

CORRELATION OF PRIMARY DYSMENORRHEA WITH REGULAR PHYSICAL ACTIVITY IN WOMEN FROM 16 TO 50 YEARS

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(Original scientific paper)

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Abstract

Primary dysmenorrhea is a prevalent gynecological condition that significantly impacts women's physical and emotional well-being. This study investigates the correlation between regular physical activity and the occurrence and severity of primary dysmenorrhea. A cross-sectional design was used, involving 401 menstruating females aged 16 to 50 years, who completed an online questionnaire assessing menstrual symptoms and physical activity habits. The results indicate a trend toward a lower prevalence of dysmenorrhea among individuals who engage in regular, long-term, and higher-intensity physical activity. Although statistical significance was not reached in most comparisons, women who exercised daily or had more than five years of experience with physical activity reported less frequent and less severe menstrual pain. These findings support the growing evidence that physical activity may serve as a non-pharmacological strategy for managing primary dysmenorrhea. The study underscores the importance of promoting active lifestyles among women as part of broader public health efforts to enhance menstrual health and reduce reliance on medication. Further longitudinal and intervention-based research is recommended to confirm causality and develop targeted exercise guidelines

Key words: Primary dysmenorrhea, Physical activity, Menstrual health, Non-pharmacological management

Introduction

Primary dysmenorrhea is the most common complaint among students and one of the leading public health issues globally. The prevalence of primary dysmenorrhea varies across different populations, ranging from 16% to 91% (Fang, 2023; Omidvar, et al., 2015). According to (Wang, et al., 2022), the prevalence of PD before 2010 was 58.8%, increased to 68.5% after 2010, and further rose to 71.1% in 2015 and 2021. Dysmenorrhea has a broad impact on women's mental and physical well-being, with long-term consequences on quality of life, personal relationships, and educational and career achievements. Additionally, untreated dysmenorrhea may result in "hyperalgesic priming," increasing the susceptibility to chronic pelvic pain (MacGregor et al., 2023).

Only 6% of adolescents seek medical consultation for managing dysmenorrhea, whereas 70% rely on self-management strategies. Alarmingly, some girls resort to misuse of medications, consuming non-therapeutic high doses for immediate pain relief (De Sanctis, et al., 2015). A systematic review and meta-analysis revealed that 71.1% of 21,573 young women experience dysmenorrhea, significantly affecting students in both school and university settings regardless of economic background (Armour, et al., 2019). This is also observed in studies by (Hadjou, et al., 2022) and (Parra-Fernández, et al., 2020), which show that primary dysmenorrhea significantly disrupts daily activities, educational performance, and overall well-being, manifesting as school absences, difficulties attending classes and participating in sports, decreased academic performance, and reduced social interactions.

Primary dysmenorrhea is significantly associated with heavy menstrual bleeding, early menarche, a family history of dysmenorrhea, and a lack of physical exercise. Other factors associated with dysmenorrhea include stress and anxiety, which are also reflected in poor dietary habits, such as consuming fast foods and spicy meals (Najafi, et al., 2018).

The impact of primary dysmenorrhea on quality of life is profound. It has been documented as a leading cause of absenteeism in educational settings, with a considerable number of students reporting that

dysmenorrhea negatively affects their academic performance and daily activities. For example, Rafique & Al-Sheikh (2018) found in their study that 54.5% of students indicated that dysmenorrhea impaired their studies, while 8.7% reported missing classes due to severe pain. Furthermore, the psychological effects of dysmenorrhea can lead to increased anxiety and depression, exacerbating the overall impact on quality of life (Sahin, et al., 2018). Women suffering from primary dysmenorrhea often experience a cycle of fear and anxiety regarding future menstrual cycles, which can further diminish their mental well-being (Adib-Rad, et al., 2022).

Primary dysmenorrhea, characterized by painful menstrual cramps without underlying pelvic pathology, affects a significant percentage of menstruating women. Management strategies for this condition can be broadly categorized into traditional and non-traditional approaches, with a particular emphasis on physical activity and dietary modifications.

