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The Effect of Hatha Yoga on Dysmenorrhea Intensity among Adolescent Girls: A Pilot Study

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Abstract

Background: Dysmenorrhea is one of the most common reproductive health problems among adolescent girls, characterized by lower abdominal pain or cramping during menstruation, often accompanied by symptoms such as nausea, dizziness, and fatigue. This condition can significantly impact adolescents' quality of life by impairing academic concentration, disrupting sleep patterns, limiting daily activities, and increasing school absenteeism. **Aims:** To determine the effect of Hatha Yoga on the intensity of primary dysmenorrhea among adolescent girls. **Methods:** A pilot study using a one-group pretest–posttest design was conducted involving 30 eighth-grade female students selected through purposive sampling. Dysmenorrhea intensity was assessed using the Numeric Rating Scale (NRS). Participants received a structured Hatha Yoga intervention consisting of 12 sessions over six weeks, with two sessions per week. Data were analyzed using the Wilcoxon Signed-Ranks Test. **Results:** The analysis showed a statistically significant reduction in dysmenorrhea intensity following the intervention ($Z = -2.828$; $p = 0.005$). **Conclusions:** Hatha Yoga was associated with a significant reduction in dysmenorrhea intensity; however, the absence of a control group limits causal inference.

Keywords: adolescent girls; dysmenorrhea; hatha yoga; numeric rating scale; pain management

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Introduction

Dysmenorrhea is one of the most prevalent reproductive health problems among adolescent girls, characterized by pain or cramping in the lower abdomen during menstruation, accompanied by nausea, dizziness, and fatigue (Juniar, 2015). The World Health Organization (WHO) reported in 2022 that approximately 50% of women worldwide experience severe dysmenorrhea, with the highest prevalence observed in the 17–24 age group, reaching 67–90%. In Indonesia, the Central Statistics Agency (Badan Pusat Statistik) recorded a prevalence of dysmenorrhea of 64.25% in 2022, comprising 54.88% primary dysmenorrhea and 9.36% secondary dysmenorrhea. This condition significantly affects adolescents' quality of life, including reduced academic concentration, sleep disturbances, decreased appetite, and impaired social interaction, and it causes 8–10% of adolescent girls to miss school (Kemenkes RI, 2023).

Pathophysiologically, primary dysmenorrhea is caused by increased production of prostaglandin F2α in the endometrium, which triggers excessive uterine contractions and vascular vasoconstriction, resulting in ischemia and pain (Itani et al., 2022; Munro et al., 2021). In addition to physiological factors, emotional stress is known to exacerbate pain perception through elevated cortisol and adrenaline levels that disrupt reproductive hormone balance. Although pharmacological treatments such as NSAIDs and hormonal contraceptives have proven effective, their long-term use is associated with various adverse effects, prompting exploration of safer non-pharmacological approaches that can be independently applied.

Hatha Yoga, as a non-pharmacological intervention, has received growing attention in the management of primary dysmenorrhea. Through the combination of asanas (physical postures), pranayama (breathing techniques), and relaxation, Hatha Yoga improves blood circulation to the pelvic region, relaxes muscles experiencing spasms, and stimulates the release of endorphins, which act as natural analgesics. Pranayama specifically activates the parasympathetic nervous system, reduces cortisol levels, and induces a relaxation response that diminishes pain perception (Saraf & Rawat, 2024). Several studies have demonstrated that regular Hatha Yoga intervention can improve the quality of life of young women with primary dysmenorrhea, reduce analgesic requirements, and enhance overall physical and mental health (Kim et al., 2019; Kanchibhotla et al., 2021; McGovern et al., 2018). However, scientific evidence regarding its effectiveness among junior high school-aged adolescent girls in Indonesia remains considerably limited.

Based on preliminary interviews conducted at SMP Negeri 1 Semanding Tuban, a number of female students who visited the school health unit (UKS) frequently reported lower abdominal pain during menstruation, particularly on the first and second days, accompanied by dizziness and nausea, preventing them from participating optimally in learning activities, with some needing to leave school early or be absent altogether. This situation underscores the need for an effective, safe, and easily applicable intervention within the school setting.

