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# The Effect of Young Green Coconut *(Cocos nucifera L. var. viridis)* Water on Dysmenorrhea in Adolescent Girls

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**ORIGINAL ARTICLES**

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## ABSTRACT

Dysmenorrhea, or menstrual pain, is a prevalent condition among adolescent girls. Various strategies have been employed to alleviate dysmenorrhea, one of which is the consumption of young coconut water, which is known for its rich electrolyte and mineral content. This study aimed to examine the effect of young coconut water consumption on the intensity of menstrual pain among adolescent girls. A pre-post experimental study design with a one-group pre-test–post-test approach was employed. The study was conducted at SMPN 39 Padang, a junior high school located in West Sumatra, Indonesia, and involved 189 female students from grades VII, VIII, and IX. A purposive sample of 12 students who reported experiencing dysmenorrhea was selected for the intervention. Participants were instructed to consume young coconut water for three consecutive days during menstruation. The intensity of menstrual pain was assessed using the Numeric Rating Scale (NRS) before and after the intervention. Data analysis was conducted using paired t-tests. Univariate analysis demonstrated a reduction in mean pain scores from 4.00 ± 1.35 (indicating moderate pain) to 1.58 ± 0.67 (indicating mild pain). The paired t-test revealed a statistically significant decrease in menstrual pain intensity following the intervention (p-value = 0.000, $p < 0.05$). In conclusion, the consumption of young coconut water was found to be effective in reducing the intensity of dysmenorrhea among adolescent girls. It may serve as a safe, natural, and accessible complementary approach for managing dysmenorrhea in adolescents.

## Key Messages:

- Young coconut water significantly reduces menstrual pain intensity in adolescent girls, offering a safe and accessible natural alternative for managing dysmenorrhea.

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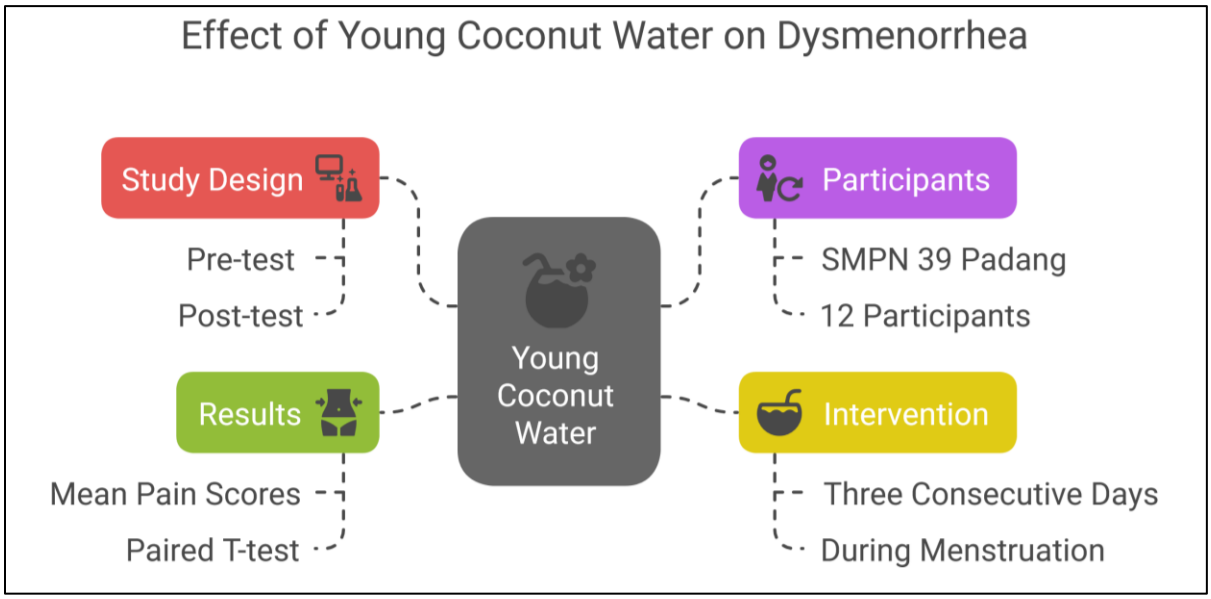
## GRAPHICAL ABSTRACT




