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THE IMPACT OF YOGA ON PAIN INTENSITY IN ADOLESCENTS WITH PRIMARY DYSMENORRHEA

Oktaviana Manda Putri[1], Siti Suciati[2]

[1,2]Diploma (D3) Midwifery Study Program, STIKES Hutama Abdi Husada, Tulungagung, East Java, Indonesia
Email correspondence : oktavianamanda@gmail.com

ABSTRAK: PENGARUH YOGA TERHADAP INTENSITAS NYERI DISMENORE PRIMER PADA REMAJA

Latar Belakang: Dismenore primer merupakan keluhan yang sering dialami oleh remaja dan dapat mengganggu aktivitas sehari-hari, konsentrasi belajar, serta kualitas hidup. Penanganan dismenore primer umumnya menggunakan terapi farmakologis, namun penggunaan jangka panjang berisiko menimbulkan efek samping. Oleh karena itu, diperlukan alternatif terapi non-farmakologis yang aman dan mudah diterapkan, salah satunya adalah yoga.

Tujuan: Penelitian ini bertujuan untuk mengetahui pengaruh yoga sebagai terapi non-farmakologis terhadap intensitas nyeri dismenore primer pada remaja.

Metode: Penelitian ini menggunakan desain quasi-eksperimen dengan pendekatan pretest–posttest with control group. Jumlah responden sebanyak 22 orang yang dibagi menjadi kelompok intervensi (11 orang) dan kelompok kontrol (11 orang). Intervensi yoga diberikan satu kali per minggu selama dua bulan. Intensitas nyeri diukur menggunakan *Numeric Rating Scale* sebelum dan sesudah intervensi. Penelitian dilaksanakan pada bulan Agustus–Oktober 2025.

Hasil: Hasil analisis menunjukkan adanya penurunan intensitas nyeri dismenore primer yang signifikan pada kelompok intervensi setelah diberikan yoga dengan nilai p = 0,001 (p < 0,05). Sementara itu, pada kelompok kontrol tidak ditemukan perbedaan yang bermakna antara pengukuran sebelum dan sesudah perlakuan p= 1,000(p > 0,05).

Kesimpulan: Yoga efektif sebagai terapi non-farmakologis dalam menurunkan intensitas nyeri dismenore primer pada remaja.

Saran: Remaja disarankan untuk memanfaatkan yoga sebagai alternatif penanganan nyeri menstruasi. Tenaga kesehatan diharapkan dapat menjadikan yoga sebagai edukasi kesehatan reproduksi remaja.

Kata kunci: dismenore primer, nyeri menstruasi, remaja, terapi non-farmakologis, yoga.

ABSTRACT

Background: Primary dysmenorrhea is a common complaint among adolescents and can interfere with daily activities, learning concentration, and quality of life. The management of primary dysmenorrhea generally relies on pharmacological therapy; however, long-term use may increase the risk of side effects. Therefore, safe and easily applicable non-pharmacological alternatives are needed, one of which is yoga.

Purpose: This study aimed to determine the effect of yoga as a non-pharmacological therapy on the intensity of primary dysmenorrhea pain among adolescents.

Methods: This study employed a quasi-experimental design with a pretest–posttest with control group approach. A total of 22 respondents were divided into an intervention group (11 participants) and a control group (11 participants). The yoga intervention was conducted once a week for two months. Pain intensity was measured using the Numeric Rating Scale before and after the intervention. The study was conducted from August to October 2025.

Result: The analysis showed a significant reduction in primary dysmenorrhea pain intensity in the intervention group after the yoga intervention, with a p-value of 0.001 (p < 0.05). Meanwhile, no significant difference was found between pretest and posttest measurements in the control group (p = 1.000; p > 0.05).

Conclusion: Yoga is effective as a non-pharmacological therapy in reducing the intensity of primary dysmenorrhea pain among adolescents.

