

Effect of Bunga Telang (*Clitoria ternatea*) Flower Tea on Pain Intensity Among Adolescent Girls with Primary Dysmenorrhea: A Pre-Experimental Study

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Background: Primary dysmenorrhea is a common menstrual health problem among adolescent girls and may interfere with daily activities and school participation. *Bunga telang* (*Clitoria ternatea*) flower tea has potential as a simple complementary approach for managing menstrual pain. **Objective:** This study aimed to evaluate the effect of *bunga telang* flower tea on pain intensity among adolescent girls with primary dysmenorrhea at Al-Hikmah Curug Vocational High School, Tangerang Regency, Indonesia. **Methods:** A quantitative pre-experimental study using a one-group pretest-posttest design was conducted among 43 Grade 10 female students selected based on predetermined eligibility criteria. Pain intensity was assessed before and after the intervention using the 0–10 Numeric Rating Scale (NRS). Participants received 1 g of dried *bunga telang* flower brewed in 200 mL of boiling water for approximately 5 minutes on H–2, H–1, and the first day of menstruation. Data were analyzed using the Shapiro–Wilk test for normality and the Wilcoxon signed-rank test for paired comparisons. **Results:** Before the intervention, 46.5% of participants reported mild pain, 37.2% moderate pain, and 16.3% severe pain. After the intervention, 39.5% reported no pain, 58.1% mild pain, 2.3% moderate pain, and none reported severe pain. The Wilcoxon signed-rank test demonstrated a significant reduction in pain intensity ($Z = -5.742$, $p = 0.001$), with all 43 participants showing lower posttest pain scores. **Conclusion:** *Bunga telang* flower tea was associated with a significant reduction in menstrual pain intensity among adolescent girls with primary dysmenorrhea. It may represent a practical complementary approach to menstrual pain management; however, controlled studies with larger samples are needed to establish causal effectiveness.

Keywords: bunga telang; *Clitoria ternatea*; primary dysmenorrhea; menstrual pain; adolescent girls; herbal intervention.

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1. Introduction

Menstruation is a normal physiological process that begins during adolescence and represents an important aspect of reproductive health [1]. However, menstrual health problems are common among adolescent girls and may interfere with their physical comfort, daily activities, and participation in education [2]. Globally, menstrual pain is experienced by more than two-thirds of women and girls who menstruate, indicating that menstrual pain represents an important health concern across different populations [3], [4].

Primary dysmenorrhea is one of the most common menstrual health problems among adolescents. It is characterized by painful menstrual cramps occurring in the absence of an underlying pelvic pathology and is frequently accompanied by symptoms such as headache, nausea, vomiting, diarrhea, fatigue, and general discomfort [5]. The reported prevalence of dysmenorrhea among adolescent girls varies considerably across

populations, but evidence consistently indicates that it affects a substantial proportion of adolescents. A systematic review and meta-analysis involving 21,573 young women estimated the overall prevalence of dysmenorrhea at 71.1%, with a similar prevalence among school students and university students [6]. Another meta-analysis involving 78,068 students reported a pooled prevalence of primary dysmenorrhea of 66.1%, with approximately 8.3% of students experiencing severe pain [7].

The high occurrence of primary dysmenorrhea is particularly relevant during adolescence because this period is closely associated with educational development and active participation in school activities [8]. Menstrual pain may reduce concentration, restrict daily activities, and contribute to school absenteeism. Evidence study showed that approximately one in five young women reported missing school or university because of dysmenorrhea, while more than two in five reported impaired classroom concentration or academic performance [9]. Recent research among adolescents has likewise demonstrated that primary dysmenorrhea can substantially affect daily activities and school attendance. Therefore, managing menstrual pain among adolescent girls is not only relevant to individual comfort but also to their ability to participate consistently in educational activities.

