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EFFECTIVENESS OF GIVING A COMBINATION OF BOILED BASIL LEAVES (*OCIMUM BASILICUM*) AND GINGER (*ZINGIBER OFFICINALE*) IN REDUCING PAIN FROM PRIMARY DYSMENORRHEA IN ADOLESCENT GIRLS

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ABSTRACT

Background: Primary dysmenorrhea is a common issue among young women, characterized by lower abdominal pain due to excessive uterine contractions. Non-pharmacological management using natural ingredients such as basil leaves (Ocimum basilicum) and ginger (Zingiber officinale) serves as a potential alternative due to their flavonoid and gingerol content, which function as natural analgesics and anti-inflammatories. Objective: This study aims to evaluate the effectiveness of a combination of boiled basil leaves and ginger in reducing primary dysmenorrhea pain intensity Method: This quasi-experimental study used a pretest-posttest control group design. The sample consisted of 30 respondents (15 in the intervention group and 15 in the control group) aged 19–23 years in Junrejo Village, selected via purposive sampling. The intervention group received a combination of basil leaf and ginger decoction, while the control group received a placebo (plain warm water with food coloring). Pain scale was measured using the Numeric Rating Scale (NRS). Data were analyzed using the Wilcoxon and Mann-Whitney tests. Results: In the intervention group, the mean pain scale significantly decreased from 5.20 (moderate pain) to 1.83 (mild pain) post-intervention (p = 0.000, Wilcoxon test). In contrast, the control group showed no significant decrease, with the mean pain scale changing from 5.10 to 4.90 (p = 0.105). The posttest comparison between the two groups using the Mann-Whitney test demonstrated a significant difference (p = 0.000), indicating that the herbal decoction significantly reduces primary dysmenorrhea pain compared to the placebo. Conclusion: The combination of basil leaf and ginger decoction is effective in reducing primary dysmenorrhea pain intensity in young women. This herbal remedy can be considered a safe, economical, and accessible non-pharmacological complementary therapy for independent menstrual pain management.

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1. INTRODUCTION

Adolescence marks a crucial transition with the onset of menarche, which is frequently accompanied by primary dysmenorrhea—lower abdominal pain without pelvic pathology (Iacovides et al., 2015). The global prevalence of dysmenorrhea is remarkably high, exceeding 50% worldwide according to the WHO, and reaching approximately 64.25% among adolescent girls in Indonesia. This pain is triggered by excessive prostaglandin release, causing strong uterine contractions, vasoconstriction, and tissue ischemia (Barcikowska et al., 2020),(Guimarães et al., 2023). Consequently, it severely disrupts daily activities, including learning concentration, physical mobility, and school attendance (Armour et al., 2019),(Negi et al., 2021).

While non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used, long-term consumption raises concerns regarding side effects like gastric irritation pharmaceutical dependency (Daily et al., 2015), (Rad et al., 2018). Thus, interest is shifting toward safe, economical, and accessiblenon-pharmacological complementary therapies using herbal plants with natural analgesic and anti-inflammatory properties.

Basil leaves (*Ocimum basilicum*) Contain flavonoids, saponins, tannins, and eugenol, which inhibit cyclooxygenase (COX) enzymes to reduce prostaglandin production while providing a calming effect (Al-bahrani et al., 2020), (Seddik et al., 2023). Ginger (*Zingiber officinale*) Contains gingerol and shogaol, offering strong thermogenic and anti-inflammatory effects that improve pelvic blood circulation and relax uterine muscles. Combining these two natural ingredients is expected to create a synergistic effect, speeding up pain reduction and offering a safe, independent solution for menstrual pain without chemical side effects (Mao et al., 2019), (Naderi et al., n.d.).

Combining these two natural ingredients is expected to create a synergistic effect, speeding up pain reduction and offering a safe, independent solution for menstrual pain without chemical side effects (Sarli et al., 2026),(Al-bahrani et al., 2020). This study aims to empirically evaluate the effectiveness of a combination of basil leaf and ginger decoction in reducing the intensity of primary dysmenorrhea pain among adolescent girls.

2. METHOD

This study utilized a quasi-experimental design with a pretest-posttest control group approach to evaluate the efficacy of an herbal combination of basil leaves (*Ocimum basilicum*) and ginger (*Zingiber officinale*) against a placebo group.