## INTRODUCTION

Adolescence is a critical transitional phase between childhood and adulthood, characterized by rapid physical growth, the development of secondary sexual characteristics, the attainment of reproductive maturity, and significant cognitive and psychological changes (1). This stage represents a multidimensional process of growth and development toward mental, emotional, social, and physical maturity. Puberty is a developmental milestone marked by the maturation of sexual organs and the ability to reproduce, with menstruation serving as a key indicator of reproductive capability (2).

One common health complaint among adolescent girls during menstruation is dysmenorrhea, defined as pain associated with menstruation that can interfere with daily activities. The World Health Organization in 2020 reported that approximately 1,769,425 cases (90%) of women experience menstrual pain, with 10–16% experiencing mild dysmenorrhea. Global studies have shown that the prevalence of primary dysmenorrhea exceeds 50% in many countries, with rates reported at 59.7% in the United States and 72% in Sweden (3). In Indonesia, the prevalence of dysmenorrhea was recorded at 64.25%, comprising 54.89% primary and 9.36% secondary dysmenorrhea cases. Among adolescent girls, 60–75% are affected by primary dysmenorrhea, and approximately 7–15% report school absenteeism due to the condition (4). In West Sumatra, the incidence of dysmenorrhea reaches 57.3%, with 9% of adolescents reporting severe pain, 39% moderate pain, and 52% mild pain. This has led to school absenteeism among 12% of affected students (5). Dysmenorrhea causes significant discomfort and is sometimes dismissed as an unavoidable aspect of femininity or as a psychological issue (6).

The management of dysmenorrhea typically involves pharmacological and non-pharmacological approaches. Pharmacological methods commonly used include nonsteroidal anti-inflammatory drugs (NSAIDs), such as mefenamic acid and ibuprofen, are the first-line pharmacological treatment. They exert analgesic effects by inhibiting prostaglandin synthesis, thereby reducing uterine contractions and menstrual blood flow (7). Hormonal therapies, including combined oral contraceptive pills and progestins like medroxyprogesterone acetate or dydrogesterone, are also effective in managing dysmenorrhea and regulating menstrual cycles. Combined oral contraceptives work by preventing ovulation and reducing the growth of the endometrial tissue, which in turn decreases menstrual blood volume, prostaglandin secretion, and uterine cramps (8). Progestins can be used to treat dysmenorrhea, such as medroxyprogesterone acetate (MPA) 5 mg or dydrogesterone 2×10 mg, taken from day 5 to 25 of the menstrual cycle (9).

Non-pharmacological strategies are increasingly explored due to their accessibility, minimal side effects, and acceptability among adolescents. Common methods include warm compresses, physical



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exercise, guided imagery, massage therapy, and dietary modifications (10). Nutritional interventions, in particular, have garnered interest as alternative therapies that may offer both pain relief and general health benefits. Among natural remedies, young coconut water—also referred to as unripened coconut water, has attracted attention due to its rich content of electrolytes, vitamins, and minerals. It contains bioactive compounds, including anti-inflammatory agents, vitamin C, iron, phosphorus, and naturally occurring sugars such as glucose, fructose, and sucrose (11). Analytical studies have shown that young coconut water contains approximately 14.11 mg/100 ml of calcium, 9.11 mg/100 ml of magnesium, and 8.59 mg/100 ml of vitamin C (12). These nutrients are believed to play a role in neuromuscular regulation and inflammatory modulation, potentially alleviating uterine muscle spasms and menstrual pain.