Materials And Methods

Study Design

In order to provide a broader sample and obtain more sincere answers, an online questionnaire was applied with questions regarding menstruation, primary dysmenorrhea symptoms, physical activity (type, duration, length).

Sample of respondents

Participants in this study were females aged 16 to 50 years who experience menstruation. From this group, those reporting symptoms of primary dysmenorrhea were selected for further analysis.

Sample of variables

The questionnaire used in this research is a comprehensive tool designed to evaluate factors influencing primary dysmenorrhea, with a particular focus on physical activity levels (6 questions) and dysmenorrhea symptoms (5 questions).

This section evaluates participants' engagement in physical activity, using components adapted from the International Physical Activity Questionnaire – IPAQ (2003) and the Paffenbarger Physical Activity Questionnaire (1993):

Questions:

1. Is physical activity part of your lifestyle? (Yes/No)
2. What kind of physical activity do you practice? (Options: Fitness exercises, yoga, pilates, swimming, running, volleyball, basketball, tennis, football, handball, bodybuilding, other)
3. How long have you been practicing physical activity? (Options: <1 year, 1–5 years, +5 years)
4. How many times per week do you practice physical activity? (Options: 1 time/week, 2–5 times/week, every day)
5. How do you judge the intensity of your physical activity? (Options: Low, Moderate, Vigorous)

This section is based on the Menstrual Distress Questionnaire – MDQ (1975) and Menstrual Symptom Questionnaire – MSQ (1968) to capture participants' menstrual health:

Purpose: To evaluate the severity and management of dysmenorrhea.

Questions:

1. Do you suffer from primary dysmenorrhea (cramping pain before or during periods)? (Yes/No)
2. How would you describe the level of discomfort? (Options: Mild, Moderate, Severe)
3. Are your periods regular? (Yes/No)
4. How many days does your bleeding last? (Options: ≤ 4 days, 5–6 days, ≥ 7 days)
5. How would you describe the amount of bleeding during your periods? (Options: Small, Medium, Heavy)

Statistical Analysis

The following statistical parameters for central tendency and variability were calculated: arithmetic mean (AS), standard deviation (SD), minimum (Min), maximum (Max), standard error of the mean (Ce), coefficient of variation (KV), coefficient of asymmetry (Sk), and coefficient of distribution (Kurtosis-Ku).

Results

Out of 401 participants, 60.1% reported engaging in physical activity as part of their lifestyle. When analyzing the relationship between physical activity and the presence of primary dysmenorrhea (PD), results showed a slightly lower prevalence of PD among those who reported being physically active (68.9%) compared to those who were not (72.5%) as presented in Table 1 and illustrated in Figure 1. However, the difference was not statistically significant ($\chi^2 = 0.604, p = 0.437$).

Table 2. Association between duration of physical activity practice and primary dysmenorrhea

			Do you suffer from primary dysmenorrhea (cramping pain before or during periods)?		Total
			Yes	No	
Is physical activity part of your lifestyle?	No	Count	116	44	160
		% within Is physical activity part of your lifestyle?	72,5%	27,5%	100,0%
	Yes	Count	166	75	241
		% within Is physical activity part of your lifestyle?	68,9%	31,1%	100,0%
Total		Count	282	119	401
		% within Is physical activity part of your lifestyle?	70,3%	29,7%	100,0%