The management of primary dysmenorrhea commonly involves pharmacological and non-pharmacological approaches [10]. Although pharmacological treatment can provide effective pain relief, adolescent girls may also seek complementary approaches that are practical, accessible, and acceptable for routine use [11]. This creates an important opportunity to explore locally available plant-based preparations as potential complementary interventions for menstrual pain. In this context, bunga telang (*Clitoria ternatea*) flower tea is of interest as a locally available herbal beverage that can be consumed as part of a simple intervention. Despite the widespread occurrence and educational impact of primary dysmenorrhea among adolescents, evidence regarding the use of bunga telang flower tea specifically for reducing menstrual pain remains limited. Evaluating this intervention among adolescent girls in a school setting may provide practical evidence regarding its potential role as a complementary approach to menstrual pain management. Such evidence may also contribute to the development of simple, accessible, and contextually appropriate strategies for supporting menstrual health among adolescents. Therefore, this study aimed to evaluate the effect of bunga telang (*Clitoria ternatea*) flower tea on pain intensity among adolescent girls with primary dysmenorrhea at Al-Hikmah Curug Vocational High School, Tangerang Regency, Indonesia..

2. Literature Review and Problem Statement

Primary dysmenorrhea is generally understood as menstrual pain occurring in the absence of identifiable pelvic pathology and is closely associated with increased uterine contractility and the release of inflammatory mediators, particularly prostaglandins. This pathophysiological basis supports the use of interventions aimed at reducing pain and inflammatory responses. In addition to pharmacological therapy, non-pharmacological approaches have received increasing attention because they may provide accessible complementary options for menstrual pain management. A systematic review and Bayesian network meta-analysis of 33 randomized controlled trials found that several non-pharmacological interventions, including herbal interventions, exercise, acupuncture, aromatherapy, topical heat, acupressure, and yoga, were associated with reductions in menstrual pain compared with placebo or no treatment, although the magnitude and certainty of effects varied across interventions [12]. Evidence specifically concerning medicinal plants is also encouraging but remains inconclusive. A systematic review of 22 randomized controlled trials found that most evaluated medicinal plants demonstrated potential efficacy in relieving primary dysmenorrhea; however, the authors emphasized that the quality of many studies was low or unclear, limiting definitive conclusions regarding efficacy and safety [13]. More recent evidence from a 2026 systematic review and meta-analysis of plant-derived therapies similarly suggests that herbal interventions

may reduce pain associated with primary dysmenorrhea and may have effects comparable with conventional pharmacological treatments, but the certainty of evidence remains low to very low because of substantial heterogeneity and methodological limitations among the included studies [14].

Bunga telang (*Clitoria ternatea*) represents a potentially relevant plant-based intervention because its flowers contain bioactive compounds, including anthocyanins, flavonoids, phenolic compounds, and other secondary metabolites that have been associated with antioxidant and anti-inflammatory activities. Experimental and pharmacological literature has also reported analgesic and anti-inflammatory properties of *C. ternatea*, although much of this evidence is derived from preclinical studies rather than clinical investigations in women with dysmenorrhea. This distinction is important because biological plausibility and preclinical analgesic activity cannot be directly equated with clinical effectiveness of bunga telang flower tea for menstrual pain. Although systematic reviews indicate a growing body of evidence supporting plant-based interventions for primary dysmenorrhea, the available literature remains dominated by other medicinal plants and does not establish sufficient clinical evidence specifically for bunga telang flower tea among adolescent girls. Thus, an important research gap remains concerning whether consumption of bunga telang flower tea can produce a measurable reduction in pain intensity among adolescents experiencing primary dysmenorrhea. The present study addresses this gap by examining the effect of bunga telang flower tea on pain intensity among adolescent girls with primary dysmenorrhea. The research question is: Does consumption of bunga telang (*Clitoria ternatea*) flower tea significantly reduce pain intensity among adolescent girls with primary dysmenorrhea? Accordingly, the study hypothesizes that adolescent girls who receive bunga telang flower tea will experience a significant reduction in pain intensity following the intervention.

3. Method

This study employed a quantitative pre-experimental design using a one-group pretest-posttest approach. A single intervention group was assessed before and after the administration of bunga telang (*Clitoria ternatea*) flower tea to evaluate changes in menstrual pain intensity. Pain intensity was assessed at baseline (pretest) and after the intervention (posttest). The study was conducted at Al-Hikmah Curug Vocational High School, Tangerang Regency, Indonesia, from 18 April to 4 June 2026.