The rationale for focusing on young coconut water in this study lies in its unique composition, natural origin, widespread availability, and appeal to adolescents. Its low cost and minimal side effects position it as a promising functional beverage for managing dysmenorrhea in school-aged populations. Despite its potential, young coconut water is not commonly utilized among adolescents experiencing dysmenorrhea. Preliminary interviews with students indicated that they had never consumed young coconut water during menstruation, suggesting a lack of awareness or availability of alternative remedies. Given the impact of dysmenorrhea on school attendance and academic performance, exploring accessible and natural interventions is crucial.

Therefore, this study aims to examine the effect of young coconut water consumption on the intensity of dysmenorrhea among adolescent girls at Junior High School of SMPN 39 Padang.

## METHODS

This study employed a pre-post experimental design with a one-group pre-test–post-test approach. The research was conducted between November 2024 and March 2025 at SMPN 39 Padang, a junior high school in West Sumatra, Indonesia. The study population comprised 189 female students from grades VII, VIII, and IX. Participants were selected using purposive sampling, targeting adolescent girls who experienced menstrual pain. A total of 12 respondents were recruited, including a 10% reserve sample, based on the following calculation:

$$N=n/((1-f) )$$

Note= N: the adjusted sample size
n: the initial sample size
f: the estimated dropout rate (assumed to be 10%, or f=0.1)

Eligibility for participation was determined by specific inclusion and exclusion criteria. The inclusion criteria were: willingness to participate, experiencing menstrual pain on the first day of menstruation, agreement to refrain from using any pain relief therapy or medication other than that provided by the researcher during the intervention period, being aged between 13 and 15 years, a mean Body Mass Index (BMI) of 20.1 ± 2.2 kg/$m^2$, and commitment to complete the study. Exclusion criteria included the presence of systemic hormonal disorders or a diagnosis of gastritis. Dropout criteria were defined as participants who initially agreed to participate but later withdrew from the intervention involving young coconut water consumption or those who failed to adhere to the study procedures.

The intervention consisted of administering young coconut water (Cocos nucifera L. var. viridis), consumed once daily after breakfast in a volume of 250 mL for the first two days of menstruation. Coconut water was provided at 10:00 a.m. each morning, based on evidence suggesting its effectiveness in maintaining hydration and electrolyte balance at this time. Young coconut water is a natural source of potassium, which contributes to optimizing metabolism and maintaining regular heart rhythm.

Pain intensity was measured using a questionnaire and an observation sheet based on the Numeric Rating Scale (NRS) (Figure 1). The NRS categorizes pain as follows: a score of 0 represents no pain; 1 indicates barely noticeable pain (very mild, like a mosquito bite); 2 reflects mild, unpleasant pain (like a light pinch); 3 signifies tolerable pain (similar to that from an injection or punch); 4 indicates distressing pain (deep and strong, like a bee sting); 5 describes very distressing pain (sharp and deep, similar to a sprain); 6 corresponds to intense pain that disrupts concentration; 7 indicates very intense pain that dominates sensory perception and impairs self-care; 8 represents utterly horrible pain that compromises


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cognitive clarity; 9 signifies excruciating, unbearable pain prompting urgent demands for relief; and 10 indicates unimaginable, unspeakable pain typically associated with severe trauma.