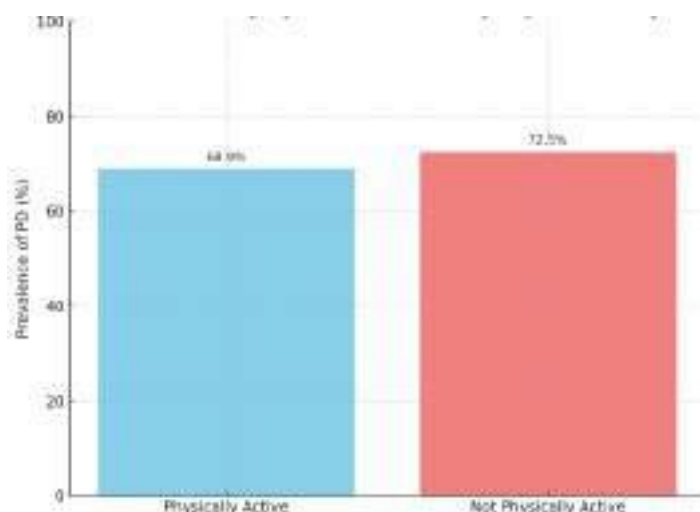


Figure 1. Prevalence of Primary Dysmenorrhea by Physical Activity Status

Table 2. Association between duration of physical activity practice and primary dysmenorrhea

			Do you suffer from primary dysmenorrhea (cramping pain before or during periods)?		Total	
			Yes	No		
How long have you been practicing physical activity?	No	Count	116	44	160	
		% within How long have you been practicing physical activity?	72,5%	27,5%	100,0%	
	< 1 year	Count	65	19	84	
		% within How long have you been practicing physical activity?	77,4%	22,6%	100,0%	
	1-5 years	Count	55	30	85	
		% within How long have you been practicing physical activity?	64,7%	35,3%	100,0%	
	+5 years	Count	46	26	72	
		% within How long have you been practicing physical activity?	63,9%	36,1%	100,0%	
	Total		Count	282	119	401
			% within How long have you been practicing physical activity?	70,3%	29,7%	100,0%

Further analysis examined whether the duration of engagement in physical activity was associated with the prevalence of PD. Participants who had been physically active for more than 5 years showed a lower rate of PD (63.9%) compared to those active for less than 1 year (77.4%) and those not active at all (72.5%) as shown in Table 2 and Figure 2. Although the trend suggests a potential protective effect of long-term physical activity, the association did not reach statistical significance ($\chi^2 = 5.082, p = 0.166$).

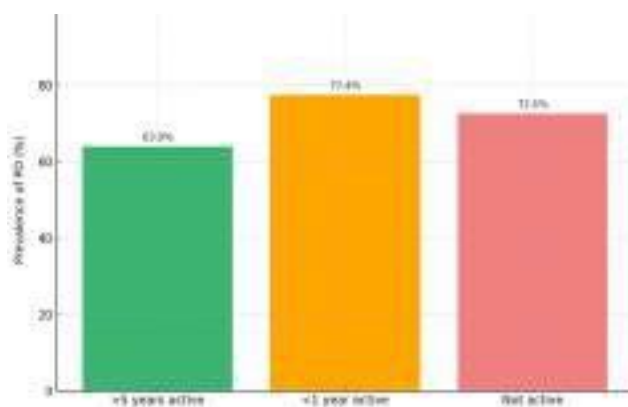


Figure 2. Prevalence of Primary Dysmenorrhea by Duration of Physical Activity

Table 3. Association between weekly frequency of physical activity and primary dysmenorrhea

			Do you suffer from primary dysmenorrhea (cramping pain before or during periods)?		Total
			Yes	No	
How many times per week do you practice physical activity?	No	Count	116	44	160
		% within How many times per week do you practice physical activity?	72,5%	27,5%	100,0%
	1 time per week	Count	10	8	18
		% within How many times per week do you practice physical activity?	55,6%	44,4%	100,0%
	2-5 times per week	Count	131	52	183
		% within How many times per week do you practice physical activity?	71,6%	28,4%	100,0%
	Every day	Count	25	15	40
		% within How many times per week do you practice physical activity?	62,5%	37,5%	100,0%
Total	Count	282	119	401	
	% within How many times per week do you practice physical activity?	70,3%	29,7%	100,0%	

