principles of health research ethics, particularly regarding respect for the rights, safety, and comfort of the participants throughout the research process. Prior to the study, all participants were provided with a complete explanation regarding the study's objectives, procedures, benefits, the form of intervention administered, and potential discomforts that may arise during data collection. This explanation was provided so that participants fully understood the research activities they would be participating in and could make an informed decision without coercion from any party. All participants willing to participate in the study were asked to sign an *informed consent* form as a form of voluntary agreement. For respondents who have not reached the legal age of majority, consent is also adapted to applicable regulations through notification to the relevant parties. Respondents are granted full rights to refuse or withdraw from the study at any time without any consequences. The confidentiality of respondents' identities and personal data is strictly maintained throughout the study. All data obtained is used solely for scientific purposes and presented in aggregate form without disclosing the individual identities of the respondents. The researchers also ensure that the entire research process is conducted safely, does not harm the respondents, and upholds the principles *of beneficence*, *confidentiality*, and *voluntary participation* in health research.

RESULTS AND DISCUSSION

Respondent Characteristics by Age

Table 1. Frequency Distribution of Respondents by Age at SMAN 1 Krucil

Variable	Number (n)	15 Years n	%	16 Years n	%	17 years old n	%	18 years old n	%	19 years old n
Respondent Age	41	1	2.4	13	31.7	13	31.7	12	29.3	4.9

Source: Primary Data, 2026

Based on Table 1, out of 41 respondents, the largest age group consists of 16- and 17-year-olds, each numbering 13 people (31.7%). The youngest respondent was 15 years old (2.4%) and the oldest was 19 years old (4.9%). This age distribution reflects that the majority of respondents were in mid-adolescence, which is the peak period for the occurrence of primary dysmenorrhea.

Respondent Characteristics Based on Menarche

Table 2. Frequency Distribution of Respondents Based on Age at Menarche at SMAN 1 Krucil

Variable	Number (n)	Early n	%	Normal n	%
Menarche	41	9	22.0	32	78.0

Source: Primary Data, 2026

Based on Table 2, the majority of respondents experienced menarche in the normal category, namely 32 individuals (78.0%), while 9 individuals (22.0%) experienced early menarche (age < 12

years). Normal menarche in adolescent girls generally occurs between the ages of 12 and 14 years. Early menarche is a risk factor for primary dysmenorrhea due to the immaturity of the hormonal system and prostaglandins at that age.

Respondent Characteristics Based on Menstrual Duration

Table 3. Frequency Distribution of Respondents Based on Menstrual Duration at SMAN 1 Krucil

Variable	Number (n)	< 7 Days n	%	> 7 Days n	%
Duration of Menstruation	41	31	75.6	10	24.4

Source: Primary Data, 2026

Based on Table 3, the majority of respondents had a menstrual duration of less than 7 days, namely 31 people (75.6%), while 10 people (24.4%) had a duration of more than 7 days. A longer menstrual duration correlates with prolonged endometrial prostaglandin production, which has the potential to exacerbate the intensity of dysmenorrhea.

Respondent Characteristics Based on Body Mass Index (BMI)

Table 4. Frequency Distribution of Respondents Based on BMI at SMAN 1 Krucil

Variable	Number (n)	Normal n	%	Overweight n	%	Obesity n	%
BMI	41	2	4.9	12	29.3	27	65.9

Source: Primary Data, 2026

Based on Table 4, an interesting finding is that the majority of respondents (65.9%) fall into the obesity category (BMI ≥ 27 kg/m²), while 12 individuals (29.3%) are in the overweight category, and only 2 individuals (4.9%) have a normal BMI. The high proportion of obesity in this sample is clinically relevant, given that excess adipose tissue contributes to increased levels of estrogen and prostaglandins, which directly exacerbate dysmenorrhea pain.

Dysmenorrhea Intensity Before and After the Intervention

Table 5. Distribution of Dysmenorrhea Intensity Before and After Sinom Consumption at SMAN 1 Krucil

Variable	Number	No Pain n	%	Mild n	%	Moderate n	%	Severe n	%
Dysmenorrhea Pretest	41	0	0	7	17.1	26	63.4	8	19.5
Post-test Dysmenorrhea	41	6	14.6	23	56.1	9	22.0	3	7.3

Source: Primary Data, 2026

Based on Table 5, before the intervention (*pretest*), no respondents were in the pain-free category. The majority experienced moderate pain (26 people; 63.4%), followed by severe pain (8 people; 19.5%), and mild pain (7 people; 17.1%). After consuming sinom (*posttest*), a significant shift in the distribution occurred: 6 people (14.6%) felt no pain, 23 people (56.1%) experienced mild pain, 9 people (22.0%) experienced moderate pain, and only 3 people (7.3%) still experienced severe pain. This shift in distribution indicates a substantial reduction in pain following the intervention.