Suggestions: Adolescents are encouraged to use yoga as an alternative approach for managing menstrual pain. Healthcare providers are expected to incorporate yoga into adolescent reproductive health education.

Keywords: , adolescents, menstrual pain, non-pharmacological therapy, primary dysmenorrhea, yoga.

INTRODUCTION

Primary dysmenorrhea is the most common menstrual pain condition experienced by adolescent girls, characterized by cramping pain in the lower abdomen that occurs before or during menstruation in the absence of clinically identifiable pelvic pathology. The prevalence of primary dysmenorrhea among adolescents remains remarkably high, reaching up to 95%, with pain severity ranging from mild to severe. This condition frequently interferes with academic performance, social activities, and overall quality of life. The high prevalence indicates that dysmenorrhea constitutes a global public health issue requiring serious attention, particularly within promotive and preventive strategies for adolescent reproductive health. In Indonesia, dysmenorrhea prevalence is also substantial, with reported rates of approximately 54.89% for primary dysmenorrhea and 9.36% for secondary dysmenorrhea among women of reproductive age. Other studies have reported prevalence rates ranging from 45% to 90%, with more than 60% of adolescent girls experiencing clinically significant menstrual pain. Data from the East Java Provincial Adolescent Reproductive Health Survey revealed that among recorded dysmenorrhea cases, approximately 4,297 adolescents (90.25%) experienced primary dysmenorrhea, while the remainder were classified as secondary dysmenorrhea (Ju, Jones, and Mishra 2014; Pinto et al. 2023; Silaen, Ani, and Putri 2019; Situmorang et al. 2024).

From a pathophysiological perspective, primary dysmenorrhea arises from the biological response of the endometrium to hormonal fluctuations during the menstrual cycle without structural abnormalities of the reproductive organs. Prior to menstruation, declining progesterone levels lead to increased phospholipase enzyme activity in endometrial tissue, triggering the release of arachidonic acid as the primary substrate for prostaglandin synthesis. Consequently, endometrial prostaglandin levels—particularly prostaglandin F2α and prostaglandin E2—are significantly elevated compared to women without dysmenorrhea. Prostaglandin F2α plays a dominant role in enhancing myometrial contractility by increasing the frequency and intensity of uterine contractions, whereas prostaglandin E2 contributes to uterine vasoconstriction and modulation of pain transmission (Itani *et al*. 2022; Yang and Kim 2016).

Excessive and uncoordinated uterine contractions, accompanied by constriction of uterine blood vessels, result in reduced myometrial perfusion and lead to localized hypoxia and ischemia. These conditions activate visceral pain receptors and produce the characteristic spasmodic pain associated with primary dysmenorrhea. In addition to prostaglandins, other mediators such as leukotrienes, vasopressin, and proinflammatory cytokines have been reported to exacerbate uterine activity and pain sensitivity. Vasopressin, in particular, increases myometrial tone and promotes uterine vasoconstriction, thereby prolonging ischemic conditions and intensifying menstrual pain. Recurrent local inflammatory responses may further reduce pain thresholds through peripheral and central sensitization mechanisms (Gao *et al*. 2019; Itani *et al.* 2022).

From a neurophysiological standpoint, pain stimuli resulting from uterine ischemia are transmitted via visceral afferent fibers to the thoracic and lumbar segments of the spinal cord. Repeated activation of nociceptive pathways may amplify pain perception and explain variations in pain intensity among adolescents, despite the absence of anatomical abnormalities in the reproductive system. This mechanism also accounts for persistent or worsening pain in certain individuals. Systemic effects of prostaglandins released into circulation contribute to accompanying symptoms such as nausea, vomiting, diarrhea, headache, fatigue, and sleep disturbances. Prostaglandins influence gastrointestinal motility and regulatory centers within the central nervous system, explaining why non-gynecological symptoms frequently accompany menstrual pain in adolescents with primary dysmenorrhea (Itani *et al.* 2022; Kirca and Celik 2023).