This study employs a pilot study using a one-group pretest–posttest design to evaluate the effect of Hatha Yoga on dysmenorrhea intensity, as measured by the Numeric Rating Scale (NRS). The intervention consisted of 12 sessions over six weeks, conducted twice per week, commencing one week prior to the menstrual period. The aim of this study is to demonstrate the effectiveness of Hatha Yoga as a non-pharmacological intervention for reducing the intensity of primary dysmenorrhea among adolescent girls, thereby providing a practical, school-based recommendation grounded in Katherine Kolcaba's Comfort Theory.

Methods

This study employed a pilot study using a one-group pretest–posttest design, in which the study group was observed before (pre-test) and after (post-test) the intervention, without a comparison control group (Munir et al., 2022). The study population comprised all eighth-grade female students at

SMP Negeri 1 Semanding Tuban who experienced dysmenorrhea, totaling 32 students. A sample of 30 respondents was determined using the Slovin formula with a 5% significance level and selected through purposive sampling. Inclusion criteria included students experiencing primary dysmenorrhea with mild-to-moderate pain who were willing to participate, while exclusion criteria encompassed students with injuries or movement limitations, chronic illness history, and absence from all intervention sessions.

Two instruments were used in this study. First, a Hatha Yoga Standard Operating Procedure (SOP) adapted from Lestari (2023), comprising eight asana-based therapeutic movements integrated with pranayama and relaxation techniques. Second, Pain intensity was measured using a single-item 0–10 Numeric Rating Scale, categorized as mild (1–3), moderate (4–6), and severe (7–10) (Carmelia, 2022). The NRS is a widely validated pain assessment tool with established validity and reliability in clinical practice (Potter & Perry, 2005).

Data collection was conducted in November 2025 at SMP Negeri 1 Semanding, Tuban, in three stages. The first stage was the pre-test, conducted on days 1–5 of the first menstrual period to measure baseline pain levels. The second stage was the Hatha Yoga intervention, delivered over 6 weeks (12 sessions), conducted twice per week for 15 minutes per session in groups of 5 respondents, facilitated by an experienced yoga instructor who ensured the correct and safe execution of each movement. The third stage was the post-test, conducted after respondents experienced the subsequent menstrual cycle using the same instrument. All sessions were standardized according to the established SOP. Menstrual cycle monitoring and attendance were consistently tracked via a communication group. This study received ethical approval from the Health Research Ethics Committee of IIKNU Tuban (Approval No. 222/0084223523/LEPK.IIKNU/IX/2025) with the implementation of the principles of informed consent, anonymity, confidentiality, and self-determination for all respondents.

Data were analyzed using SPSS version 23 through the stages of editing, coding, scoring, and tabulating. Descriptive analysis was used to describe respondent characteristics and the distribution of dysmenorrhea levels before and after the intervention. Statistical test selection was based on the normality test results: if the data were normally distributed, a paired t-test was used; if not, the Wilcoxon Signed-Rank Test was used as a nonparametric test for two paired ordinal-scale samples (Munir et al., 2022). The research hypothesis was accepted if the p-value was ≤ 0.05, indicating a significant effect of Hatha Yoga on reducing the intensity of dysmenorrhea.