Data Normality Test

Table 6. Results of the Data Normality Test (Shapiro-Wilk) for Dysmenorrhea Intensity

Group	Test	Statistic	P-Value
Dysmenorrhea Intensity	Pretest	0.770	< 0.001
	Posttest	0.834	< 0.001

Source: SPSS Data Analysis Results, 2026

Based on Table 6, the *Shapiro-Wilk* normality test on the *pretest* data showed a W statistic of 0.770 with $p < 0.001$, and on the *posttest* data, $W = 0.834$ with $p < 0.001$. Since the p-values for both are less than $\alpha = 0.05$, the data are deemed not normally distributed. Therefore, the *bivariate* analysis continued with the nonparametric *Wilcoxon Signed-Rank Test.*

Intervention Effectiveness Test (Wilcoxon Test)

Table 7. Results of the Wilcoxon Signed-Rank Test for Dysmenorrhea Intensity Before and After the Intervention

Variable	Mean Rank Pretest	Mean Rank Posttest	Z	P-Value
Dysmenorrhea Intensity	0	15	-5.165	< 0.001

Source: SPSS Data Analysis Results, 2026

Based on Table 7, the *Wilcoxon* test results show a Z-value of -5.165 with *a p-value* < 0.001 ($p < 0.05$). The *mean rank of the posttest* (15) is higher than that *of the pretest* (0), indicating a statistically significant reduction in pain intensity after the administration of sinom. Thus, H_0 is rejected and H_1 is accepted, namely that there is a significant difference in the intensity of primary dysmenorrhea pain before and after the consumption of turmeric and tamarind drink (sinom) among female adolescents at SMAN 1 Krucil.

Discussion

Characteristics of Respondents and Risk Factors for Dysmenorrhea

The respondents in this study were adolescent girls aged 15–19 years, with the largest proportion in the 16- and 17-year-old age groups. This indicates that the majority of respondents were in mid-adolescence, a period when the reproductive system begins to reach hormonal maturity and the menstrual cycle becomes more regular. During this phase, primary dysmenorrhea tends to occur more frequently and is experienced with greater intensity. This is associated with increased hormonal activity in the hypothalamic–pituitary–ovarian axis, which influences prostaglandin production during menstruation. Increased prostaglandin production causes stronger uterine contractions, thereby triggering menstrual pain. Additionally, during adolescence, the cervix is not yet fully mature, and pain receptor sensitivity remains high, both of which contribute to heightened pain perception during menstruation. These conditions explain why primary dysmenorrhea is more commonly found in adolescents than in adults.

Research findings also indicate that some participants experienced early menarche. Early menarche is a key risk factor associated with the occurrence of primary dysmenorrhea. Adolescents who experience their first menstruation at a younger age tend to have a higher risk of experiencing menstrual pain because their reproductive system and hormonal balance have not yet developed optimally. Fluctuations in estrogen and progesterone levels that are not yet stable can increase the body's sensitivity to prostaglandin production, leading to more intense uterine contractions. In addition to biological factors, early menarche is also often associated with exposure to stress, nutritional patterns, and lifestyle changes that affect adolescent reproductive health. The earlier an adolescent experiences menarche, the longer the exposure to menstrual cycles that have the potential to cause recurrent dysmenorrhea each month. These findings reinforce the view that age at menarche is an important indicator in assessing the risk of menstrual disorders in adolescent girls.

In addition to age and menarche, this study also showed that the majority of respondents fell into the obesity category based on body mass index (BMI). This finding is significant because obesity is closely linked to hormonal imbalances and inflammatory processes that can exacerbate primary dysmenorrhea. Excess adipose tissue is known to increase the conversion of androgens into peripheral estrogen through the process of aromatization. This increase in estrogen levels then affects endometrial proliferation and stimulates higher prostaglandin production during menstruation. Consequently, uterine contractions become stronger, and the menstrual pain experienced tends to be more severe. Additionally, obesity is associated with increased systemic inflammatory mediators, which can heighten the body's pain sensitivity.

