



EFFECT OF CHAMOMILE TEA ON DYSMENORRHEA PAIN AND ANXIETY AMONG ADOLESCENT GIRLS: A PRE-EXPERIMENTAL STUDY

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ABSTRACT	Keywords
Dysmenorrhea is common among adolescent girls and may be accompanied by anxiety, which can interfere with daily activities and well-being. Chamomile (<i>Matricaria chamomilla</i>) has been investigated as a complementary herbal intervention because of its potential anti-inflammatory, antispasmodic, and calming properties. Objective: This study aimed to evaluate changes in dysmenorrhea pain and anxiety among adolescent girls before and after chamomile tea administration. Methods: A pre-experimental one-group pretest–posttest design was used. Thirty-one adolescent girls with dysmenorrhea at SMA Islam Duduk Sampeyan Gresik were selected using purposive sampling. Pain was assessed using the Numeric Rating Scale (NRS), and anxiety was assessed using the Hamilton Anxiety Rating Scale (HARS). Chamomile tea was prepared according to the study SOP using 250 mg of chamomile and 150 mL of hot water, with a steeping time of 5–10 minutes. Data were analyzed using the Wilcoxon Signed-Rank Test. Results: The median pain score decreased from 3 (IQR 2–3) before the intervention to 1 (IQR 1–2) after the intervention ($Z = -4.824$, $p < 0.001$, $r = 0.866$). The median anxiety score decreased from 2 (IQR 2–3) to 1 (IQR 1–2) ($Z = -4.914$, $p < 0.001$, $r = 0.882$). Conclusion: Chamomile tea administration was associated with statistically significant reductions in dysmenorrhea pain and anxiety scores in this sample. Because the study did not include a control group, the findings do not establish that chamomile tea alone caused these changes. Further randomized controlled trials are needed to confirm the effectiveness of the intervention.	chamomile tea; <i>Matricaria chamomilla</i>; dysmenorrhea; anxiety; adolescent girls

INTRODUCTION

Adolescence is a period of substantial biological and psychosocial development. Menstruation is a normal physiological process during this period; however, dysmenorrhea, commonly characterized by cramping pain during

menstruation, is frequently experienced by adolescent girls. The condition may interfere with daily activities, school attendance, concentration, and quality of life (Elsera et al., 2022; Saputra et al., 2021; Yuliyanti Asda Djailani, 2021).

Dysmenorrhea may also be accompanied by psychological symptoms, including anxiety. Pain can activate physiological stress responses and increase emotional distress, whereas anxiety may increase pain sensitivity and intensify the perception of discomfort. This reciprocal relationship may worsen the overall experience of menstruation and affect sleep, concentration, learning activities, and school participation (Pialiani et al., 2018; Shintya et al., 2023; Elsera et al., 2022).

Primary dysmenorrhea is associated with increased prostaglandin activity in the endometrium during menstruation. Increased prostaglandin production may intensify uterine contractions and reduce uterine blood flow, contributing to menstrual pain. Chamomile contains several bioactive compounds, including apigenin, chamazulene, and α -bisabolol, which have been investigated for anti-inflammatory, antispasmodic, and calming properties (Mollabashi et al., 2020; Dwi et al., 2023; Saadatmand et al., 2024).

Previous studies have reported potential benefits of chamomile for menstrual-related symptoms and anxiety-related outcomes. Nevertheless, research evaluating dysmenorrhea pain and anxiety simultaneously among adolescent girls remains limited. Therefore, this study aimed to evaluate changes in dysmenorrhea pain and anxiety before and after chamomile tea administration among adolescent girls at SMA Islam Duduk Sampeyan Gresik.

METHOD

Study design and setting. This study used a pre-experimental one-group pretest–posttest design. The study was conducted among adolescent girls experiencing dysmenorrhea at SMA Islam Duduk Sampeyan Gresik. **Participants and sampling.** A total of 31 adolescent girls were included in the final analysis. Participants were selected using purposive sampling according to the

predetermined inclusion and exclusion criteria. Ethical approval was obtained from the relevant institutional ethics committee under approval number 137/EC/KEPK-S1/04/2026.

Pain assessment. Dysmenorrhea pain was assessed using the Numeric Rating Scale (NRS), which measures perceived pain intensity on a 0–10 scale. For the descriptive analysis, the study categorized pain scores according to the study protocol. Because the NRS produces ordered scores, median and interquartile range (IQR) were used as the primary descriptive statistics in the revised analysis.