Conventional management of primary dysmenorrhea primarily focuses on suppressing prostaglandin synthesis through the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and hormonal contraceptives. NSAIDs inhibit cyclooxygenase enzyme activity, while hormonal contraceptives suppress ovulation and reduce endometrial thickness, thereby decreasing prostaglandin production during menstruation. Although these pharmacological treatments are generally effective, their long-term use among adolescents is often limited by side effects, low adherence, and a growing preference for more natural and sustainable therapeutic approaches (Itani *et al*. 2022; Prakasiwi and Damayanti 2023).

These limitations have driven increasing interest in non-pharmacological interventions that influence pain mechanisms through autonomic nervous system regulation, muscle relaxation, and stress reduction, offering a more comprehensive approach to managing primary dysmenorrhea. One such intervention gaining attention is yoga, which is

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categorized as a mind–body therapy integrating physical postures, breathing regulation, relaxation, and meditation. Yoga has been shown to modulate autonomic nervous system activity by reducing sympathetic dominance and enhancing parasympathetic tone, thereby contributing to decreased pain perception and increased pain tolerance thresholds (Armour *et al*. 2019; Field 2016).

Numerous experimental studies have demonstrated that regular yoga practice can reduce the intensity of primary dysmenorrhea by improving pelvic blood circulation, promoting uterine muscle relaxation, and alleviating psychological tension that exacerbates menstrual pain. Additionally, yoga has been associated with increased endorphin release and reduced cortisol levels, both of which play essential roles in stress regulation and pain perception among adolescents. Quasi-experimental studies involving adolescent girls have shown that menstrual yoga interventions conducted over 4–8 weeks significantly reduce primary dysmenorrhea pain scores compared to baseline measurements. Other studies have reported that structured Vinyasa yoga practice effectively decreases pain intensity in adolescents with statistically significant differences (Delpia *et al*. 2025; Fitriana *et al*. 2025; Suhaid *et al*. 2023).

Similar findings have been reported in studies utilizing Suryanamaskar sequences, which demonstrated significant reductions in menstrual pain intensity following yoga interventions among secondary school adolescents. Randomized controlled trials conducted among university students have indicated that 12 weeks of Hatha yoga is significantly more effective in reducing primary dysmenorrhea pain compared to control groups without intervention. Recent meta-analyses and systematic reviews further confirm that yoga is a safe and effective non-pharmacological intervention for reducing primary dysmenorrhea pain intensity, while also improving quality of life and psychological well-being among adolescents. Yoga interventions offer notable advantages, including ease of implementation, low cost, and feasibility for independent practice without reliance on medication. Given the high prevalence of primary dysmenorrhea among adolescents and the limitations of pharmacological therapies, yoga represents a promising, evidence-based alternative for reducing menstrual pain intensity in this population. Therefore, research examining the effectiveness of yoga in alleviating primary dysmenorrhea pain among adolescents is essential to strengthen the scientific foundation for integrating yoga into adolescent reproductive health promotion strategies (Kirca and Celik 2023; Pinto *et al*. 2023; Yang and Kim 2016).

RESEARCH METHODS

This study employed a quasi-experimental design with a pretest–posttest control group approach. This design was selected to evaluate the effect of a yoga intervention on the intensity of primary dysmenorrhea by comparing changes in pain levels before and after the intervention between the intervention group and the control group. The study was conducted at the Mother's Movement Yoga Studio, Tulungagung, from August to October 2025. The yoga intervention was implemented in a controlled setting and guided by a certified yoga instructor to ensure consistency and standardization throughout the study period.

The study population consisted of adolescent girls experiencing primary dysmenorrhea. Sampling was performed using a non-probability sampling technique with a purposive sampling method. A total of 22 respondents participated in the study and were proportionally allocated into two groups: 11 respondents in the intervention group and 11 respondents in the control group. The inclusion criteria comprised adolescent girls in good general health, having regular menstrual cycles, experiencing primary dysmenorrhea, and having no history of gynecological disorders such as endometriosis or polycystic ovary syndrome (PCOS). Respondents who regularly used hormonal therapy or analgesic medications during the study period, as well as those with musculoskeletal disorders or other medical conditions that could hinder participation in yoga activities, were excluded from the study.