Participants and Sample Size Justification

The target population comprised young women residing in Junrejo Village. A total sample of 30 participants was selected using a purposive sampling technique, meeting the inclusion criteria:

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aged 19–23 years (categorized as young adults/late adolescents within reproductive health research frameworks), experiencing regular primary dysmenorrhea, and not consuming any pharmacological analgesics within 24 hours prior to the study. Participants were allocated into two groups: the intervention group (n = 15) and the control group (n = 15). The sample size of 30 participants per group was determined based on G*Power analysis for a non-parametric Wilcoxon and Mann-Whitney test with an effect size of 0.5, a significance level (α) of 0.05, and a power (1-β) of 0.80.

Intervention and Placebo Protocol

The intervention group received a standardized formulation of boiled basil leaves and ginger decoction. The preparation consisted of 15 grams of fresh basil leaves (*Ocimum basilicum*) and 10 grams of sliced ginger rhizome (*Zingiber officinale*), boiled in 200 mL of water at 100°C for 15 minutes until the volume reduced to approximately 100 mL. This decoction was administered warm in a single dose on the first day of menstruation when the pain score reached ≥ 3 on the Numeric Rating Scale (NRS). The control group received a placebo consisting of 100 mL of warm water with a matching safe food coloring and a minute drop of ginger extract aroma to ensure blinding, administered under the same timing and conditions.

Instruments and Ethical Considerations

Menstrual pain intensity was measured using the Numeric Rating Scale (NRS-11), ranging from 0 (no pain) to 10 (worst imaginable pain). The validity and reliability of the NRS for subjective pain assessment in Indonesian young women have been widely verified in previous local reproductive health research.

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board / Ethics Committee of Poltekkes Wira Husada Nusantara Malang (Approval Number: 075/KEPK-SM/2026). Written informed consent was voluntarily obtained from all participants prior to data collection.

3. RESULTS AND DISCUSSION

Result

Univariate analysis was used to examine the characteristics of the respondents and to describe the primary dysmenorrhea pain scale before (*pretest*) and after (*posttest*) the administration of the combined basil leaf and ginger decoction. The pain scale was measured using the Numeric Rating Scale (NRS) 0–10.

1. Univariate Analysis

a. Characteristics of Respondents Based on AgeTable 4.1

No	Usia (Tahun)	Frequency (n)
1	19-20 years old	12
2	21-23 years old	18
	Total	30

Based on Table 4.1, it is shown that the majority of the respondents were within the age range of 21–23 years old, accounting for 18 respondents (60.0%).

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b. Dysmenorrhea Pain Scale Before Intervention (*Pretest*) Table

4.2 Distribution of Dysmenorrhea Pain Scale Before Intervention (*Pretest*)

No	Pain Scale	Frequency (n)
1	Mild Pain (1–3)	5
2	Moderate Pain (4–6	21
3	Severe Pain (7–10)	4
Total		30

Based on Table 4.2, it is known that prior to the administration of the combined basil leaf and ginger decoction, the majority of the respondents experienced moderate pain, totaling 21 individuals (70.0%).

c. Dysmenorrhea Pain Scale After Intervention (*Posttest*)

Table 4.3 Distribution of Dysmenorrhea Pain Scale After Intervention (*Posttest*)

No	Pain Scale	Frequency (n)
1	No Pain (0)	8
2	Mild Pain (1–3)	19
3	Moderate Pain (4–6)	3
Total		30

Based on Table 4.3, it is known that following the intervention, the majority of the respondents experienced a reduction in pain to the mild pain scale category, totaling 19 individuals (63.3%), and no respondents remained in severe pain.

2. Bivariate Analysis (Hypothesis Testing)

Bivariate analysis was conducted to determine the relationship or effectiveness of variable X (the combined basil leaf and ginger decoction) on variable Y (the reduction of primary dysmenorrhea pain). Since the pain scale data is ordinal and not normally distributed, the non-parametric Wilcoxon Signed Rank Test was utilized. Tabel 4.4 Wilcoxon Test Results of the Dysmenorrhea Pain Scale Before and After Intervention

Group	Pre test	Post test	Wilcoxon P-value	Mann-Whit Ney (P-value)	P-Value
Intervention (n=15)	5,20	1,83	0.000	0.000	0,000
Control (n=15)	5.10	4.90	0.105		

Based on Table 4.4, the intervention group showed a significant decrease in the mean pain score from 5.20 (Moderate Pain) to 1.83 (Mild Pain) with a p-value = 0.000 proving a significant reduction in pain after the administration of the herbal decoction. Conversely, the control group receiving the placebo showed no statistically significant change, with the mean pain score shifting slightly from 5.10 to 4.90 (p-value = 0.105).