Anxiety assessment. Anxiety was assessed using the Hamilton Anxiety Rating Scale (HARS), a clinician-rated instrument consisting of 14 items assessing the severity of anxiety symptoms. Evidence from an adolescent sample aged 12–18 years indicates that the HARS demonstrated acceptable inter-rater reliability and internal consistency, as well as good construct validity (Clark & Donovan, 1994). However, the present study did not independently conduct a new validation study of the instrument in Indonesian adolescents. The HARS scoring and interpretation used in this study followed the scoring procedure specified in the research instrument and study protocol.

Chamomile tea intervention. According to the study SOP, 250 mg of chamomile tea was placed in a glass and prepared with 150 mL of hot water. The preparation was allowed to steep for 5–10 minutes, stirred gently, and the plant material was removed before consumption. Participants consumed the prepared tea until finished and were observed for possible adverse effects or allergic reactions. The SOP also identified a history of allergy to chamomile or plants from the Asteraceae family, severe gastric disorders, and the use of certain sedative medications as contraindications or conditions requiring consideration. The SOP provided the

preparation method and steeping duration; the exact administration frequency, timing in relation to the onset of menstruation, and total intervention duration should be reported according to the actual study schedule used by the researchers.

Potential confounding variables. Factors such as menstrual cycle phase, analgesic use, physical activity, sleep quality, dietary intake, caffeine consumption, previous use of herbal products, and stress levels may influence dysmenorrhea and anxiety. These factors were not comprehensively controlled in the present study and were therefore considered potential sources of confounding.

Statistical analysis. Data were analyzed using IBM SPSS Statistics version 22. The Wilcoxon Signed-Rank Test was used to compare paired pre-intervention and post-intervention scores because the outcome data were ordinal and the paired differences did not meet the assumptions required for a parametric paired test. Statistical significance was set at $\alpha = 0.05$. Effect size was calculated as $r = |Z|/\sqrt{N}$, where $N = 31$.

RESULTS

Table 1. Age Distribution of Adolescent Girls at SMA Islam Duduk Sampeyan Gresik

Age (years)	Frequency	Percentage
15	1	3.2%
16	14	45.2%
17	16	51.6%
Total	31	100.0%

The participants were 15–17 years old. Most participants were 17 years old (16; 51.6%), followed by 16 years old (14; 45.2%) and 15 years old (1; 3.2%).

Table 2. Age at Menarche Distribution Among Adolescent Girls at SMA Islam Duduk Sampeyan Gresik

Age at menarche	Frequency	Percentage
<12	1	3.2%
12-14	30	96.8%
>14	0	0%
Total	31	100.0%

Most participants (30; 96.8%) reported menarche at 12–14 years of age, while 1 participant (3.2%) reported menarche before age 12.

Table 3. Effect of Chamomile Tea (*Matricaria chamomilla*) on Dysmenorrheic Pain Intensity Among Adolescent Girls at SMA Islam Duduk Sampeyan Gresik

	N	Median	IQR	Z	P-value
Before	31	3	2–3	-	-
After	31	1	1–2	-4.824	<0.001

The median dysmenorrhea pain score decreased from 3 (IQR 2–3) before the intervention to 1 (IQR 1–2) after the intervention. The Wilcoxon Signed-Rank Test showed a statistically significant difference between the two measurements ($Z = -4.824$, $p < 0.001$), with a very large effect size ($r = 0.866$).

Table 4. Effect of Chamomile Tea (*Matricaria chamomilla*) on Anxiety

Levels Among Adolescent Girls at SMA Islam Duduk Sampeyan Gresik

	N	M edian	I Q R	Z	P- va lu e
Before	3	2	2	-	-
After	1		-		
			3		
After	3	1	1	-	<
Before	1		-	4	0.
			2	.	00
				9	1
				1	
				4	

The median anxiety score decreased from 2 (IQR 2–3) before the intervention to 1 (IQR 1–2) after the intervention. The Wilcoxon Signed-Rank Test showed a statistically significant difference ($Z = -4.914$, $p < 0.001$), with a very large effect size ($r = 0.882$).

DISCUSSION

This study found statistically significant reductions in dysmenorrhea pain and anxiety scores following the intervention period. However, because the study used a one-group pretest–posttest design without a control group, the findings should be interpreted as an association between the intervention period and the observed reductions rather than definitive evidence that chamomile tea alone caused the changes.