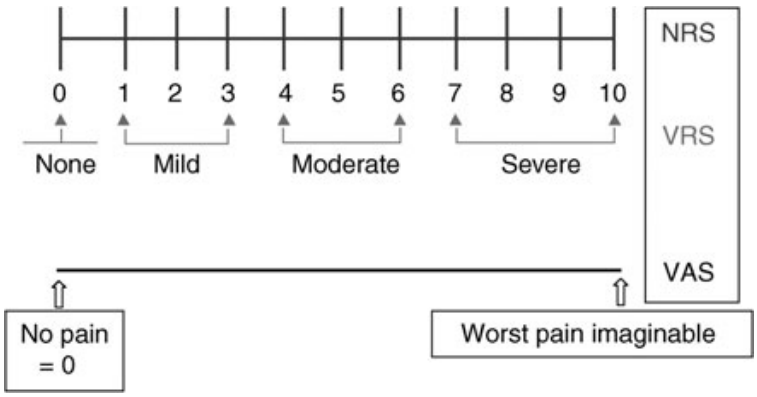


**Figure 1. Numeric rating scale (nrs) with verbal rating scale (VRS) and visual analog scale (VAS) (13).**

The pre-test was conducted 5–10 minutes before the intervention, during which the researcher selected respondents who were experiencing the first or second day of menstruation. The post-test was administered following the two-day intervention, by reassessing pain intensity using the NRS observation sheet. Throughout the intervention period, respondents were prohibited from consuming any analgesic medications to ensure the validity of the intervention's effect.

Univariate analysis was performed to describe pain intensity before and after the intervention, using descriptive statistics including mean, standard deviation (SD), minimum, and maximum values. Bivariate analysis was conducted using a paired t-test at a 95% confidence level ($\alpha = 0.05$) to evaluate the statistical significance of differences in pain scores. Prior to performing the t-test, the Shapiro–Wilk test was conducted to verify data normality.

This study was approved by the Health Research Ethics Committee of the Faculty of Public Health, Universitas Andalas (Approval No: 022/KEPK/FKM-UA/II/2025). Written informed consent was obtained from all participants and their guardians prior to data collection.

## RESULTS

Table 1 shows a comparison of menstrual pain intensity before and after the young coconut water intervention. Before the intervention, the average pain score was 4.00 ± 1.35, with a minimum score of 2 and a maximum score of 6. This suggests that most participants experienced mild to moderately severe menstrual pain during the first days of menstruation. After consuming young coconut water for two consecutive days, the average pain score dropped significantly to 1.58 ± 1.38, with scores ranging from 0 (no pain) to 4 (mild pain).

**Table 1. Comparison of Menstrual Pain Intensity Before and After Young Coconut Water Intervention**

| | Mean | SD | Min | max |
|---|---|---|---|---|
| Before | 4.00 | 1.35 | 2 | 6 |
| After | 1.58 | 1.38 | 0 | 4 |

Table 2 presents a summary of the changes in menstrual pain intensity before and after the intervention with young coconut water. Initially, most participants reported experiencing moderate to severe pain, with only a few experiencing mild symptoms. The baseline mean pain score was 4.00, indicating a moderate level of dysmenorrhea among the participants. After consuming young coconut water for two consecutive days, there was a significant shift in pain intensity: the majority of participants reported only mild pain, and no severe pain cases were observed. The mean pain score significantly decreased to 1.58.



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Statistical analysis using a paired t-test confirmed a significant reduction in pain intensity following the intervention ($p < 0.05$). This improvement underscores the potential of young coconut water as a natural dietary intervention for managing menstrual pain.

**Table 2. Changes in Menstrual Pain Intensity Before and After Young Coconut Water Intervention.**

| Menstrual Pain Intensity | | n | Mean | *p-value* |
|---|---|---|---|---|
| Before the intervention of young coconut | Mild Pain | 2 | 4.00 | **0,00** |
| | Moderate Pain | 6 | | |
| | Severe Pain | 4 | | |
| After the intervention of young coconut | Mild Pain | 9 | 1.58 | |
| | Moderate Pain | 3 | | |
| | Severe Pain | 0 | | |

Note: A significant difference was observed at $\alpha = 0.05$, based on the results of the paired t-test

## DISCUSSION

The present study found that prior to the administration of young coconut water, half of the respondents (50%) experienced moderate dysmenorrhea. Dysmenorrhea, characterized by menstrual pain ranging from mild discomfort to intense cramping, is a prevalent condition among women of reproductive age and can significantly interfere with daily activities. These findings are consistent with the study by Jeong D (2023) (14), who similarly reported moderate levels of dysmenorrhea among adolescents before intervention, suggesting a comparable baseline condition.