The intervention group received a yoga program specifically designed for menstrual pain management. Yoga sessions were conducted once a week for a duration of two months, with each session consisting of gentle yoga postures, breathing techniques, and relaxation exercises tailored to the physical condition of adolescents. All sessions were delivered in a structured and supervised manner. In contrast, the control group did not receive any yoga intervention and continued their usual daily activities without any structured exercise program.

The primary variable measured in this study was the intensity of primary dysmenorrhea pain, which was assessed using an ordinal pain scale categorized into mild, moderate, and severe pain. Pain intensity was measured using the Numeric Rating Scale (NRS) and assessed twice in both groups, namely before the intervention (pretest)

and after the two-month intervention period (posttest). Data normality was tested using the Shapiro–Wilk test, and inferential analysis was performed using non-parametric statistical tests. Differences in pain intensity between the intervention and control groups at pretest and posttest were analyzed using the Mann–Whitney U test. Meanwhile, changes in pain intensity before and after the intervention within each group were analyzed using the Wilcoxon Signed Rank Test. Statistical significance was determined at a p-value of less than 0.05.

RESEARCH RESULTS

Table 1
Characteristics of Research Participants

Characteristics	N	%
Age		
14- 17 years (Middle Adolescence)	4	18,2
18-21 years (Late Adolescence)	18	81,8
Menstrual Duration		
<5 Days	0	0
5-7 Days	22	100
Menstrual Cycle		
Reguler	38	67,9
Irreguler	7	12,5
Pretest Pain Scale		
Moderate Pain	1	4,5
Severe Pain	21	95,5
Posttest Pain Scale		
Mild Pain	10	45,5
Moderate Pain	2	9,1
Severe Pain	10	45,5

A total of 22 respondents participated in this study and were evenly divided into the intervention group (n = 11) and the control group (n = 11). The majority of respondents were classified as being in late adolescence (81.8%). All participants reported a menstrual duration of 5–7 days (100%), and all respondents had regular monthly menstrual cycles (100%). At baseline, most participants reported severe pain, with 21 respondents (95.5%) classified as having severe pain and 1 respondent (4.5%) reporting moderate pain. Following the intervention, pain intensity decreased, with 10 respondents (45.5%) reporting mild pain and 2 respondents (9.1%) reporting moderate pain, while 10 respondents (45.5%) continued to report severe pain.

Results of Pain Scale Measurement Using the Numeric Rating Scale (NRS)

Baseline measurements (pretest) in the intervention group showed that all respondents experienced severe dysmenorrhea pain (100%). Following the intervention period, a change in pain intensity distribution was observed, with 90.91% of respondents demonstrating a reduction in pain intensity from severe to mild, while 9.09% reported a decrease to moderate pain. In contrast, in the control group, all respondents experienced severe dysmenorrhea pain at baseline (100%), and no reduction in pain intensity was observed after two months of monitoring without intervention.

Statistical Test Results

Normality testing using the Shapiro–Wilk test indicated that pain intensity data at both pretest and posttest in the intervention and control groups were not normally distributed ($p < 0.05$). Therefore, subsequent analyses were conducted using non-parametric statistical tests.

Table 2
Comparison of Pretest and Posttest Pain Scores Between Groups Using the Mann–Whitney U Test

	Pretest Pain Scale	Posttest Pain Scale
Mann-Whitney U	20,000	,000
Z	-3,009	-4,090
Asymp. Sig (2-tailed)	,003	,000
Exact Sig.	,007[b]	,000[b]

The results of the Mann–Whitney U test indicated a statistically significant difference between the intervention group and the control group in both pretest and posttest measurements. At baseline (pretest), the significance value was $p = 0.007$ ($p < 0.05$). Following the intervention (posttest), the significance value was $p = 0.000$ ($p < 0.05$), demonstrating a significant difference in pain intensity between the two groups after the intervention was administered.