Furthermore, the inter-group analysis using the Mann-Whitney U test on the posttest scores yielded a p-value = 0.000. This statistical evidence demonstrates a significant difference in post-intervention pain reduction between the intervention group and the control group, confirming the effectiveness of the combined basil leaf and ginger decoction compared to a placebo.

Discussion

The high baseline intensity of primari dysmenorrhea observed during the pretest (70.0% moderate pain) closely aligns with global data positioning dysmenorrhea as a premier reproductive health issue among late adolescents, driven by the hyperproduction of endometrial prostaglandins (PHF2α and PGE2) following progesterone withdrawal (Iacovides et al., 2015), (Armour et al., 2019). This prostaglandin accumulation stimulates excessive, dysrhythmic myometrial contractions, culminating in severe uterine

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vasoconstriction and transient tissue ischemia (Barcikowska et al., 2020). This ischemic state directly activates pelvic nociceptors, causing intense lower abdominal cramps that regularly impair learning concentration and drive academic absenteeism among young girls (Armour et al., 2019),(Negi et al., 2021).

The statistically significant reduction of pain scores post-intervention (p =0.000) underscores the robust pharmacological efficacy of the bioactive compounds in ginger (*Zingiber officinale*), specifically (6)-gingerol and shogaols. These constituents act as potent anti-inflammatory agents by selectively inhibiting the cyclooxygenase (COX-1 and COX-2) and lipoxygenase pathways, which directly downregulates the synthesis of inflammatory prostaglandins (Mao et al., 2019),(Daily et al., 2015). Furthermore, the intrinsic thermogenic properties of ginger's (Guimarães et al., 2023).volatile oils deliver a warming effect that induces pelvic vasodilation, thereby effectively restoring local perfusion, alleviating the painful uterine ischemia, and rapidly dropping the respondents' mean pain scale from 5.20 to 1.83 (Rad et al., 2018).

This therapeutic response is optimized by the complementary smooth-muscle-relaxing and neurological mechanisms of basil leaves (*Ocimum basilicum*), which contain high concentrations of eugenol and flavonoids. Eugenol operates as a natural peripheral analgesic by blocking voltage-gated sodium channels in sensory nerve fibers, thereby inhibiting the transmission of pain signals from the uterus to the central nervous system (Seddik et al., 2023). while the flavonoids exert a potent spasmolytic effect that relaxes hyperactive myometrial tissues to minimize mechanical intra-uterine pressure (Al-bahrani et al., 2020). Integrating these two botanical remedies creates a synergistic "dual-attack formulation"—where ginger targets the biochemical cascade and basil resolves the mechanical and neurological aspects—matching the efficacy of synthetic NSAIDs like ibuprofen without the risks of gastric mucosal irritation, making this economical decoction highly recommended for autonomous adolescent self-care (Sarli et al., 2026), (Rad et al., 2018).

4. CONCLUSION

Based on the results and discussion of this study, it can be concluded that the combination of basil leaf (*Ocimum basilicum*) and ginger (*Zingiber officinale*) decoction is highly effective in reducing the intensity of primary dysmenorrhea pain among adolescent girls. The intervention successfully lowered the respondents' mean pain scale from a moderate baseline score of 5.20 down to a mild posttest score of 1.83, with a highly significant statistical value (p=0,000)

This therapeutic success is driven by the synergistic "dual-attack" mechanism of the two herbs: the gingerols and shogaols in ginger suppress the biochemical inflammatory cascade by blocking prostaglandin synthesis, while the eugenol and flavonoids in basil alleviate the mechanical and neurological aspects by relaxing uterine muscle spasms and inhibiting pain signal transmissions.

Therefore, this herbal decoction can be highly recommended as a safe, non-toxic, economical, and accessible non-pharmacological complementary therapy. It serves as an excellent autonomous self-care alternative for adolescent girls to independently manage menstrual pain, thereby reducing reliance on synthetic painkillers and minimizing the long-term risks of pharmaceutical side effects.

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