Obesity in adolescents is also often accompanied by low physical activity, a diet high in fat and sugar, and poor sleep quality, which can indirectly worsen dysmenorrhea symptoms. Lack of physical activity leads to suboptimal blood flow to the pelvic area, making uterine contractions more likely to cause pain. On the other hand, a sedentary lifestyle and academic stress in adolescents can worsen hormonal imbalances that contribute to the occurrence of primary dysmenorrhea. These findings indicate that managing primary dysmenorrhea requires more than just focusing on symptomatic pain relief; it must also incorporate preventive and promotive approaches through reproductive health education, lifestyle improvements, weight management, and increased physical activity among adolescent girls. Consequently, interventions can be more comprehensive in reducing the underlying risk factors for primary dysmenorrhea.

The Effectiveness of Sinom in Reducing the Intensity of Dysmenorrhea

The results of this study indicate that the administration of turmeric-tamarind drink (sinom) is effective in reducing the intensity of primary dysmenorrhea pain in adolescent girls. This is evidenced by the results of the *Wilcoxon Signed-Rank Test*, which showed a Z-value of -5.165 with *a p-value* < 0.001, indicating a significant difference in pain intensity before and after the intervention. Before the administration of sinom, the majority of respondents were in the moderate to severe pain category, indicating that primary dysmenorrhea had a significant impact on the respondents' physical comfort and daily activities. After the intervention was administered, there was a shift in the distribution of pain levels toward milder categories, with some respondents even reporting no pain. This change indicates that the administration of sinom not only has statistical significance but also holds important clinical significance, as reduced pain intensity can enhance adolescents' ability to engage in learning activities, social interactions, and daily routines more effectively during menstruation.

The effectiveness of sinom in reducing primary dysmenorrhea pain can be explained through the pharmacological mechanisms of the bioactive compounds found in turmeric and tamarind. Turmeric (*Curcuma longa*) contains curcumin as its primary compound, which possesses anti-inflammatory, analgesic, and antioxidant activities. Curcumin works by inhibiting the activity of the cyclooxygenase-2 (COX-2) enzyme, which plays a role in the formation of prostaglandins, particularly prostaglandins PGF2α and PGE2. These two prostaglandins are the primary mediators that trigger excessive uterine contractions and cause pain in primary dysmenorrhea. By inhibiting prostaglandin production, uterine contractions become more controlled, thereby reducing pain intensity. This mechanism suggests that turmeric's analgesic effects resemble the mechanism of action of nonsteroidal anti-inflammatory drugs (NSAIDs), but with a relatively lower risk of gastrointestinal side effects due to its natural herbal origin.

In addition to turmeric, the tamarind (*Tamarindus indica*) content in Sinom also makes a significant contribution to its pain-relieving effects. Tamarind contains various bioactive compounds such as tartaric acid, malic acid, flavonoids, and phenolic compounds that possess antioxidant and anti-inflammatory properties. Flavonoids are known to inhibit the activity of lipoxygenase and cyclooxygenase enzymes, which play a role in the formation of inflammatory mediators. Inhibiting this inflammatory process helps reduce the pain response that occurs during menstruation. Additionally, the antioxidant effects of tamarind also help reduce oxidative stress associated with increased pain sensitivity in uterine tissue. The combination of turmeric and tamarind produces

pharmacological effects that are both synergistic and additive, thereby providing a more optimal analgesic effect compared to when used individually.

The findings of this study align with previous research demonstrating the effectiveness of turmeric and tamarind in reducing menstrual pain. Earlier studies reported that consuming turmeric and tamarind beverages significantly reduced the intensity of dysmenorrhea pain in both adolescents and college students. The reduction in pain scores following the intervention suggests that curcumin has great potential as a herbal-based complementary therapy for the management of primary dysmenorrhea. Additionally, other studies have confirmed that curcumin's anti-inflammatory effects are associated with reduced prostaglandin levels, which are a primary factor in the onset of menstrual pain.

This study provides additional scientific contributions because it was conducted on a group of high school adolescents who have different biological, psychological, and social characteristics compared to groups of college students, who have been studied more extensively in the past. High school adolescents are in a developmental phase that is vulnerable to menstrual disorders due to hormonal instability and high academic activity. Therefore, the results of this study strengthen the evidence that sinom has the potential to be an effective, safe, easily accessible, and culturally appropriate non-pharmacological alternative therapy to help manage primary dysmenorrhea in adolescent girls. In addition to supporting the development of herbal therapies based on local wisdom, these findings also open opportunities for integrating traditional medicine into promotive and preventive approaches to adolescent reproductive health within school and community settings.

