



Relationship between physical activity and dysmenorrhea in female students of SMA Negeri 5 Denpasar

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ABSTRACT

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Dysmenorrhea is a common condition characterized by menstrual pain among adolescent girls. Physical activity is one factor associated with dysmenorrhea severity. This study aimed to determine the relationship between physical activity and dysmenorrhea in female adolescents at SMAN 5 Denpasar. This study employed a correlational analytical design with a cross-sectional approach. The study population consisted of 196 individuals, and 66 adolescent girls were selected using purposive sampling. Data were collected using a physical activity questionnaire. The results showed that 39.4% of respondents had low physical activity, and 60.6% had moderate physical activity. Spearman's rank correlation test revealed a significant relationship between physical activity and dysmenorrhea ($p = 0.001$), with a correlation coefficient of -0.693 , indicating a strong negative correlation. In conclusion, the higher the level of physical activity, the lower the severity of dysmenorrhea experienced by female adolescents. Moderate physical activity performed regularly has a positive effect in reducing menstrual pain. It is recommended for female students to increase physical activity routinely, such as walking, aerobics, yoga, or other light exercises as a non-pharmacological effort to overcome dysmenorrhea.

INTRODUCTION

Dysmenorrhea is a common complaint frequently experienced by adolescent girls, characterized by pain in the lower abdomen that appears before or during menstruation. Although classified as a prevalent health issue, this condition is often dismissed by some segments of society¹. Dysmenorrhea occurs due to uterine wall contractions triggered by increased levels of prostaglandin hormones that play a role in the shedding of the endometrial lining. According to the WHO, 90% of women experience dysmenorrhea, with 10-15% experiencing mild dysmenorrhea. The prevalence of primary dysmenorrhea exceeds 50% in many countries, with 62.3% in the United States, 59.7% according to Klein and Litt, and 72% in Sweden. In Indonesia, the prevalence of dysmenorrhea reaches 64.25%, with 54.89% of them being primary dysmenorrhea and 9.36% secondary dysmenorrhea. This process may cause pain of varying severity, ranging from mild to significantly disruptive to daily activities². Globally, physical inactivity contributes to 7.2% of deaths and 7.6% of cardiovascular diseases. Non-communicable diseases resulting from a lack of physical activity vary, from 1.6% in hypertension to 8.1% in dementia. Middle-income countries account for approximately 69% of total deaths related to physical inactivity, with the highest burdens found in Latin America, the Caribbean,



and high-income countries, while Oceania and East/Southeast Asia record the lowest figures³. Conversely, the WHO notes that approximately 90% of women experience dysmenorrhea, with 10–15% experiencing mild cases. Prevalence is high across various countries, such as 62.3% in the United States, 59.7% according to Klein and Litt, and 72% in Sweden⁴.

In Indonesia, the severity of dysmenorrhea reaches 64.25%, consisting of 54.89% primary dysmenorrhea cases and 9.36% secondary dysmenorrhea cases⁵. Although official data for Bali Province is not yet available, several studies indicate a high prevalence. One such study by Artawan (2022) reported that 74.42% of adolescent girls in Bali experience dysmenorrhea, and these pain symptoms are known to disrupt sleep patterns and quality. Dysmenorrhea is classified into two types: primary and secondary. Primary dysmenorrhea is the most common type among adolescents and is not caused by abnormalities in the reproductive organs. The pain is generally triggered by high prostaglandin production, which causes uterine contractions. Several lifestyle factors, such as diet, stress, and physical activity, also influence the occurrence of dysmenorrhea symptoms⁶.

Numerous studies indicate that physical activity can help reduce the intensity and duration of menstrual pain. Women who regularly engage in physical activity tend to experience dysmenorrhea with milder intensity compared to those who are less active. This activity can improve blood flow, lower prostaglandin levels, and alleviate the stress that often exacerbates menstrual pain. Nevertheless, the understanding of the link between physical activity and dysmenorrhea in adolescent girls remains limited, particularly in Indonesia⁷.

The results of a preliminary study conducted on 10 adolescent girls at State Senior High School (SMA Negeri) 5 Denpasar showed that 70% of them experienced dysmenorrhea. This finding is close to the national figure, which shows a prevalence of 64.25%, with primary dysmenorrhea at 54.89% and secondary dysmenorrhea at 9.36%⁸. Therefore, this study aims to further explore the relationship between physical activity and the severity of dysmenorrhea among adolescent girls, focusing on students at State Senior High School (SMA Negeri) 5 Denpasar.

METHODS

This study employed a correlational analytical design with a cross-sectional approach. The research was conducted at State Senior High School (SMA Negeri) 5 Denpasar from March to June 2025. The sample consisted of 66 tenth-grade female students selected using a purposive sampling technique, based on predefined inclusion and exclusion criteria. Inclusion criteria included being 15–16 years old, having attained menarche, and voluntarily agreeing to participate. Respondents with a history of health disorders, particularly reproductive organ diseases, or those who were absent during data collection, were excluded from the sample. The independent variable in this study was physical activity, while the dependent variable was the level of dysmenorrhea. Data were collected using a digital questionnaire administered via Google Forms.