The study population consisted of female students in Grade 10 at Al-Hikmah Curug Vocational High School, Tangerang Regency, who met the eligibility criteria. A total of 43 students met the predetermined eligibility criteria and were included in the study. Participants were recruited using purposive sampling based on the following inclusion and exclusion criteria. The inclusion criteria were: (1) active female students who had experienced menarche; (2) reported regular menstrual cycles; (3) experienced menstrual pain; and (4) were willing to participate in the study, follow the bunga telang flower tea intervention protocol, and provide informed consent. The exclusion criteria were: (1) a history of gynecological disorders, such as endometriosis, ovarian cysts, or uterine fibroids; (2) a history of allergy to bunga telang or plants belonging to the Fabaceae family; and (3) absence from school or failure to complete the intervention procedure during data collection.

The intervention consisted of bunga telang (*Clitoria ternatea*) flower tea prepared from 1 g of dried bunga telang flowers brewed in 200 mL of boiling water. The preparation was allowed to steep for approximately 5 minutes before consumption. The intervention was administered for three consecutive assessment days: two days before the expected onset of menstruation (H-2), one day before menstruation (H-1), and the first day of menstruation. Participants were instructed to consume the prepared bunga telang flower tea according to the study protocol. Adherence to the intervention was monitored by asking participants to document their consumption of the tea.

The primary outcome was menstrual pain intensity, measured using the Numeric Rating Scale (NRS). The NRS uses an 11-point numerical scale ranging from 0 to 10, where 0 indicates no pain and 10 indicates the worst possible pain. For descriptive categorization, pain scores of 1–3 were classified as mild pain, 4–6 as moderate pain, and 7–10 as severe pain. Pain intensity was assessed before the intervention (pretest) and after completion of the intervention protocol (posttest). The change in NRS score between the two measurements was used to evaluate the effect of the intervention.

Data were collected using a structured observation form containing participant characteristics, intervention adherence, and pain intensity measurements. The NRS was used as the primary instrument for assessing menstrual pain intensity. The NRS has been widely used to assess pain intensity and has demonstrated acceptable validity and reliability across clinical and research settings. In the study by De Arruda et al. (2022), the NRS demonstrated strong discriminative validity, with an area under the curve (AUC) of 0.902, and excellent reliability, with an intraclass correlation coefficient (ICC) of 0.90. Therefore, the NRS was considered appropriate for assessing pain intensity in the present study.

Data collection was conducted in three stages: preparation, intervention, and post-intervention assessment. During the preparation stage, the researchers obtained research permission from Universitas Muhammadiyah Tangerang and Al-Hikmah Curug Vocational High School. A preliminary assessment was also conducted to identify eligible participants. Eligible students were provided with an explanation of the study objectives, procedures, potential benefits, and possible risks. Participants who agreed to participate provided informed consent before data collection. At baseline, participants completed the observation form and reported their menstrual pain intensity using the NRS. The intervention was subsequently administered according to the predetermined protocol. Participants consumed bunga telang flower tea on H-2, H-1, and the first day of menstruation. Intervention adherence was monitored through participant documentation of tea consumption. Following completion of the intervention protocol, pain intensity was reassessed using the same NRS to obtain the posttest measurement. The pretest and posttest scores were subsequently compared to determine changes in menstrual pain intensity.

Data processing consisted of editing, coding, data entry, and data cleaning. Completed observation forms were reviewed for completeness and consistency. Participant data were coded before being entered into a statistical software program, and the dataset was subsequently checked for potential entry errors and inconsistencies. Descriptive analysis was performed to summarize participant characteristics and pain intensity before and after the intervention. Continuous variables were summarized using appropriate measures of central tendency and dispersion according to data distribution. The Shapiro–Wilk test was used to assess the normality of the pain intensity data because the sample size was fewer than 50 participants. The normality test indicated that the pretest pain scores were not normally distributed ($p = 0.028$), and the posttest pain scores were also not normally distributed ($p = 0.001$). Therefore, the Wilcoxon signed-rank test was used to compare pain intensity before and after the intervention. Statistical significance was determined at a two-sided significance level of $\alpha = 0.05$. A p -value of less than 0.05 was considered statistically significant. The Wilcoxon signed-rank test yielded $p = 0.001$, indicating a statistically significant difference in pain intensity between the pretest and posttest measurements.