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Table 3
Wilcoxon Signed Rank Test Result

Research Groups	Z	p-value
Intervention Group	- 3,207	p = 0,001 (p<0,05)
Control Group	0,000	p = 1,000 (p>0,05)

Analysis using the Wilcoxon Signed Rank Test in the intervention group demonstrated a statistically significant reduction in pain intensity following the yoga intervention, with a p-value of 0.001 ($p < 0.05$). All respondents in the intervention group experienced a decrease in pain scores, as indicated by the predominance of negative ranks, reflecting lower posttest pain scores compared to pretest scores. In contrast, the Wilcoxon Signed Rank Test results for the control group showed no statistically significant difference in pain intensity before and after the observation period, with a significance value of $p = 1.000$ ($p > 0.05$). All respondents in the control group exhibited relatively unchanged pain scores between the pretest and posttest measurements. Overall, these findings indicate that yoga practice administered once per week over a two-month period is significantly effective in reducing the intensity of primary dysmenorrhea pain among adolescents compared to those who did not receive the intervention.

DISCUSSION

The findings of this study indicate that structured yoga practice conducted over an eight-week period resulted in a statistically significant reduction in the intensity of primary dysmenorrhea pain in the intervention group, while no significant change was observed in the control group. These results suggest that yoga functions as an active intervention that directly influences menstrual pain mechanisms rather than reflecting natural menstrual cycle variability or physiological adaptation over time. The significant difference observed between the intervention and control groups in post-intervention measurements further strengthens the evidence that pain reduction is closely associated with regular and structured yoga practice. These findings are consistent with several experimental studies reporting the effectiveness of yoga in reducing primary dysmenorrhea pain among adolescents and young adults.

A study by (Yonglitthipagon *et al.* 2017) demonstrated that a 12-week yoga program significantly reduced menstrual pain scores and improved quality of life compared to a non-intervention group. Similar results were reported by Ahuja et al. (2025), who found that yoga was equally effective—and in certain aspects superior—to aerobic exercise in alleviating primary dysmenorrhea pain. The consistency of these findings across studies indicates that yoga represents a stable and reproducible intervention across diverse populations.

From a pathophysiological perspective, primary dysmenorrhea is closely associated with increased endometrial prostaglandin synthesis, particularly prostaglandins F2α and E2, which lead to excessive uterine contractions, uterine vasoconstriction, and myometrial ischemia. These conditions stimulate visceral pain receptors, resulting in the characteristic spasmodic and recurrent menstrual pain. The reduction in pain intensity observed in the intervention group suggests that yoga may influence the biological pathways involved in prostaglandin production and action. Several physiological studies indicate that yoga modulates inflammatory and neuroendocrine responses. Yoga practice reduces sympathetic nervous system activity while enhancing parasympathetic dominance, thereby contributing to decreased uterine contractility and improved pelvic blood flow. Enhanced uterine tissue perfusion may alleviate hypoxia and ischemia, reducing nociceptor stimulation and menstrual pain intensity. Furthermore, yoga has been reported to reduce inflammatory mediators and stress hormones that exacerbate pain perception (Asmalinda, Lukita, and Sapada 2022; Schmalzl *et al.* 2015).

Primary dysmenorrhea pain is influenced not only by peripheral mechanisms but also by central processes involving modulation within the central nervous system. Pain perception is shaped by complex interactions between peripheral nociceptive input and cognitive-emotional processing in the brain. As a mind–body intervention, yoga has the potential to simultaneously affect both components. Neurophysiological evidence suggests that yoga and meditation practices enhance the activity of descending pain inhibitory pathways, which suppress the transmission of pain impulses from the spinal cord to the cerebral cortex. Activation of these pathways allows individuals to exert greater endogenous control over pain, resulting in lower perceived pain intensity despite the persistence of peripheral stimuli. This mechanism may explain why participants in the intervention group experienced significant pain reduction without pharmacological inhibition of prostaglandin synthesis. Additionally, breathing techniques (pranayama) and relaxation components of yoga enhance body awareness and emotional regulation. Increased interoceptive

awareness may alter how individuals process pain signals, reducing the perception of pain as a threatening or disabling experience. This mechanism is particularly relevant in adolescents, who are still undergoing emotional and neurodevelopmental maturation (Kim 2019; Mcgovern and Cheung 2018; Schmalzl *et al.* 2015).