Results

This study involved 30 eighth-grade female students experiencing primary dysmenorrhea. Regarding respondent characteristics, the majority were aged 14 years (n = 23; 76.7%), followed by 13 years (n = 4; 13.3%), and 15 years (n = 3; 10.0%). Regarding menstrual duration, most respondents menstruated for 6–7 days (n = 20; 66.7%), followed by 8–14 days (n = 7; 23.3%) and 3–5 days (n = 3; 10.0%). Prior to the Hatha Yoga intervention, the majority of respondents experienced moderate pain (n = 24; 80.0%), while six respondents (20.0%) experienced mild pain, and none experienced severe pain. Following the 12-session Hatha Yoga intervention over six weeks, a notable shift in pain distribution was observed: respondents with mild pain increased to 14 (46.7%), while those with moderate pain decreased to 16 (53.3%), and no respondents experienced severe pain. The distribution of dysmenorrhea levels before and after the intervention is presented in Table 1

Table 1. Characteristics of respondents

Characteristis	Category	Frekuency	Persentage (%)
Age	13 years old	4	13,3
	14 years old	23	76,7
	15 years old	3	10,0
Menstrual durations	3-5 days	3	10,0

	6-7 days	20	66,7
	8-14 days	7	23.3
	≥15 days	0	0,0
Dysmenorrhea level (pre-test)	Mild	6	20,0
	Moderate	24	80,0
	Severe	0	0,0
Dysmenorrhea level (post-test)	Mild	14	46,7
	Moderate	16	53,3
	Severe	0	0,0

Table 2 shows changes in dysmenorrhea severity before and after the Hatha yoga intervention among 30 adolescent girls. Before the intervention, 80.0% of participants experienced moderate dysmenorrhea and 20.0% experienced mild dysmenorrhea. After the intervention, the proportion of mild dysmenorrhea increased from 20.0% to 46.7%, while the proportion of moderate dysmenorrhea decreased from 80.0% to 53.3%. No cases of severe dysmenorrhea were observed at either assessment. The Wilcoxon Signed-Rank Test showed a statistically significant difference between the pre-test and post-test ($Z = -2.828$, $p = 0.005$), indicating that Hatha yoga significantly reduced the severity of dysmenorrhea.

Table 2. Cross-tabulation of pre-test and post-test Hatha Yoga

Assessment	Mild, n (%)	Moderate, n (%)	Severe, n (%)	Statistical analysis
Pre-test	6 (20.0)	24 (80.0)	0 (0.0)	
Post-test	14 (46.7)	16 (53.3)	0 (0.0)	Z = −2.828; p = 0.005
Total	**30 (100.0)**	**30 (100.0)**	**0 (0.0)**	

Discussion

The findings of this study showed that prior to the Hatha Yoga intervention, the majority of respondents experienced moderate dysmenorrhea (80.0%), while a smaller proportion reported mild pain (20.0%), and none experienced severe pain. This is consistent with the findings of Mulyani et al. (2021), who reported that most adolescent girls experienced moderate dysmenorrhea before any intervention, with mean pain intensity scores ranging between four and six on the scale. The high proportion of moderate pain among respondents is closely related to age characteristics, as nearly all respondents were 14 years old, a stage classified as early adolescence. During this developmental phase, the reproductive system and hormonal balance remain unstable, leading to excessive prostaglandin production in the endometrium and stronger uterine contractions (Goss, 2023). Menstrual duration also contributed, as most respondents menstruated for six to seven days, prolonging prostaglandin production and extending uterine contractions, thereby intensifying pain (Bernardi et al., 2017). This was further compounded by limited knowledge of non-pharmacological dysmenorrhea management, causing most respondents to simply wait for pain to subside without appropriate intervention.

After six weeks of Hatha Yoga intervention totaling twelve sessions, a meaningful shift in pain distribution was observed. Respondents with moderate pain decreased from 24 to 16, while those with mild pain increased from 6 to 14 — indicating that 8 respondents transitioned from the moderate to the mild category after the intervention. Statistical testing confirmed a significant effect of Hatha Yoga on reducing dysmenorrhea intensity, with a significance value below the established threshold. These findings are consistent with Fathoni et al. (2024), who reported reduced dysmenorrhea intensity in nearly all respondents following Hatha Yoga, and with Dhesinta Suryandari et al. (2022), who found that more than ninety percent of respondents experienced a reduction in dysmenorrhea following

regular Hatha Yoga practice. Physiologically, the reduction in pain intensity can be explained by Hatha Yoga's mechanisms, which involve stretching movements of the pelvic and abdominal muscles, pranayama breathing techniques, and deep relaxation. Asana movements enhance blood circulation to the reproductive area and relax uterine muscle spasms, while pranayama activates the parasympathetic nervous system to reduce the stress response and cortisol levels and stimulates endorphin release as the body's natural analgesic (Saraf & Rawat, 2024). These findings also align with Katherine Kolcaba's Comfort Theory, which posits that therapeutic nursing interventions can enhance physical and psychological comfort by fostering relief, ease, and transcendence states, thereby reducing pain perception.