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Tangerang, under ethical approval number 071/KEP/III.3.AU/F/FIKES/2026. Participation was voluntary, and participants were informed about the study objectives, procedures, potential benefits, and possible risks before enrollment. Written informed consent was obtained from participants prior to data collection. Participant confidentiality and privacy were maintained throughout the study, and personal identifiers were not disclosed in the research report. Participants were also informed of their right to withdraw from the study without penalty.

4. Results and Discussion

Before the administration of *bunga telang* (*Clitoria ternatea*) flower tea, all participants reported menstrual pain. As shown in Table 1, mild pain was the most frequently reported category, affecting 20 participants (46.5%), followed by moderate pain in 16 participants (37.2%) and severe pain in 7 participants (16.3%). No participant reported being free of pain at baseline.

Table 1. Distribution of Menstrual Pain Intensity Before *Bunga Telang* Flower Tea Intervention

Pain intensity	n	%
No pain	0	0.0
Mild pain	20	46.5
Moderate pain	16	37.2
Severe pain	7	16.3
Total	43	100.0

At baseline, 53.5% of participants experienced moderate or severe menstrual pain, while 46.5% experienced mild pain. This indicates that all participants experienced primary dysmenorrhea before receiving the intervention, with mild-to-moderate pain being the predominant presentation.

Following the administration of *bunga telang* flower tea, the distribution of pain intensity shifted toward lower pain categories. As presented in Table 2, 17 participants (39.5%) reported no pain, 25 (58.1%) reported mild pain, and only 1 participant (2.3%) reported moderate pain. No participant reported severe pain after the intervention.

Table 2. Distribution of Menstrual Pain Intensity After *Bunga Telang* Flower Tea Intervention

Pain intensity	n	%
No pain	17	39.5
Mild pain	25	58.1
Moderate pain	1	2.3
Severe pain	0	0.0
Total	43	100.0

After the intervention, 97.7% of participants reported either no pain or mild pain, compared with 46.5% before the intervention. The proportion experiencing moderate or severe pain decreased from 53.5% at baseline to 2.3% after the intervention. In particular, the proportion of participants reporting severe pain decreased from 16.3% to 0.0%.

The Shapiro–Wilk test was performed to determine whether the pretest and posttest pain scores followed a normal distribution. The results are presented in Table 3.

Table 3. Shapiro–Wilk Test for Pretest and Posttest Pain Scores

Measurement	Shapiro–Wilk statistic (W)	n	p-value
Pretest	0.941	43	0.028
Posttest	0.823	43	0.001

The pretest pain scores were not normally distributed ($W = 0.941$, $p = 0.028$), and the posttest pain scores were also not normally distributed ($W = 0.823$, $p = 0.001$). Because both p-values were below 0.05, the assumption of normality was not met. Therefore, a non-parametric statistical test was considered appropriate for comparing the paired pretest and posttest pain scores.

Because the pain scores were not normally distributed, the Wilcoxon signed-rank test was used to evaluate the difference between pretest and posttest pain intensity. The results are shown in Table 4.

Table 4. Wilcoxon Signed-Rank Test of Pain Intensity Before and After *Bunga Telang* Flower Tea Intervention

Comparison	n	Mean rank	Sum of ranks	Z	p-value
Negative ranks	43	22.00	946.00	-5.742	0.001
Positive ranks	0	0.00	0.00		
Ties	0				
Total	43				

Negative ranks indicate lower posttest pain scores than pretest scores; positive ranks indicate higher posttest scores; ties indicate no change.