Beyond pelvic pain, primary dysmenorrhea is often accompanied by systemic symptoms such as nausea, vomiting, diarrhea, fatigue, headache, and sleep disturbances. These symptoms are largely mediated by systemic prostaglandin effects and heightened sympathetic nervous system activity. Although this study focused on pain intensity as the primary outcome, the significant pain reduction observed in the intervention group suggests potential indirect improvements in associated symptoms. Several studies have reported that yoga not only reduces menstrual pain but also improves sleep quality and decreases fatigue during menstruation. (Oates 2017) found that young women with primary dysmenorrhea who participated in a six-week yoga program experienced improved sleep quality and reduced somatic complaints compared to controls. These effects are believed to be related to autonomic nervous system regulation and reduced muscle tension, both of which contribute to symptom exacerbation during menstruation. Thus, yoga can be considered a holistic intervention that addresses not only pain but also the broader spectrum of symptoms affecting adolescents' quality of life (Mcgovern and Cheung 2018; On *et al.* 2021).

Clinically, the results of this study have important implications for the management of primary dysmenorrhea in adolescents. The significant pain reduction achieved through yoga intervention demonstrates that non-pharmacological approaches can serve as safe and effective alternatives, particularly for adolescents who face limitations in long-term analgesic use. These findings support global recommendations advocating lifestyle-based and structured physical activity interventions as part of chronic pain management strategies. Given its ease of implementation, low cost, and minimal side effects, yoga holds substantial potential for integration into adolescent health promotion programs in schools, communities, and healthcare settings. The results further reinforce the view that yoga is not merely a fitness activity but a therapeutic intervention with a strong scientific basis in adolescent reproductive health (Cahyati, Nurhayati, and Sumarlina 2022)

Characteristics of Respondents

The characteristics of respondents in this study indicate that all participants were adolescents in good general health, had regular menstrual cycles, and experienced primary dysmenorrhea without gynecological abnormalities such as endometriosis or polycystic ovary syndrome (PCOS). This profile represents the population most commonly affected by primary dysmenorrhea, as reported in epidemiological studies indicating higher prevalence among adolescents and young women with normal ovulatory cycles. Adolescents with regular menstrual cycles tend to experience consistent prostaglandin production during the late luteal phase, increasing susceptibility to menstrual pain caused by excessive uterine contractions. Primary dysmenorrhea predominantly occurs in healthy adolescents without pelvic pathology, supporting the validity of the inclusion criteria used in this study. In addition to biological factors, adolescence is associated with heightened pain sensitivity due to ongoing central nervous system maturation. Neurophysiological studies suggest that adolescents have lower pain thresholds compared to adult women, making menstrual pain more intense and disruptive to daily activities. Therefore, the respondent characteristics align well with a clinically relevant population for evaluating the effectiveness of yoga interventions in reducing primary dysmenorrhea pain (Armour *et al*. 2019; Sanctis *et al*. 2016).

