

EFFECTIVENESS OF IMPLEMENTING TURMERIC AND TAMARIND HERBAL CONSUMPTION AS A COMPLEMENTARY THERAPY TO REDUCE THE PAIN SCALE OF DYSMENORRHEA IN ADOLESCENT GIRLS

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ABSTRACT

*Dysmenorrhea may limit the daily functioning of adolescent girls and contribute to absence from school because of lower abdominal pain arising from uterine contractions during menstruation. Turmeric and tamarind are used as herbal options for managing this condition, as their bioactive constituents may support reproductive hormone regulation and pain reduction. This study examined whether regular intake of a turmeric–tamarind preparation could reduce dysmenorrhea intensity as a complementary intervention. A quantitative pre-experimental method with a one-group pretest–posttest design was applied. Through purposive sampling, 34 female students with a history of menstruation and dysmenorrhea were recruited. Pain intensity was recorded before and after the intervention. The average score fell from 7.61 at baseline to 1.69 after treatment, producing a mean rank of 5.345. The statistical test yielded a *p*-value of 0.000, which was below 0.05. Thus, the turmeric–tamarind preparation was effective in lowering dysmenorrhea pain among adolescent girls. Regular use of this herbal preparation is recommended alongside a healthy diet, avoidance of spicy and oily foods and alcoholic beverages, and appropriate personal hygiene.*

Keywords: *Dysmenorrhea, menstrual pain, turmeric-tamarind herbal drink.*

INTRODUCTION

Between the ages of 8 and 14, adolescents undergo physical development from childhood toward adulthood. This stage is characterized by reproductive maturation, including sexual maturity and the activation of reproductive organ functions (Widiastini et al., 2024). In girls, menstruation is one indicator of this maturation and involves the regular shedding of blood from the uterine lining through the vagina. Menstrual bleeding generally lasts 3–8 days and usually recurs within a 28-day cycle, although cycle irregularities may occur. Physical discomfort is frequently experienced before or during menstruation. Other menstrual problems include premenstrual syndrome, irregular cycles, and dysmenorrhea, with pain that may spread from the lower body to the waist, lower back, and thighs (Ekawati et al., 2021).

Pain occurring during menstruation is known as dysmenorrhea and may restrict women from carrying out their usual daily activities (Widyanthi & Resiyanthi, 2021). World Health Organization data indicate that menstrual pain affects approximately 1,769,425 adolescent girls, with 10–16% experiencing symptoms severe enough to markedly disturb everyday life (Hamdiyah, 2020). In Indonesia, dysmenorrhea affects

64.25% of women, including 54.89% with primary dysmenorrhea and 9.36% with secondary dysmenorrhea. Bali also records a high occurrence, with an estimated 29,505 individuals experiencing menstrual pain of mild to severe intensity (Widyanthi & Resiyanthi, 2021). Among students, dysmenorrhea may reduce concentration, increase fatigue during lessons, restrict participation in classroom activities, and negatively affect academic achievement (Fahmiah et al., 2022).

Management of dysmenorrhea may involve either pharmacological or non-pharmacological measures. Pharmacological management commonly relies on analgesic and anti-inflammatory medications, including mefenamic acid, ibuprofen, piroxicam, and similar drugs. Non-pharmacological options include warm compresses, routine exercise, and herbal preparations. These complementary measures have been reported to alleviate symptoms associated with primary dysmenorrhea (Hamdayani, 2018).

Herbal products, including traditional herbal medicines and phytopharmaceuticals, represent an alternative approach for women seeking to manage menstrual pain while minimizing the risk of side effects (Sari & Warsiti, 2012). One commonly used herbal remedy is a combination of turmeric and tamarind. Turmeric contains cyclooxygenase-related compounds that may help reduce the occurrence of dysmenorrhea by suppressing uterine contractions mediated by prostaglandins in the uterine epithelial tissue through the action of cochromin (Widiatami et al., 2018). Furthermore, turmeric contains phenolic compounds with antioxidant properties that function as analgesic, anti-inflammatory, and blood-cleansing agents. Its principal bioactive constituent, curcumin, acts by inhibiting the cyclooxygenase pathway, thereby decreasing uterine contractions. Through the inhibition of prostaglandin-mediated uterine contractions in the uterine epithelial tissue, curcumin contributes to reducing the incidence of dysmenorrhea in women (Sina, 2012).