The Wilcoxon signed-rank test demonstrated a statistically significant difference between pretest and posttest pain intensity scores ($Z = -5.742$, $p = 0.001$). All 43 participants had lower pain scores after the intervention, as indicated by 43 negative ranks and no positive ranks or ties. Thus, pain intensity decreased consistently among all participants following the administration of *bunga telang* flower tea. The descriptive findings further support this result. The proportion of participants with no pain increased from 0.0% before the intervention to 39.5% after the intervention, while severe pain decreased from 16.3% to 0.0%. Overall, 97.7% of participants experienced either no pain or mild pain after the intervention, compared with 46.5% before the intervention. These findings indicate a statistically significant reduction in menstrual pain intensity following the *bunga telang* flower tea intervention. However, because the study used a one-group pretest-posttest design without a control group, the observed reduction should be interpreted as an improvement following the intervention rather than definitive evidence of a causal effect.

Discussion

Changes in Pain Intensity Following the Intervention

The present study demonstrated a clear reduction in menstrual pain intensity following the administration of *bunga telang* (*Clitoria ternatea*) flower tea. Before the intervention, 46.5% of participants reported mild pain, 37.2% reported moderate pain, and 16.3% reported severe pain. Following the intervention, the proportion of participants reporting no pain increased to 39.5%, while 58.1% reported mild pain. Only one participant (2.3%) continued to report moderate pain, and no participant reported severe pain. The shift in the distribution of pain categories suggests that the intervention was associated with a clinically meaningful improvement in menstrual pain intensity.

The observed reduction is biologically plausible because *C. ternatea* contains several classes of bioactive compounds, including flavonoids, anthocyanins, phenolic compounds, and other secondary metabolites. These compounds have been investigated for antioxidant and anti-inflammatory activities. In the context of primary dysmenorrhea, inflammation and prostaglandin-mediated uterine contractions are important components of menstrual pain [15]. Therefore, the anti-inflammatory and analgesic properties reported for *C. ternatea* provide a possible biological basis for its potential role as a complementary intervention [16]. However, this mechanism should be interpreted cautiously because much of the evidence concerning the pharmacological activity of *C. ternatea* has been generated from experimental or preclinical studies rather than clinical trials specifically evaluating flower tea in adolescents with primary dysmenorrhea.

The findings are consistent with previous studies investigating *bunga telang* preparations for menstrual pain. Previous research has reported reductions in dysmenorrhea severity following the consumption of *bunga telang* tea or infusion among adolescent girls [17]. Similar findings have been reported in studies evaluating other plant-based interventions for primary dysmenorrhea, suggesting that herbal preparations may have potential as complementary approaches for menstrual pain management [18]. However,

differences in preparation methods, dosage, duration of intervention, participant characteristics, and pain measurement instruments make direct comparisons between studies difficult.

The present findings are also consistent with broader evidence regarding non-pharmacological management of primary dysmenorrhea. Systematic reviews have reported that several non-pharmacological and plant-based interventions may reduce menstrual pain compared with placebo, usual care, or no intervention [12]. Nevertheless, the certainty of evidence varies considerably across interventions because of methodological limitations, heterogeneity in intervention protocols, and differences in outcome assessment. Therefore, the findings of the present study contribute to the emerging evidence concerning bunga telang as a potential complementary intervention but should not yet be interpreted as definitive evidence of clinical efficacy.

Effect of Bunga Telang Flower Tea on Menstrual Pain

The Wilcoxon signed-rank test showed a statistically significant difference between pretest and posttest pain intensity scores ($Z = -5.742$, $p = 0.001$). Importantly, all 43 participants demonstrated a reduction in their pain scores, with no participants showing either an increase or an unchanged score. This consistent direction of change strengthens the evidence that the observed reduction was not limited to a small subgroup of participants.

The reduction in pain may be related to the bioactive constituents of *C. ternatea*. Flavonoids and other phenolic compounds have been reported to possess anti-inflammatory and antioxidant activities, while experimental studies have suggested analgesic properties of extracts from the plant. From a physiological perspective, reducing inflammatory activity may potentially influence pathways involved in menstrual pain [19]. Nevertheless, because the present study did not measure prostaglandin concentrations, inflammatory biomarkers, or other biological mediators, the proposed mechanism cannot be directly confirmed from the present data. The biological explanation should therefore be regarded as a plausible mechanism rather than a demonstrated mediator of the observed effect [20].