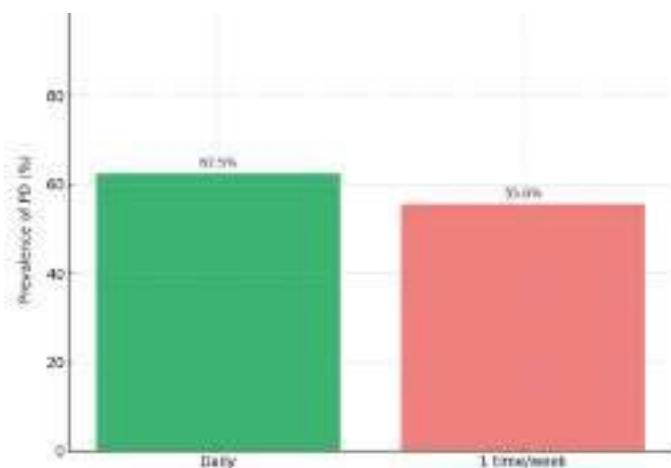


Figure 3. Prevalence of Primary Dysmenorrhea by Frequency of Physical Activity

Regarding frequency of physical activity, individuals who exercised daily reported the lowest prevalence of PD (62.5%), while those who exercised once per week showed the highest rate (55.6%) as summarized in Table 3 (see also Figure 3). Again, the association was not statistically significant ($\chi^2 = 3.557, p = 0.313$), but the trend aligns with the hypothesis that more frequent activity may contribute to symptom reduction.

In terms of exercise intensity, 57.6% of participants engaging in vigorous-intensity activity reported PD, compared to 70.2% among those with moderate intensity and 73.0% in those with low intensity as illustrated in Figure 4, with numerical values provided in Table 4. Despite this noticeable difference, the association was also not statistically significant ($\chi^2 = 3.059, p = 0.383$).

Table 4. Association between perceived physical activity intensity and primary dysmenorrhea

			Do you suffer from primary dysmenorrhea (cramping pain before or during periods)?		Total
			Yes	No	
How do you judge the intensity of your physical activity?	No	Count	116	44	160
		% within How do you judge the intensity of your physical activity?	72,5%	27,5%	100,0%
	Low	Count	27	10	37
		% within How do you judge the intensity of your physical activity?	73,0%	27,0%	100,0%
	Moderate	Count	120	51	171
		% within How do you judge the intensity of your physical activity?	70,2%	29,8%	100,0%
	Vigorous	Count	19	14	33
		% within How do you judge the intensity of your physical activity?	57,6%	42,4%	100,0%
Total	Count	282	119	401	
	% within How do you judge the intensity of your physical activity?	70,3%	29,7%	100,0%	

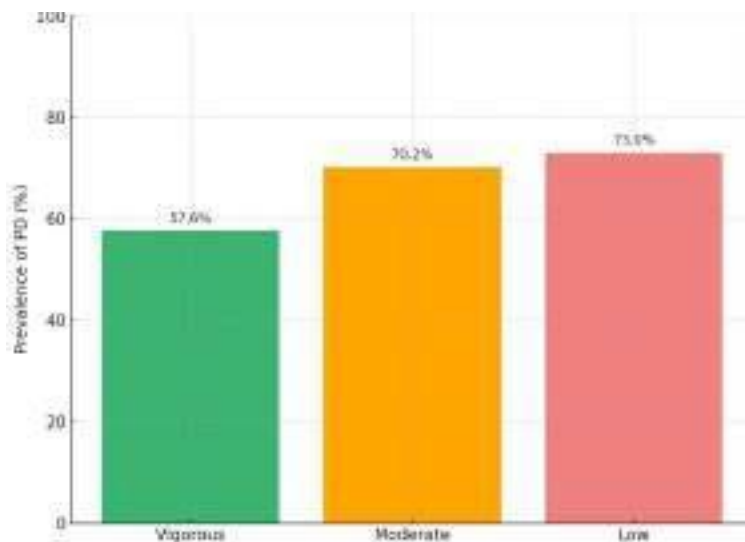


Figure 4. Prevalence of Primary Dysmenorrhea by Intensity of Physical Activity

These findings indicate that while there is a visible trend toward reduced prevalence of dysmenorrhea among those who are physically active - particularly those who are consistent, exercise daily, or engage in higher-intensity activities - the lack of statistically significant associations suggests that other factors may also contribute to the experience of menstrual pain. Further research with larger samples or interventional designs is needed to clarify the causal relationship between physical activity and primary dysmenorrhea.