Clinical and Practical Implications

Sinom is a traditional beverage made from turmeric and tamarind that offers advantages in terms of ingredient availability, ease of preparation, and relatively low cost. All the main ingredients for sinom can be easily obtained in various regions of Indonesia, particularly in East Java, which has a strong tradition of herbal jamu consumption in daily life. Its simple preparation process makes sinom a practical non-pharmacological therapeutic alternative that can be self-administered by adolescents or families at home. These advantages make sinom not only clinically effective but also highly significant from a social and cultural perspective, as it stems from local wisdom that has been passed down through generations to maintain women's reproductive health.

From a public health perspective, the use of sinom holds great potential as a promotive and preventive intervention in managing primary dysmenorrhea among adolescents. Herbal therapies based on natural ingredients like sinom can offer a safer and more affordable alternative to long-term analgesic use, particularly for adolescents who are vulnerable to the side effects of nonsteroidal anti-inflammatory drugs (NSAIDs). Additionally, an approach based on local herbs is more readily accepted by the community because it aligns with the cultural and traditional consumption habits that have developed within their social environment.

In the context of primary health care, health workers such as community nurses, midwives, and health promotion officers can integrate education on the use of sinom into adolescent reproductive health programs in schools and communities. Such education can include an understanding of primary dysmenorrhea, hygienic and standardized methods for preparing sinom, the benefits of consuming traditional herbs, and the importance of safe and appropriate management of menstrual pain. Integrating reproductive health education with the use of local herbal therapy has the potential to improve adolescent health literacy while strengthening community-based preventive approaches to addressing menstrual issues among school-aged adolescents.

The results of this study also indicate a high prevalence of obesity among respondents, suggesting that nutritional status is a key factor that must be considered in the management of primary dysmenorrhea in adolescents. Obesity is known to be associated with hormonal imbalances and increased inflammatory processes, which can exacerbate menstrual pain. Therefore, the management of primary dysmenorrhea should not only focus on symptomatic pain relief but also consider underlying risk factors, including adolescents' lifestyle and nutritional status.

A holistic approach that combines herbal interventions such as sinom with healthy lifestyle modifications has the potential to provide more optimal long-term benefits. Adopting a balanced diet, increasing physical activity, maintaining a healthy weight, managing stress, and improving sleep quality can help maintain hormonal balance and reduce the inflammatory processes that trigger dysmenorrhea. Thus, the management of primary dysmenorrhea is not only oriented toward treating pain during menstruation but is also directed at efforts to improve adolescents' reproductive health and overall quality of life. These findings demonstrate that the use of sinom can be part of a more comprehensive, sustainable, and locally-based adolescent reproductive health strategy.

Study Limitations

This study has several limitations that must be considered when interpreting the results. First, the use of a *pre-experimental* design with a *one-group pretest-posttest* approach without a control group limits the study's ability to evaluate causal relationships more robustly. The absence of a comparison group means the researchers cannot fully rule out the possibility of placebo effects, psychological adaptation of the respondents to pain, or other confounding factors that could influence the natural reduction in pain intensity over time (*natural remission of pain*). Thus, although a significant reduction in pain was found after sinom administration, the results of this study still need to be interpreted with caution because there remains the possibility of external variables that cannot be fully controlled.

Second, pain intensity was measured only once after the intervention, specifically 3 hours after sinom consumption. While this measurement effectively illustrates the initial analgesic effect of sinom administration, it does not yet explain the duration of its effectiveness over a longer period. This study did not observe whether the pain-reducing effect persists for several hours after consumption or throughout the entire menstrual period. Therefore, the effectiveness of sinom as a continuous therapy for primary dysmenorrhea still requires further investigation through observations with longer monitoring periods and repeated measurements.

Third, this study has not standardized the content of active compounds, particularly the curcumin content in the sinom beverage, through analytical laboratory analysis. In fact, variations in curcumin levels and other bioactive compounds in herbal materials can be influenced by raw material quality, plant age, processing methods, and boiling duration. The absence of standardization of these active compounds means that the concentration of pharmacologically active compounds consumed by the participants cannot be objectively determined. This constitutes a limitation in ensuring the consistency of dosage and the effectiveness of the herbal intervention administered.