Evidence from Fatmawati et al. (2020) showed that menstrual pain intensity declined after the administration of a turmeric–tamarind preparation made from *Curcuma domestica* Val. Before treatment, the average pain score was 3.2188 with an SD of 1.03906, whereas after treatment it was 1.4062 with an SD of 0.66524. Analysis using the Wilcoxon Signed Ranks Test produced a significance value of 0.000 ($p < 0.05$). This result supported the acceptance of H_1 and demonstrated a reduction in menstrual pain among adolescent girls following the intervention (Fatmawati et al., 2020). A similar outcome was obtained by Sari & Mareta (2020). Using the Paired Sample t-Test, they identified a significant difference between pain scores measured before and after treatment, with $p = 0.000$ and $\alpha < 0.05$. The acceptance of H_a therefore supported the effectiveness of turmeric–tamarind herbal preparation in reducing menstrual pain among adolescent girls at MAN 3 Palembang in 2019.

Datturohma et al. (2025) examined turmeric–tamarind (*Tamarindus indica*) preparation and pineapple juice as interventions for primary dysmenorrhea among adolescent girls at TPMB “M” through a qualitative case-study design. In the turmeric–tamarind group, the NRS score decreased from 9, classified as severe pain, to 2, classified as mild pain. In comparison, the pineapple juice group showed a reduction from 9 to 3. The larger decline observed in the turmeric–tamarind group indicated that this preparation

was more effective than pineapple juice in lowering primary dysmenorrhea pain (Datturohma et al., 2025).

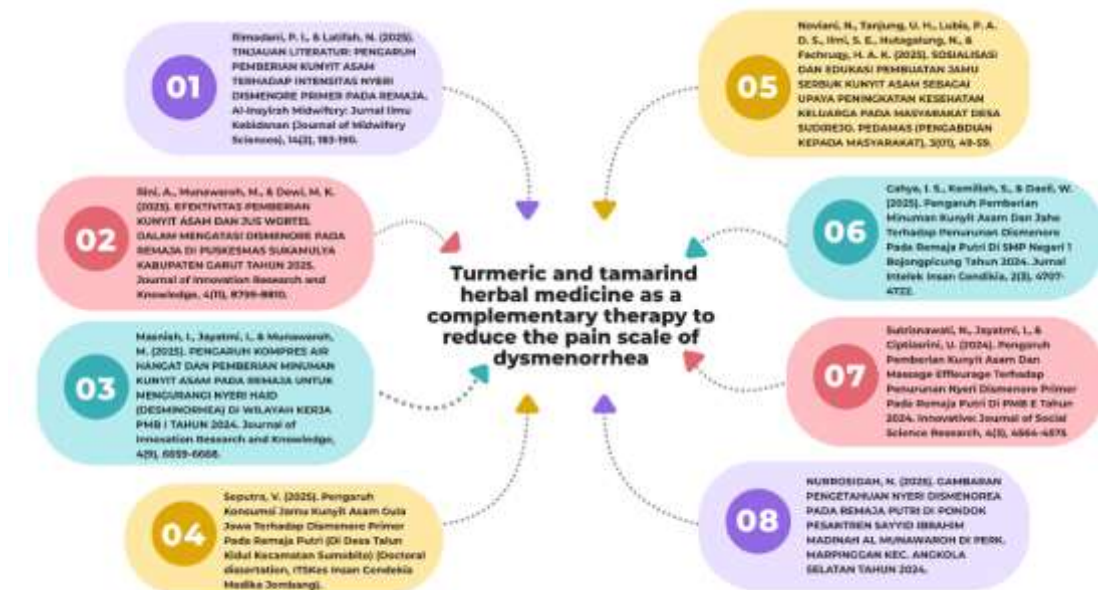


Figure 1. The description of State of Art.

Figure 1 presents evidence from 20 publications issued between 2017 and 2024 on the use of turmeric, tamarind, or curcumin for menstrual pain. The selected literature covered randomized controlled and quasi-experimental research. Pain generally declined after the interventions, potentially because prostaglandin activity and inflammation were reduced. Nevertheless, the evidence remains constrained by small participant groups, brief treatment periods, and methodological variation. More rigorous clinical research is therefore required before turmeric–tamarind can be firmly established as complementary care for primary dysmenorrhea.

Study 04 applied a single-group pretest–posttest model to 47 randomly selected adolescent girls. Each participant drank 200 ml of a turmeric–tamarind preparation containing palm sugar once a day for three days. Pain was recorded with the Numerical Rating Scale before and after treatment, while changes were tested using the Wilcoxon Signed-Rank test at $\alpha < 0.05$. Initially, moderate pain was reported by 33 participants (70.2%). After treatment, 32 participants (68.1%) were classified as having mild pain. A p-value of 0.001 supported H1 and showed that the preparation reduced primary dysmenorrhea among adolescents in Talun Kidul Village, Sumobito District.