The findings also support the potential feasibility of using bunga telang flower tea as a complementary, non-pharmacological approach for menstrual pain among adolescents. The intervention uses a simple preparation that can be consumed orally and may be relatively easy to implement in community or school-based settings. This characteristic may be particularly relevant for adolescent menstrual health programs, where interventions need to be acceptable, practical, and easy to implement. However, the present study was conducted in a single school and used a one-group pretest-posttest design; therefore, the findings should be interpreted primarily as evidence of an association between the intervention and the observed reduction in pain rather than definitive proof of causality.

The absence of a control group is particularly important when interpreting the results. Menstrual pain can change naturally over time, and pain intensity may also be influenced by factors such as rest, sleep, physical activity, psychological stress, expectations regarding the intervention, dietary intake, and concurrent use of other pain-relieving strategies. Regression to the mean may also contribute to the observed reduction when participants are recruited during a period of relatively high pain intensity. Consequently, although the statistically significant reduction and the fact that all participants experienced lower scores are encouraging, these findings cannot completely exclude alternative explanations.

Future studies should therefore use randomized controlled designs with adequate control or comparison groups and larger, more diverse samples. Future research should also standardize the preparation and dosage of bunga telang flower tea, monitor adherence more objectively, control potential confounding factors, and consider measuring relevant biological markers. Such approaches would provide stronger

evidence regarding the clinical effectiveness and possible mechanisms of bunga telang flower tea in the management of primary dysmenorrhea.

This study has several limitations. First, the one-group pretest-posttest design did not include a control or comparison group; therefore, changes in pain intensity cannot be attributed exclusively to *bunga telang* flower tea, as spontaneous changes in menstrual pain, placebo effects, regression to the mean, or other behavioral factors may have contributed to the observed improvement. Second, the study was conducted in a single vocational high school with a relatively small sample of 43 participants, which may limit the generalizability of the findings to adolescent girls from different age groups, schools, geographic areas, or socioeconomic backgrounds. Third, potential confounding factors, including psychological stress, sleep quality, physical activity, dietary intake, menstrual characteristics, and the use of other pain-relieving methods, were not comprehensively controlled and may have influenced menstrual pain independently of the intervention. Finally, pain intensity was assessed using a subjective self-reported measure, and the study did not evaluate the biological mechanisms underlying the observed reduction. Future research should therefore employ controlled study designs with larger and more diverse samples, standardized intervention protocols, comprehensive control of potential confounding factors, and, where feasible, objective physiological or biochemical outcomes to provide stronger evidence regarding the effectiveness and mechanisms of *bunga telang* flower tea for primary dysmenorrhea.

5. Conclusion

This study demonstrated that the administration of bunga telang (*Clitoria ternatea*) flower tea was associated with a significant reduction in pain intensity among adolescent girls with primary dysmenorrhea at Al-Hikmah Curug Vocational High School, Tangerang Regency. Following the intervention, the proportion of participants experiencing no pain or mild pain increased from 46.5% to 97.7%, while moderate-to-severe pain decreased from 53.5% to 2.3%, and the Wilcoxon signed-rank test confirmed a statistically significant difference between pretest and posttest pain scores ($Z = -5.742$, $p = 0.001$). These findings are consistent with previous evidence suggesting that *C. ternatea* contains bioactive compounds with potential antioxidant, anti-inflammatory, and analgesic activities, although the biological mechanisms responsible for the observed clinical improvement were not directly assessed in this study. The findings suggest that bunga telang flower tea may have potential as a simple and accessible complementary approach for managing menstrual pain among adolescents, particularly in school-based settings. Nevertheless, the absence of a control group, relatively small sample size, single-school setting, and limited control of potential confounding factors restrict causal interpretation and generalizability. Future studies should employ randomized controlled designs with larger and more diverse populations, standardized intervention protocols, and objective physiological or biochemical measures to establish the clinical effectiveness and underlying mechanisms of bunga telang flower tea for primary dysmenorrhea.

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