Additionally, this study utilized pain measurement based on participants' subjective perception via *the Numeric Rating Scale* (NRS). Although this instrument is valid and widely used in clinical research, pain assessment remains influenced by psychological conditions, pain tolerance levels, individual experiences, and the emotional factors of each participant. Consequently, the possibility of subjective bias in pain assessment still exists.

Given these limitations, future studies are recommended to use a *randomized controlled trial* (RCT) design with a control group to enhance internal validity and strengthen the causal relationship between sinom administration and the reduction of primary dysmenorrhea pain. Future studies should also consider using larger and more diverse samples to ensure the research findings have broader generalizability. Additionally, measuring biological biomarkers such as prostaglandin levels, inflammatory mediators, and other hormonal parameters can be conducted to obtain objective evidence regarding the mechanism of action of sinom in reducing menstrual pain. Standardizing the content of curcumin and other active compounds through phytochemical analysis is also important to ensure the consistent quality of the herbal interventions used. With the development of such methodologies, it is hoped that research on sinom can provide stronger scientific evidence and contribute to the development of herbal-based complementary therapies in adolescent reproductive health.

CONCLUSION

Based on the research results, it was concluded that the administration of turmeric and tamarind drink (sinom) was statistically effective in reducing the intensity of primary dysmenorrhea pain in adolescent girls at SMAN 1 Krucil ($Z = -5.165$; $p < 0.001$). Before the intervention, the majority of respondents experienced moderate to severe pain; after consuming sinom, most shifted to the pain-free and mild pain categories. Sinom can be recommended as a safe, affordable, and locally-based non-pharmacological alternative therapy for managing primary dysmenorrhea in adolescent girls. Healthcare workers, particularly midwives and community nurses, are encouraged to integrate education on the use of sinom into adolescent reproductive health programs in schools. Further research with an RCT design, an adequate control group, standardized curcumin doses, and measurement *of prostaglandin biomarkers* is urgently needed to strengthen the evidence base for the effectiveness of sinom in the management of primary dysmenorrhea.

REFERENCES

Aziza, H. R., & Ariestantia, D. R. (2025). Exploration of the Benefits of Kusam as a Complementary Effort in Reducing the Intensity of Menstrual Pain in Adolescent Girls. *Journal La Medihealtico*, *6*(6), 1607–1619.

Azrah, K., Oktaviyana, C., & Masthura, S. (2022). Pengaruh Pemberian Minuman Kunyit Asam Terhadap Penurunan Dismenore Primer Pada Mahasiswi Program Studi Ilmu Keperawatan Fakultas Kedokteran Universitas Abulyatama Aceh Besar. *JOURNAL OF HEALTHCARE TECHNOLOGY AND MEDICINE*, *8*(2), 1149–1154.

Cerchione, R., Morelli, M., Passaro, R., & Quinto, I. (2025). A critical analysis of the integration of life cycle methods and quantitative methods for sustainability assessment. *Corporate Social Responsibility and Environmental Management*, *32*(2), 1508–1544.

Do-Thi, P., & Do, I. (2022). The full process in modeling and quantitative methods by using SPSS. In *Intelligent Systems Modeling and Simulation II: Machine Learning, Neural Networks, Efficient Numerical Algorithm and Statistical Methods* (pp. 597–626). Springer.

Fadhillah, A. C. R., & Futriani, E. S. (2025). Efektivitas pemberian kunyit asam terhadap penurunan skala nyeri dismenore pada remaja putri di sman 2 karawang. *Mahesa: Malahayati Health Student Journal*, *5*(5), 1858–1868.

Hafizhah, P. N., & Ramadhan, G. E. (2023). Pengaruh Pemberian Rebusan Kunyit Asam Terhadap Penurunan Skala Nyeri Dismenorea Pada Remaja di SMA Muhammadiyah 25 Pamulang. *SCIENTIFIC JOURNAL OF ALTRUISTIC NURSING*, *6*(2), 9–16.

Herawati, V. D., & Muna, W. O. A. P. (2022). Pengaruh Pemberian Minuman Kunyit Asam Terhadap Penurunan Skala Nyeri Dismenorea. *Jurnal Ilmu Keperawatan Indonesia (JIKI)*, *15*(2), 108–114.