Despite the overall positive trend, some respondents did not experience a change in pain category after the intervention and remained in the moderate range. This diverges from the more uniform pain reduction reported in several previous studies. This variation is likely attributable to differences in respondent consistency and adherence during training sessions. Some respondents appeared less focused, frequently paused mid-session, or did not execute movements according to instructions, reducing the therapeutic efficacy of the intervention. Fatmawati, Suprayitna, and Prihatin (2020) corroborated this finding, emphasizing that adherence to and proper understanding of Hatha Yoga techniques are key determinants of reductions in dysmenorrhea intensity. Additionally, the school-based implementation environment, including potential ambient noise disturbances and the relatively short attention span characteristic of early adolescence, contributed to the observed variability in outcomes.

These findings indicate that Hatha Yoga has the potential to serve as a safe, effective, and self-applicable non-pharmacological intervention for managing primary dysmenorrhea among school-aged adolescent girls, while also enriching evidence-based community nursing practice in the field of adolescent reproductive health. This study has several limitations. First, the single-group design without a control group prevents the full exclusion of the influence of factors outside the intervention on changes in pain level. Second, school-based implementation introduces potential external disturbances that may affect respondent concentration during sessions. Third, respondent consistency and adherence in performing all Hatha Yoga movements varied across individuals, making the intervention dose received not entirely uniform. Future studies should address these limitations by employing more robust designs, such as randomized controlled trials, extending intervention duration, and incorporating more structured adherence monitoring to obtain stronger scientific evidence on the effectiveness of Hatha Yoga in managing primary dysmenorrhea among adolescent girls.

Conclusion

This study demonstrates that the Hatha Yoga intervention significantly reduces dysmenorrhea intensity among adolescent girls. Prior to the intervention, the majority of respondents experienced moderate dysmenorrhea. After completing 12 Hatha Yoga sessions over 6 weeks, a notable decrease in pain intensity was observed, with an increase in the proportion of respondents categorized as having mild pain, although a portion remained in the moderate category. This study suggests that Hatha Yoga may help reduce dysmenorrhea intensity among adolescent girls; however, controlled trials are required to confirm its effectiveness.

These findings have practical implications: Hatha Yoga can be integrated into school-based adolescent reproductive health programs, particularly through the School Health Unit (UKS), as a promotive and preventive approach to managing primary dysmenorrhea. For future research, it is recommended to employ a study design with a control group to strengthen the causal relationship between the Hatha Yoga intervention and the reduction in dysmenorrhea intensity, while also considering extended intervention duration and frequency, along with more structured adherence monitoring, to optimize therapeutic effectiveness.

Conflicts of Interest

The authors declare no conflicts of interest in this study. All authors have completed the ICMJE uniform disclosure form and report no financial relationships with any organizations that might have an interest in the submitted work.

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Author's Contribution

IRN contributed to the study's conception and design, data acquisition, and data analysis, wrote the first draft of the manuscript, revised the final draft, and gave final approval of the version to be published. MUF contributed to the study design, data analysis, and critical revision of the manuscript. KF contributed to data collection, analysis, and manuscript revision.

Data Availability Statement

The dataset generated during and analyzed during the current study is available from the corresponding author upon reasonable request.

Declaration of Use of AI in Academic Writing

The author used ChatGPT/Gemini in the writing process to improve readability and remove grammatical errors. However, he took full responsibility for the content.

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