Curcumin in turmeric and anthocyanins in tamarind inhibit the cyclooxygenase (COX-2) pathway, thereby reducing inflammatory responses. Effleurage massage consists of gentle stroking movements performed with the entire hand over the affected area to improve blood circulation, increase abdominal muscle warmth, and promote physical and psychological relaxation. This qualitative study applied a case study approach to obtain an in-depth understanding of the phenomenon. Two adolescent girls

with primary dysmenorrhea who sought treatment at PMB E participated in the study. Eligible participants were adolescents with dysmenorrhea who were able to communicate effectively. The effect of turmeric–tamarind administration was evaluated using the Numeric Rating Scale (NRS). Participants who consumed the herbal preparation twice daily showed a reduction in the NRS score from 5 before treatment to 3 afterward, whereas those receiving effleurage massage experienced a decrease from 6 to 2. Both interventions were provided for three consecutive days. The observations showed that effleurage massage produced a greater reduction in primary dysmenorrhea pain intensity than the herbal intervention.

This study evaluated the effectiveness of turmeric and tamarind herbal preparations as complementary therapy for reducing dysmenorrhea pain intensity in adolescent girls. The findings are expected to broaden existing knowledge, provide a reference for future studies, and support the development of evidence-based healthcare services and programs related to complementary herbal therapy. The study is also expected to strengthen collaboration among healthcare professionals, families, and communities.

RESEARCH METHOD

This research was conducted using a pre-experimental design with a one-group pretest–posttest approach. In this design, participants underwent an initial assessment (pretest) before receiving the intervention, followed by a second assessment (posttest) after the intervention to determine changes in the study outcome. The study involved seventh-grade female students enrolled at SMP Negeri 18 Surakarta, where the total population comprised 90 students. Participants were recruited through purposive sampling, and eligibility was limited to students who had experienced both menstruation and dysmenorrhea. Based on these criteria, 34 respondents were included in the study. The intensity of dysmenorrhea pain was evaluated using the Numerical Rating Scale (NRS). Prior to data collection, eligible students were identified and informed about the study. Written informed consent was then obtained from those who agreed to participate, and only respondents who met the inclusion criteria were enrolled in the research.

RESULTS AND DISCUSSION

Results

Table 1 presents the characteristics of the respondents included in this study. These data provide an overview of the respondents' baseline characteristics.

1. Age

Table 1. Distribution of Participants by Age

Age	Frequency	Percentage (%)
10	1	1.12%
11	5	5.56%
12	43	47.78%
13	40	44.42%
14	1	1.12%

Total	90	100%
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Table 1 the above shows that the majority of female students are 12 years old, namely 47.78% or (43 female students), 13 years old is 44.42% or (40 female students), 11 years old is 5.56% or (5 female students), while 10 years old and 14 years old are 1.12% or (1 female student) each.

2. Menarche

Table 2. Frequency characteristics distribution of Menarche

Age (year)	Frequency	Percentage (%)
9	2	5.88%
10	3	8.82%
11	14	41.18%
12	12	35.30%
13	3	8.82%
Total	34	100%

As presented in Table 2, the participants' age at menarche ranged from 9 to 13 years. Menarche most commonly occurred at 11 years of age, involving 14 students (41.18%), followed by 12 years of age among 12 students (35.30%). Three students (8.82%) experienced menarche at age 10, and the same number at age 13. The smallest proportion was observed at age 9, with 2 students (5.88%).

3. Dysmenorrhea pain before intervention

Table 3. Pre-Intervention Dysmenorrhea Pain Scores Measured Using the Numerical Rating Scale (NRS)

Classification	Frequency	Percentage (%)
No Pain	0	0%
Mild Pain	4	11.76%
Moderate Pain	18	52.96%
Severe Pain Under Control	12	35.28%
Very Severe/Uncontrolled	0	0%
Total	34	100%

Table 3 the above shows that the majority of female students with a moderate pain scale category with a range of 4-6 were 52.96% or (18 female students), the controlled severe pain scale category with a range of 7-9 were 35.28% or (12 female students), and the mild pain category with a range of 1-3 were 11.76% or (4 female students).