Discussion

The aim of this study was to examine the relationship between regular physical activity and the prevalence of primary dysmenorrhea among women aged 16–50.

60.1% of the participants reported engaging in physical activity as part of their lifestyle, indicating a generally high level of physical activity within this cross-sectional sample. This finding may be partly explained by increased health awareness and growing emphasis on healthy life style behaviors among women (Celenay et al., 2021). Participation at this level is consistent with growing evidence from diverse populations that indicates variable but significant engagement in physical activity. For example, a recent cross-sectional study of 150 young nulliparous women (aged 17–25 years) in Indonesia reported that 90.7% of participants were classified as having a high level of physical activity based on the International Physical Activity Questionnaire (IPAQ), and physical activity levels showed a strong inverse relationship with the intensity of dysmenorrhea pain (Pearson $r = -0.748$, $p < 0.001$) (Triwahyuningsih, R. Y., 2024). However, participation rates vary considerably across populations and settings. Different results found Shukova Stojmanovska D., et al. (2023) with 44% of students involved in regular physical activity. KIDMED index is connected with regular physical activity according to same authors, meaning that the subsample of students that are involved in regular physical activity have higher percentage in high KIDMED index values (48,4%) then the not exercising subsample of students (33,3%), suggesting that physical activity may be part of a broader healthy lifestyle pattern.

These different levels of participation highlight the importance of contextual factors in the adoption of physical activity. A large systematic review and meta-analysis that included 82 observational studies (totaling 101,413 women), which examined the association between physical activity and menstrual health in different populations, found that low levels of physical activity were consistently associated with increased odds of menstrual pain (OR 1.67, 95% CI 1.31–2.11), as well as with increased odds of premenstrual syndrome (OR 1.22, 95% CI 1.03–1.45) (Buchanan-Smith, L. I. M., 2025). This strong association, observed across many populations and contexts, suggests that the protective effect of physical activity on menstrual health is generalizable, despite differences in baseline levels of participation.

Furthermore, intervention studies show high acceptability and adherence to structured exercise programs. For example, a 24-week randomized controlled trial of traditional Chinese Baduanjin exercises conducted with 62 international female students (mean age 27.9 years) reported very good adherence to the program without side effects, as well as significant improvements in menstrual symptoms, stress levels, and sleep quality (Alkhatib, A., 2024). Taken together, these findings support the idea that increased health awareness and lifestyle modification efforts may be driving factors for increased physical activity participation, particularly among young women, leading to measurable benefits for menstrual health.

Higher levels of physical activity appeared to correspond with lower rates of primary dysmenorrhea (PD). Participants who engaged in physical activity reported a slightly lower prevalence of PD (68.9%) compared to non-active individuals (72.5%), suggesting a potential benefit of maintaining an active lifestyle (Carroquino-Garcia, et al., 2019; Dehnavi, et al., 2018; McGovern & Cheung, 2018; Rigal, et al., 2024). Similarly, daily exercisers had the lowest prevalence of primary dysmenorrhea (62.5%), while participants who engaged in high-intensity physical activity reported an even lower prevalence (57.6%) compared with moderate (70.2%) and low (73.0%) intensity groups. This dose–response pattern is supported by evidence from randomized controlled trials. An RCT conducted in Pakistan ($n = 42$), which directly compared high-intensity aerobic exercise (80–90% of target heart rate) with low-intensity exercise (40–60% of target heart rate) over an eight-week period, showed that high-intensity protocols were significantly more effective in reducing primary dysmenorrhea symptomatology (Imtiaz, I., 2022). Also, a 10-week study of high-intensity interval training (HIIT) using a spinning bike reported significant reductions in menstrual pain and menstrual distress scores, as well as—importantly—decreases in biochemical biomarkers, including prostaglandin E2 (PGE2), prostaglandin F2 α (PGF2 α), and high-sensitivity C-reactive protein (hsCRP), along with improvements in cardiovascular fitness (Huang, W. C., 2022). These findings provide mechanistic support for the observed intensity-dependent benefits of physical activity.