Pain Intensity Variations in Intervention and Control Groups

The results demonstrate a significant reduction in pain intensity in the intervention group following yoga practice, whereas no significant change was observed in the control group between pretest and posttest measurements. This finding confirms that the observed pain reduction was not due to natural menstrual cycle variation but was directly attributable to the yoga intervention. The reduction in pain intensity aligns with previous studies reporting that yoga effectively decreases primary dysmenorrhea pain through nervous system regulation and pelvic muscle relaxation. Several studies have shown that eight-week yoga programs significantly reduce menstrual pain compared to control groups. Improvements in pain scores and quality of life among young women with primary dysmenorrhea following structured yoga interventions have also been consistently reported. (Gao *et al.* 2019) further supported these findings, concluding that yoga provides significant analgesic effects in primary dysmenorrhea compared to no intervention. Conversely, the absence of significant

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pain reduction in the control group is consistent with literature indicating that primary dysmenorrhea tends to persist or recur without specific intervention. (Ju, Jones, and Mishra 2014) reported that pain intensity in adolescents with primary dysmenorrhea remains relatively stable over time in the absence of pharmacological or non-pharmacological treatment. Spontaneous physiological adaptation to dysmenorrhea pain is uncommon, making the lack of improvement in the control group clinically expected. These findings reinforce the interpretation that pain reduction in the intervention group resulted directly from yoga practice (Burnett and Lemyre 2017; Miri and Rezaeipor 2024; Widowati and Acihayati 2023; Yonglitthipagon et al. 2017).

Impact of Yoga on Pain Intensity in Adolescents with Primary Dysmenorrhea

Based on comparative analysis between the intervention and control groups, it can be concluded that yoga significantly reduces the intensity of primary dysmenorrhea pain in adolescents. This effect is reflected in the Mann–Whitney test results showing significant differences between groups at posttest and the Wilcoxon test results indicating significant pain reduction within the intervention group. Physiologically, yoga reduces dysmenorrhea pain through several key pathways, including modulation of prostaglandin activity, regulation of autonomic nervous system balance, and enhancement of endogenous pain inhibition mechanisms. Yoga practice increases parasympathetic dominance, decreases sympathetic activity, and enhances endorphin secretion, which serves as a natural analgesic. Additionally, yoga reduces stress hormone levels such as cortisol, which are known to exacerbate menstrual pain perception. Psychological stress reduction is particularly relevant in adolescents, as emotional and psychosocial factors strongly influence pain modulation in this age group. Yoga also enhances body awareness and emotional regulation, contributing to reduced central pain sensitization. Neurophysiological studies demonstrate that mind–body practices like yoga alter central pain processing, making pain more tolerable and less intense. These findings are consistent with recent systematic reviews and meta-analyses concluding that yoga is a safe, effective, and feasible non-pharmacological intervention for managing primary dysmenorrhea in adolescents. Therefore, yoga may be considered a valuable component of promotive and preventive approaches in adolescent reproductive health (Gao *et al*. 2019; Iacovides, Avidon, and Baker 2015; Jain, Sisodia, and Kumar 2023; Nag *et al*. 2013; Yang and Kim 2016).

Physiologically, the absence of pain reduction in the control group can be explained by the persistence of inflammatory pathways and ongoing prostaglandin synthesis without modulation or preventive intervention. Singh et al. (2024) reported sustained high levels of prostaglandins and inflammatory mediators in women with untreated dysmenorrhea, which correlate with persistent pain symptoms. Large cohort studies have also observed that individuals who do not receive mind–body interventions report stable or increasing pain scores over time, often associated with unmanaged psychological stress. These findings suggest that emotional distress and stress responses significantly influence pain experiences in the absence of interventions such as yoga.

CONCLUSION

This study demonstrates that structured yoga practice conducted once weekly for two months is effective in reducing the intensity of primary dysmenorrhea pain among adolescents. A significant difference was observed in pain scores before and after the intervention in the yoga group, whereas no significant change was identified in the control group. These findings indicate that yoga represents a safe and beneficial non-pharmacological intervention for managing primary dysmenorrhea pain in adolescents.

SUGGESTION

Adolescents experiencing primary dysmenorrhea are encouraged to utilize yoga as a safe and accessible alternative for managing menstrual pain. Healthcare professionals are expected to provide education regarding the benefits of yoga as part of promotive and preventive strategies in adolescent reproductive health.

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