Table 4. Mean of dysmenorrhea pain before intervention

Scale of Pain	N	Mean	Min-Max	Standard Deviation
Before	34	7.61	3-8	0.626

Table 4 indicates that participants reported an average pre-intervention dysmenorrhea pain score of 7.61. Individual pain scores ranged from 3 to 8 before the

intervention, with a standard deviation of 0.626.

4. Dysmenorrhea pain after intervention

Table 5. Post-Intervention Dysmenorrhea Pain Scores Assessed Using the Numerical Rating Scale (NRS)

Classification	Frequency	Percentage (%)
No Pain	0	0%
Mild Pain	20	58.82%
Moderate Pain	14	41.18%
Severe Pain Under Control	0	0%
Very Severe/Uncontrolled	0	0%
Total	34	100%

Table 5 the above shows that the majority of female students with a mild pain category with a range of 1-3 were 58.82% or (20 female students) and the moderate pain scale category with a range of 4-6 were 41.18% or (14 female students).

Table 6. Mean of dysmenorrhea pain before intervention

Scale of Pain	N	Mean	Min-Max	Standard Deviation
After	34	1.69	2-4	0.451

As presented in Table 6, the post-intervention mean dysmenorrhea pain score was 1.69. The observed pain scores ranged from 2 to 4.

5. Normality Test

Table 7. Normality Test

Scale of Pain	Shapiro-Wilk		
	Statistic	sdf	Sig.
Before	0.832	34	0.261
After	0.746	34	0.204

As presented in Table 7, the normality test yielded significance values of 0.261 for the pre-intervention data and 0.204 for the post-intervention data, both exceeding the threshold of 0.05. These findings indicate that the dysmenorrhea pain data were normally distributed.

6. Effect of Turmeric–Tamarind Herbal Therapy on Dysmenorrhea Pain

Table 8. Comparison of Dysmenorrhea Pain Scores Before and After Turmeric–Tamarind Herbal Therapy

Variable	N	Mean	Mean Rank	SD	P-Value
Before	34	7.61	5.345	0.897	0.000
After		1.69			

Table 8 shows a marked change in dysmenorrhea pain following the administration of turmeric–tamarind herbal therapy. Among the 34 participants, the mean pain score fell

from 7.61 before treatment to 1.69 afterward. The analysis yielded a mean rank of 5.345 and a p -value of 0.000, which was below the 0.05 significance threshold. This result confirms a significant reduction in pain after treatment and supports the use of turmeric–tamarind herbal preparations as complementary therapy for dysmenorrhea among adolescent girls.

Discussion

1. Dysmenorrhea Pain Before the Intervention

Before the intervention was administered, the participants had an average dysmenorrhea pain score of 7.61, with scores ranging from 3 to 8. Dysmenorrhea is one of the gynecological complaints commonly experienced by adolescent girls. Menstrual pain should be regarded as a clinical symptom rather than an independent disease. It is also necessary to distinguish dysmenorrhea from premenstrual syndrome. Premenstrual syndrome consists of several symptoms that usually emerge around 7–10 days before menstruation and are associated with changes in estrogen, progesterone, and serotonin levels. Although this condition may affect all women, it generally does not require specific medical treatment. Dysmenorrhea, in comparison, tends to involve fewer symptoms that are mainly physical. Clinically, it refers to pain experienced during menstruation, although its manifestations and severity vary between individuals (Saragih et al., 2024).

Assessment of menstrual pain should include the timing of symptom onset, anatomical location, duration, pain characteristics, and factors that worsen or reduce the discomfort. Primary dysmenorrhea usually begins 6–12 months after menarche, when ovulatory cycles become established. The pain generally starts with menstrual bleeding, is felt in the lower abdomen or pelvic area, and may persist for about 8–72 hours. It can also radiate to the lower back or thighs and may be accompanied by headache, nausea, vomiting, or diarrhea. While mild menstrual discomfort is common, dysmenorrhea refers to pain severe enough to disrupt usual activities, require rest, and limit normal work or daily functioning for several hours or days (Astuti, 2021).