Hidayati, T., & Hanifah, I. (2023). Differences in the Effectiveness of Tamarind Turmeric Herbal Drink and Warm Compresses on Primary Dysmenorrhea Pain Intensity in Adolescent Women. *International Journal Of Nursing And Midwifery Science (Ijnms)*, *7*(3), 394–400.

Hirose, M., & Creswell, J. W. (2023). Applying core quality criteria of mixed methods research to an empirical study. *Journal of Mixed Methods Research*, *17*(1), 12–28. https://doi.org/https://doi.org/10.1177/15586898221086346

Lisani, F., & Hudaya, I. (2021). Literatur Review: Pemberian Minuman Kunyit Asam (Curcuma Domestica Val.-Tamarindus Indica L.) Sebagai Penurun Tingkat Nyeri Menstruasi (Dysmenorrhea). *Bhamada: Jurnal Ilmu Dan Teknologi Kesehatan (E-Journal)*, *12*(2), 33–37.

Makiyah, A. C., & Anggraini, N. (2023). The effectiveness of giving tumeric tamarind in reducing menstrual pain (dismenoroe) in young girls at Mts Al-Muqowamah. *Asian Journal of Community Services*, *2*(1), 23–34.

Massazza, A., Teyton, A., Charlson, F., Benmarhnia, T., & Augustinavicius, J. L. (2022). Quantitative methods for climate change and mental health research: current trends and future directions. *The Lancet Planetary Health*, *6*(7), e613–e627.

Noor, N. H. M., & Fuzi, A. M. (2025). Assessment of validity, reliability, and normality in quantitative study: A survey instrument analysis with IBM SPSS. *8th ASNet International Multidisciplinary Academic Conference*, 27–43.

Pilcher, N., & Cortazzi, M. (2024). 'Qualitative'and'quantitative'methods and approaches across subject fields: implications for research values, assumptions, and practices. *Quality & Quantity*, *58*(3), 2357–2387.

Ratnasari, F. (n.d.). Literature Review: Reducing Dysmenorrhea in Teenager by Drinking Tamarind Turmeric Water. *Journal of Vocational Nursing*.

Rezkiyanti, A., & Rusli, R. (2022). Efektivitas minuman kunyit asam sebagai terapi dismenore primer terhadap penurunan skala nyeri. *Jurnal Gizi Kerja Dan Produktivitas*, *3*(2), 59–64.

Rimadani, P. I., & Latifah, N. (2025). TINJAUAN LITERATUR: PENGARUH PEMBERIAN KUNYIT ASAM TERHADAP INTENSITAS NYERI DISMENORE PRIMER PADA REMAJA. *Al-Insyirah Midwifery: Jurnal Ilmu Kebidanan (Journal of Midwifery Sciences)*, *14*(2), 183–190.

Saputri, I. N., Handayani, D., & Yasara, J. (2020). Pengaruh pemberian minuman kunyit asam terhadap intensitas nyeri menstruasi pada remaja putri. *Jurnal Kebidanan Kestra (JKK)*, *3*(1), 55–60.

Sari, S. M., & Mareta, A. (2020). Pengaruh Pemberian Jamu Kunyit Asam Dengan Penurunan Nyeri Haid Pada Remaja Putri Di Man 3 Palembang Tahun 2019. *Jurnal Kesehatan: Jurnal Ilmiah Multi Sciences*, *10*(02), 151–159.

Selina, R., & Lismayanti, L. (2025). Efektivitas Konsumsi Air Kunyit Asam Terhadap Penurunan Intensitas Nyeri Menstruasi Pada Perempuan Usia Reproduktif: Literatur Review. *Jurnal Ilmiah Penelitian Mahasiswa*, *3*(6), 796–802.

Simanjuntak, Y. S. (2021). *PENGARUH PEMBERIAN REBUSAN ASAM KUNYIT TERHADAP PENGURANGAN DISMENORHEA PADA REMAJA PUTRI DI LINGKUNGAN 1 PASAR GUNUNGTUA*.

Susanti, U., & Wulandari, T. S. (2022). EFEKTIVITAS KUNYIT ASAM SEBAGAI PENURUN NYERI PADA REMAJA YANG MENGALAMI DISMENORE. *Jurnal Ilmiah Keperawatan Dan Kesehatan Alkautsar (JIKKA)*, *1*(1).

Torri, M. C. (2016). Linking Small-Scale Commercial Activities and Women's Health: The Jamu System in Urban Areas of Java, Indonesia. *Journal of Small Business Management*, *54*(1), 341–355.