From a physiological standpoint, dysmenorrhea primarily results from uterine muscle contractions stimulated by increased prostaglandin production during menstruation. Elevated prostaglandin levels intensify the strength and frequency of uterine contractions, leading to pain (15). However, the experience of dysmenorrhea is not solely determined by biological mechanisms. Psychological factors such as emotional stress, poor emotional regulation, and the availability of social support are also crucial in modulating pain perception. Elevated cortisol levels due to stress can heighten pain sensitivity, while strong social support networks can mitigate perceived pain (16).

In addition to psychological influences, environmental and lifestyle factors also play significant roles. Dietary habits, particularly high intake of caffeine, saturated fats, and sugars, have been associated with increased systemic inflammation, potentially exacerbating menstrual pain (17). Observation data from this study revealed that among the participants, two reported mild pain, six reported moderate pain, and four experienced severe pain. Furthermore, a familial pattern of dysmenorrhea was observed, with many participants sharing similar menstrual histories with their mothers. Frequent consumption of nutritionally poor fast foods was also common among the respondents. These findings highlight the multifactorial nature of dysmenorrhea, encompassing physiological, psychological, social, and environmental domains. The impact of dysmenorrhea on adolescents' academic activities was evident, as those experiencing more severe pain were more likely to miss classes or seek permission to leave lessons.

Following the administration of young coconut water, a substantial reduction in dysmenorrhea severity was observed. Post-intervention data showed that 75% of the respondents reported only mild dysmenorrhea, indicating a marked improvement. This result is consistent with previous studies by Hajiansyah A (2024) (18), which also reported significant reductions in dysmenorrhea severity following young coconut water consumption.

The beneficial effects of young coconut water can be attributed to its high electrolyte content, particularly potassium and magnesium, which are essential for muscle relaxation, hydration maintenance, and reduction of muscle cramps (19). Adequate hydration is critical during menstruation, as it helps reduce uterine muscle contractions and promotes better circulation, thereby alleviating pain and improving overall comfort.

Statistical analysis further confirmed the effectiveness of the intervention. A paired t-test revealed a p-value of 0.000, which is well below the significance threshold of 0.05, indicating a statistically significant reduction in dysmenorrhea following young coconut water consumption. This shift from



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predominantly moderate pain before the intervention to predominantly mild pain afterward underscores the therapeutic potential of this natural remedy. These findings are supported by Widowati R (2021) (20), who also demonstrated significant improvements in dysmenorrhea among adolescents through young coconut water interventions.

These findings suggest that young coconut water appears to be an effective, accessible, and natural complementary therapy for the management of dysmenorrhea in adolescents. By addressing hydration and electrolyte balance, it offers a non-pharmacological option that can significantly alleviate menstrual pain and improve quality of life during menstruation.

However, this study is not without limitations. The absence of a control group makes it difficult to attribute the reduction in pain exclusively to the intervention. The relatively small sample size and focus on students from a single institution also limit the generalizability of the findings. Moreover, reliance on self-reported pain intensity introduces potential bias, and the short intervention period may not fully capture variations in menstrual experiences across multiple cycles. To strengthen the evidence base, future studies should employ randomized controlled trial designs with larger and more diverse populations, extend the intervention across several menstrual cycles, and incorporate objective assessments of hydration and electrolyte status.

## CONCLUSION

This study demonstrated that young coconut water is an effective, accessible, and natural complementary therapy for managing adolescent dysmenorrhea. Before the intervention, half of the respondents experienced moderate dysmenorrhea, reflecting the significant burden of menstrual pain on daily functioning. The administration of young coconut water substantially reduced pain intensity, with 75% of participants reporting only mild dysmenorrhea post-intervention. Statistical analysis further confirmed the significant effect of young coconut water on dysmenorrhea reduction, which confirms that young coconut water positively improves dysmenorrhea in adolescent girls. Particularly adolescents, educators, healthcare providers, and parents, are encouraged to consider natural and accessible options, such as young coconut water, as part of a holistic approach to managing dysmenorrhea. Promoting healthy hydration habits, balanced nutrition, and stress management techniques may reduce menstrual discomfort and improve adolescents' quality of life.

## CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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