Network meta-analyses, which have synthesized evidence from 29 to 49 randomized controlled trials (with a total number of participants ranging from 1,808 to 3,129), consistently show that all forms of exercise lead to significant reductions in pain intensity, with summary effect values ranging from -1.9 to -3.20 points on the 0–10 cm visual analogue scale (VAS), compared with control groups (Tsai, I. C., 2024; Li, X., 2024). Specifically, a Bayesian network meta-analysis reported an overall effect of exercise of -3.20 points on the VAS (95% CI -4.01 to -2.34), which represents a clinically important improvement and

exceeds the minimal clinically important change for pain scores (Li, X., 2024). These models are consistent with physiological theories suggesting that physical activity may alleviate menstrual pain by improving blood flow, reducing prostaglandin production, and increasing endorphin release (Kannan et al., 2021; Zheng et al., 2024). Similarly, the aforementioned HIIT study documented concomitant reductions in inflammatory markers and modulation of sex hormones (estradiol, progesterone, prolactin), in parallel with symptom improvement (Huang, W. C., 2022).

Exercise frequency also appears to be a critical factor. An 8-week randomized clinical trial ($n = 86$), which applied an exercise program based on the FITT (Frequency, Intensity, Duration, Type) principles, with approximately three sessions per week, showed that the mean values of dysmenorrhea severity (McGill scale) decreased from 4.74 (SD 2.14) in the control group to 3.06 (SD 1.78) in the exercise group ($P < 0.001$), while the mean duration of pain was reduced from 2.32 (SD 1.26) days to 1.29 (SD 0.92) days ($P < 0.001$) (Heidarimoghadam, R., 2019). Taken together, these converging findings from observational studies, mechanistic research, and randomized controlled trials provide strong evidence for the protective effect of physical activity across several dimensions—frequency, intensity, and type—supporting the hypothesis that exercise represents an effective nonpharmacological intervention for the management of primary dysmenorrhea.

Duration of physical activity was a significant factor, with women who had been active for more than five years reporting a significantly lower prevalence of primary dysmenorrhea (PD) (63.9%) compared with those who had been active for less than one year (77.4%). Although this difference was not statistically significant in the current study, this trend reflects a possible cumulative protective effect of long-term physical activity on menstrual health (Armour et al., 2019). These sustained benefits may be the result of physiological adaptations, including hormonal regulation and desensitization to pain through the sustained release of endorphins (Jaleel et al., 2022).

Evidence from interventional studies supports the concept of progressive benefits associated with continued exercise. A large network meta-analysis, including 49 randomized controlled trials ($n = 3,129$), showed that all exercise interventions produced statistically significant pain reduction, with clinically significant relief typically occurring after 4–8 weeks of training (Zheng, Q., 2024). Importantly, this analysis showed that resistance exercise was more effective when the duration of the intervention exceeded 8 weeks, suggesting that longer-term commitment may yield greater benefits for some forms of exercise. Another network meta-analysis of 29 randomized controlled trials ($n = 1,808$) documented significant reductions in pain at both the 4-week and 8-week time points, with some modalities showing progressive improvement: relaxation exercises reduced VAS pain by -3.56 points (95% CI -5.03 to -2.08) after 4 weeks and -3.87 points (95% CI -5.51 to -2.22) after 8 weeks (Tsai, I. C., 2024).