Unlike the primary form, secondary dysmenorrhea may arise at any stage after menarche and often first appears in the third or fourth decade of life because of an underlying pelvic disorder. It may involve changes in the intensity or timing of menstrual pain together with symptoms such as dyspareunia, menorrhagia, intermenstrual bleeding, or postcoital bleeding. Secondary dysmenorrhea should be considered when pain begins during the first one or two menstrual cycles after menarche, first occurs after 25 years of age, develops later without a previous history of dysmenorrhea, or is accompanied by abnormal findings on pelvic examination. Additional indicators include infertility associated with endometriosis, pelvic inflammatory disease, or pelvic adhesions; heavy or irregular bleeding related to adenomyosis, uterine fibroids, or endometrial polyps; persistent dyspareunia; and minimal or absent improvement after treatment with non-steroidal anti-inflammatory drugs, oral contraceptives, or both. A family history of

endometriosis in first-degree relatives may also help distinguish secondary dysmenorrhea from primary dysmenorrhea (Saragih et al., 2024).

When dysmenorrhea is not managed appropriately, it can adversely affect both physical and psychological health by causing physical weakness, restricting daily activities, and contributing to emotional distress. Inadequate treatment may also lead many adolescent girls to miss school and avoid participating in classroom activities, thereby disrupting the learning process, reducing concentration, and impairing their ability to comprehend educational materials (Wiryanti et al., 2022). Consistent with these findings, the present study observed that menstrual pain was a common gynecological complaint among the adolescent participants. However, the respondents in this study reported a relatively high mean pain score of 7.61. This elevated level of pain may be associated with limited knowledge regarding appropriate dysmenorrhea management, together with unhealthy dietary habits, including frequent consumption of snack foods, high-cholesterol meals, and carbonated soft drinks, which may contribute to increased dysmenorrhea pain.

2. Dysmenorrhea Pain After the Intervention

Following the intervention, the participants' mean dysmenorrhea pain score was 1.69, with recorded scores ranging from 2 to 4. Management of dysmenorrhea may involve pharmacological as well as non-pharmacological strategies. Pharmacological treatment generally relies on analgesic agents such as mefenamic acid, ibuprofen, paracetamol, and other pain-relieving medications (Mouliza et al., 2023). For adolescent girls, herbal remedies may also be used as a non-pharmacological option to reduce pain without producing adverse effects. One commonly selected remedy is a turmeric and tamarind drink. In Indonesia, many adolescent girls favor traditional non-pharmacological treatments, including turmeric and tamarind preparations (Sari & Hayati, 2020).

The pain-relieving effect of turmeric and tamarind is linked to the curcumin and essential oils present in turmeric. These substances produce effects comparable to those of analgesic drugs by suppressing prostaglandin production and thereby reducing dysmenorrhea pain. Tamarind contains anthocyanins and tannins, whose mechanism differs from that of non-steroidal anti-prostaglandin medications. These compounds help relieve pain by reducing myometrial muscle tension during menstruation (Iryani et al., 2022). Turmeric and tamarind may be administered as a decoction. Because of its high phenolic content, this preparation has antioxidant activity and may function as an analgesic, an anti-inflammatory agent, and a blood purifier. Its acidic constituents, including flavonoids with analgesic properties, also contribute to the therapeutic effect (Dayana et al., 2025).

A decline in average pain was observed among several respondents after the intervention. This improvement may have occurred because turmeric inhibits prostaglandin synthesis. In addition, the anthocyanins and tannins in tamarind may have supported pain reduction by decreasing tension in the myometrial muscles during

menstruation, through a mechanism that differs from that of non-steroidal anti-prostaglandin drugs.

3. Changes in Dysmenorrhea Pain Following Turmeric–Tamarind Administration

Pain intensity declined markedly after participants received the turmeric–tamarind preparation. The mean score fell from 7.61 before administration to 1.69 afterward, producing a mean difference of 5.345. The statistical test resulted in $p = 0.000$, which was lower than the significance threshold of 0.05. This finding confirms the effectiveness of turmeric–tamarind herbal preparations as complementary treatment for decreasing dysmenorrhea pain in adolescent girls.

Menstruation involves the periodic release of the uterine lining accompanied by bleeding. Lower abdominal discomfort may occur before or during this physiological process (Baiti et al., 2021). Pain that disrupts ordinary activities and leads to a need for rest or medical care is referred to as dysmenorrhea. Dysmenorrhea is divided into primary and secondary forms, with the primary form being more common during puberty and adolescence (Iryani et al., 2022).

Dysmenorrhea can be managed through pharmacological or non-pharmacological measures. Analgesic medication, hormonal treatment, non-steroidal prostaglandin inhibitors, and cervical canal dilation are among the pharmacological options (Husna & Silaen, 2025). Non-pharmacological management may involve warm compresses, exercise, Mozart music therapy, relaxation, or herbal drinks. Herbal preparations are increasingly selected by adolescent girls because they are perceived to offer pain relief with fewer adverse effects. Turmeric beverages are among the herbal products commonly consumed for menstrual pain. Although turmeric has long been used traditionally in Indonesia, knowledge of the bioactive constituents responsible for its therapeutic action remains limited (Pratiwi et al., 2025).