The observed reduction in pain is biologically plausible based on previous evidence concerning chamomile constituents. Apigenin, chamazulene, α -bisabolol, and related compounds have been investigated for anti-inflammatory and antispasmodic properties. Previous studies have proposed that chamomile may influence inflammatory pathways and smooth-muscle relaxation, which could contribute to reduced menstrual pain (Mollabashi et al., 2020; Jannahuthor et al., 2025; Rahmadhani et

al., 2024; Widiarti et al., 2025). However, prostaglandin levels, inflammatory mediators, and uterine contractility were not directly measured in the present study. Therefore, these biological mechanisms should be understood as explanations based on previous research rather than mechanisms demonstrated by the current investigation.

The reduction in anxiety may also be consistent with previous research on chamomile and anxiety-related symptoms. Apigenin and other chamomile constituents have been discussed in relation to GABAergic mechanisms and central nervous system relaxation (Saadatmand et al., 2024). Nevertheless, the present study did not measure GABA receptor activity, neurotransmitter levels, cortisol concentrations, or other biological markers of stress. The proposed mechanisms therefore remain theoretical explanations based on previous literature.

The relationship between dysmenorrhea and anxiety may also help explain the observed findings. Menstrual pain may increase psychological distress through physiological stress responses, while anxiety may increase pain sensitivity and influence the perception of pain. Consequently, a reduction in pain may be accompanied by a reduction in anxiety. However, this interpretation should be made cautiously because the study did not include a control group and did not comprehensively control for potential confounding variables.

The findings are generally consistent with previous studies reporting potential benefits of chamomile for menstrual pain and anxiety-related symptoms. However, differences in study design, participant characteristics, dosage, preparation method, intervention duration, and measurement instruments limit direct comparison between studies. Recent randomized controlled trials and

systematic reviews are particularly important for determining whether chamomile produces effects beyond placebo or natural changes over time.

The large effect sizes observed in the present study should also be interpreted cautiously. Although the Wilcoxon results indicate substantial within-participant changes, effect sizes from uncontrolled pretest–posttest studies may be influenced by natural symptom fluctuation, regression to the mean, expectancy effects, placebo effects, and other factors unrelated to the intervention. Therefore, the results support further investigation rather than definitive evidence of causal effectiveness.

LIMITATIONS

This study has several limitations. First, the absence of a control group means that the observed reductions in pain and anxiety cannot be attributed solely to chamomile tea. Dysmenorrhea pain may naturally decrease as menstruation progresses, and anxiety may improve independently of the intervention. Second, the relatively small sample size and single-school setting limit the generalizability of the findings. Third, purposive sampling may have introduced selection bias. Fourth, the outcomes were based on subjective clinical assessments and may have been influenced by reporting bias, participant expectations, and placebo effects. Fifth, potentially important confounding variables, including menstrual cycle phase, analgesic use, physical activity, sleep quality, dietary intake, caffeine consumption, previous use of herbal products, and stress levels, were not comprehensively controlled. Finally, objective biomarkers such as prostaglandins, inflammatory cytokines, cortisol concentrations, and physiological stress indicators were not measured, so the biological mechanisms underlying the observed changes cannot be confirmed.

CONCLUSIONS

Chamomile tea administration was associated with statistically significant reductions in dysmenorrhea pain and anxiety scores among the adolescent girls included in this study. The findings suggest that chamomile tea may have potential as a complementary approach for menstrual-related symptoms. However, the one-group pretest–posttest design without a control group does not establish a causal effect of chamomile tea. Further randomized controlled trials with placebo or active comparison groups, larger samples, standardized intervention protocols, and objective biomarkers are needed to confirm the effectiveness and mechanisms of chamomile tea.

RECOMMENDATIONS FOR FUTURE RESEARCH

Future studies should use randomized controlled designs with placebo or active comparison groups and larger, more diverse samples. Intervention protocols should clearly specify the botanical source, manufacturer or product information, dose, concentration, preparation method, water temperature, steeping duration, volume, timing relative to menstruation onset, frequency, and total duration of treatment. Researchers should also monitor potential confounding variables and consider objective biomarkers, including prostaglandin levels, inflammatory cytokines, cortisol concentrations, and physiological stress indicators, to better clarify the mechanisms underlying any observed effects.

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