The physiological mechanisms underlying these duration-dependent effects are increasingly being characterized. A 24-week randomized controlled trial of traditional Chinese Baduanjin exercises ($n = 62$ international female students) reported significant improvements in blood progesterone and estrogen levels, along with reductions in menstrual symptom questionnaire (MSQ) scores: total MSQ score in the intervention group 47.83 ± 8.71 vs. 65.12 ± 16.86 in the control group; premenstrual subscale 17.07 ± 3.33 vs. 28.42 ± 7.56 ; menstrual pain subscale 16.03 ± 4.53 vs. 19.58 ± 5.14 (all $P < 0.05$) (Buchanan-Smith, L. I. M., 2025). These hormonal adaptations over a 24-week period suggest that sustained physical activity may induce long-term endocrine regulatory changes, which contribute to the reduction of menstrual symptoms. Similarly, a 10-week high-intensity interval training (HIIT) study demonstrated modulation of several hormones, including estradiol, progesterone, prolactin, and cortisol, along with reductions in prostaglandins and inflammatory markers (Huang, W. C., 2022), indicating that even medium-term exercise (2–6 months) can produce significant physiological adaptations.

An Indonesian meta-analysis of five randomized controlled trials ($n = 312$) concluded that aerobic exercise programs produced a large standardized effect size on pain reduction ($d = -2.03$, 95% CI -3.37 to -0.69), with proposed mechanisms involving improvements in systemic circulation and uterine blood flow, which may develop progressively over time (Fadli et al., 2024). However, it is important to note that the current literature does not yet contain robust data from long-term prospective studies (>12 months) that quantify the cumulative protective effects of sustained physical activity on the incidence and severity of dysmenorrhea over several years. The trend observed in the current study—lower prevalence of dysmenorrhea in women active for more than 5 years (63.9%) compared with those active for less than 1 year (77.4%)—is consistent with theoretical expectations of a cumulative benefit, but requires confirmation

through longitudinal research with standardized measures of physical activity and extended follow-up periods.

In summary, despite the lack of statistical significance in some comparisons within the current study, the consistent direction of the data across several dimensions of physical activity—frequency, intensity, and duration—supports the hypothesis that physical activity may contribute to reducing the prevalence and severity of primary dysmenorrhea (PD). This interpretation is strongly strengthened by converging evidence from large-scale meta-analyses, which demonstrate a 67% increased odds of menstrual pain in less active women (OR 1.67, 95% CI 1.31–2.11) in a total of 101,413 participants (Buchanan-Smith, L. I. M., 2025), as well as from network meta-analyses of randomized controlled trials showing clinically meaningful reductions in pain of 1.9–3.20 points on the VAS scale (Tsai et al., 2024; Li, X., 2024; Zheng, Q., 2024). Mechanistic studies document exercise-induced changes in prostaglandins, sex hormones, inflammatory markers, and endorphin-mediated analgesia (Alkhatib, A., 2024; Huang, W. C., 2022). In particular, comparative effectiveness studies show that structured exercise produces pain reduction comparable to or superior to standard treatment with nonsteroidal anti-inflammatory drugs (NSAIDs), without the side effects associated with their long-term use (Fuentes-Aparicio, L., 2023). However, current evidence is considered moderate for pain intensity outcomes, but limited for pain duration and quality of life measures (Fuentes-Aparicio, L., 2023). These findings highlight the need for further longitudinal and interventional studies with extended follow-up periods (>12 months), standardized measurements, and inclusion of diverse populations, to confirm causality and to determine optimal exercise protocols as a safe and effective non-pharmacological approach to menstrual health management (Rigal et al., 2024; Fuentes-Aparicio, L., 2023).

Conclusion

The findings of this study highlight a consistent trend:

- Individuals who engage in regular physical activity, especially at moderate to vigorous intensities and over longer durations, tend to report a lower prevalence of primary dysmenorrhea. Although statistical significance was not reached in the observed associations, the direction of the results reinforces existing literature suggesting a protective effect of physical activity against menstrual pain.
- Notably, participants who exercised daily or had more than five years of physical activity experience reported lower discomfort levels compared to sedentary individuals or those with minimal engagement in exercise. These findings underscore the potential of physical activity as a viable, low-cost, and empowering approach to menstrual health management.

In conclusion, while further longitudinal and interventional studies are necessary to establish causality, this research supports the integration of physical activity into lifestyle recommendations for women experiencing menstrual pain. Encouraging regular physical activity could be a crucial step in improving quality of life and reducing the reliance on pharmacological interventions among women of reproductive age.

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