Curcumin appears to play a central role in the biological activity of turmeric and tamarind by increasing cholesterol 7 α -hydroxylase activity and promoting cholesterol breakdown. Research involving mouse liver tissue and microsomal fractions has also shown that dimethoxycurcumin, bisdemethoxycurcumin, and acetyl curcumin can suppress lipid peroxidation. These effects help explain the use of turmeric and tamarind for menstrual pain relief. Their active compounds exhibit analgesic, anti-inflammatory, and antispasmodic actions. Pain reduction may be supported by the analgesic activity of turmeric ethanol extract, while tamarind anthocyanins may limit inflammation through inhibition of the cyclooxygenase (COX) pathway. Other constituents, such as tannins, saponins, sesquiterpenes, alkaloids, and phlobatamines, may influence autonomic nervous activity and consequently lessen uterine contractions (Susilawati et al., 2024).

Turmeric and tamarind preparations also contain substances with analgesic, antipyretic, and anti-inflammatory activity. In tamarind, several bioactive compounds additionally produce sedative effects. The combined use of both ingredients has been reported to be safe and non-toxic. Therefore, this herbal combination may contribute to pain relief, antioxidant protection, and weight reduction.

Evidence reported by Yuniza et al. (2019) supports the results of the present study. In their research, the mean menstrual pain score declined from 3.50 before the intervention to 1.46 afterward. Bivariate testing produced a p-value of 0.000, confirming that turmeric–tamarind drinks significantly reduced menstrual pain among female students (Yuniza et al., 2019). This effect is related to curcuminoids, including curcumin or diferuloylmethane, monodemethoxycurcumin, and bisdemethoxycurcumin. Their phenolic characteristics enable these compounds to neutralize free radicals. The preparation also contains 5.8% essential oil, consisting of 1% α -phellandrene, 0.6% sabinene, 1% cineole, 0.5% borneol, 25% zingiberene, and 53% sesquiterpenes. Its mono- and sesquiterpene components include zingiberene, curcumin, and α - and β -turmerone. These constituents underlie the therapeutic value of turmeric–tamarind herbal medicine and support its use as a safe alternative for menstrual pain management.

The study results also confirm the proposed hypothesis that routine consumption of turmeric–tamarind herbal preparations can lessen primary dysmenorrhea symptoms. This effect corresponds with their analgesic, anti-inflammatory, antipyretic, and sedative properties, which help regulate stress-related sympathetic nervous activity in adolescent girls. When turmeric rhizomes and tamarind fruits are processed into herbal preparations, their active compounds suppress cyclooxygenase activity. This action limits inflammation associated with prostaglandin release during menstruation. Reduced cyclooxygenase activity also decreases excessive autonomic responses, uterine contractions, and emotional stress. Therefore, regular intake of the preparation may lower the occurrence of primary dysmenorrhea among adolescent girls.

Turmeric–tamarind herbal medicine may therefore function as complementary analgesic therapy for menstrual pain in adolescents. The curcuminoids in turmeric provide antioxidant and anti-inflammatory effects that reduce inflammatory activity and suppress uterine contractions. Tamarind also has strong antioxidant properties, which become greater when it is combined with other spices.

CONCLUSION

The intervention resulted in a statistically significant reduction in dysmenorrhea pain among adolescent girls. Pain intensity decreased from a mean score of 7.61 before treatment to 1.69 after treatment, representing a mean difference of 5.345. This improvement was supported by a p-value of 0.000, indicating statistical significance at the 0.05 level. These findings suggest that turmeric and tamarind herbal preparations can be used as an effective complementary approach to reducing dysmenorrhea pain. Based on these findings, adolescent girls are encouraged to incorporate turmeric and tamarind herbal preparations into their complementary pain management practices while maintaining healthy dietary habits. The results may also serve as a useful source of evidence for nurses and nursing students undertaking research related to dysmenorrhea management. In addition, schools are encouraged to strengthen menstrual health education by providing information on dysmenorrhea management and making educational materials, including leaflets and brochures describing the stages of

dysmenorrhea, readily accessible. To build upon the present findings, future investigations are recommended to adopt qualitative methods with in-depth interviews to further explore the factors contributing to dysmenorrhea among adolescent girls.

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