The instruments used included a self-administered sociodemographic characteristics questionnaire, the Physical Activity Questionnaire for Adolescents (PAQA) consisting of six items to measure physical activity levels, and a dysmenorrhea questionnaire comprising 15 Likert-scale questions to assess the severity of dysmenorrhea⁹. All instruments were standardized questionnaires that had previously undergone validity and reliability testing. Data analysis was performed descriptively and inferentially using the Spearman's rank correlation test, with a significance level of $\alpha = 0.05$. This research obtained ethical approval as evidenced by Ethical Clearance Certificate Number: DP.0402/F.XXXII.25/64232025, dated May 20, 2025, and a research permit from State Senior High School 5 Denpasar Number: B.10.400.7.22.1/2165/SMAN 5 DPS/DIKPORA.

RESULT AND DISCUSSION

Based on the predetermined sampling criteria, 66 respondents were selected as research participants. The sample characteristics are presented in Table 1.

Table 1. Characteristics of female students at SMA Negeri 5 Denpasar

Characteristic	Frequency (f)	Percentage (%)
Age		
15 years old	35	53.0
16 years old	31	47.0
Class		
Natural Science	39	59.1
Social Science	27	40.9
Total	66	100

The characteristics of the respondents at SMA Negeri 5 Denpasar, as presented in Table 1, indicate that the majority of respondents were 15 years old (53.0%), while the remaining 47.0% were 16 years old. Regarding their academic track, the majority of students were from the Natural Sciences (IPA) track (59.1%), with the other 40.9% coming from the Social Sciences (IPS) track.

Table 2. Physical activity levels of female students at SMA Negeri 5 Denpasar

Physical Activity	Frequency (f)	Percentage (%)
Low	26	39.4
Moderate	40	60.6
Total	66	100

The results indicate that the majority of female students at SMA Negeri 5 Denpasar engage in moderate physical activity (60.6%), while the remaining 39.4% engage in low physical activity. The distribution of physical activity levels is presented in Table 2. These findings indicate that most adolescent girls in the school environment tend to have low to moderate physical activity levels. According to global health research and WHO data, there is a significant gender gap in physical activity. Approximately 85% of adolescent girls worldwide do not meet the recommended daily physical activity levels, a figure consistently higher than that of their male counterparts. For many girls, the school setting becomes an environment where body-related self-consciousness may increase; the fear of being judged by peers, combined with a lack of private changing facilities or concerns about maintaining their physical appearance during the school day, creates a powerful deterrent. Furthermore, biological factors like the menstrual cycle and higher prevalence of anemia often intersect with a rigid curriculum that lacks the flexibility to accommodate these needs. Consequently, when school contextual factors such as locker room privacy, diverse activity choices like yoga or dance, and a supportive social climate are neglected, the resulting culture reinforces sedentary behavior among girls, highlighting the urgent need for schools to shift toward more gender-responsive and inclusive physical activity frameworks.

Table 3. Severity of dysmenorrhea among female students at SMA Negeri 5 Denpasar

Dysmenorrhea	Frequency (f)	Percentage (%)
No dysmenorrhea	29	43.9
Mild	15	22.7
Moderate	15	22.7
Severe	7	10.6
Total	66	100

The severity of dysmenorrhea among female students at SMA Negeri 5 Denpasar, as presented in Table 3, shows that the majority (43.9%) of female students did not experience dysmenorrhea. However, 15 female students (22.7%) each experienced mild and moderate dysmenorrhea, while 7 female students (10.6%) reported severe dysmenorrhea. Dysmenorrhea is one of the most common menstrual complaints experienced by adolescent girls, particularly during the early stages of menarche,

which generally occurs between the ages of 10 and 16 years⁸. Primary dysmenorrhea is generally caused by an increased production of prostaglandins, chemical compounds that trigger excessive uterine muscle contractions, thereby causing pain. Symptoms of dysmenorrhea may include pain in the lower abdomen and lower back, accompanied by nausea, vomiting, diarrhea, or headaches⁹. When menstrual pain is not managed properly, the impact can extend to psychosocial and educational aspects. Elyana (2025)⁴ states that dysmenorrhea can lead to school absenteeism, decreased concentration in learning, and emotional disturbances such as irritability or anxiety. Various factors play a role in exacerbating dysmenorrhea symptoms, including psychological stress, poor sleep quality, low levels of physical activity, suboptimal nutritional status, and diets high in fat and low in fiber.

The management of dysmenorrhea can be achieved through both pharmacological and non-pharmacological approaches. Furthermore, the nutritional status of adolescents also influences the severity of dysmenorrhea; adolescents with chronic energy deficiency (CED) or anemia tend to experience more severe menstrual pain¹⁰. Based on the categorization of physical activity levels, it was found that the majority of respondents had a moderate activity level, accounting for 40 students (60.6%), while 26 respondents (39.4%) fell into the low activity category. No respondents were found to engage in vigorous physical activity in this study.

Table 4. Relation between physical activity and dysmenorrhea among female students

Physical Activity	No dysmenorrhea		Mild		Moderate		Severe		Total		p-value*
	f	%	f	%	f	%	f	%	f	%	
Low	3	4.5	3	4.5	13	19.7	7	10.6	26	39.4	0.001
Moderate	26	39.4	12	18.2	2	3.0	0	0	40	60.6	
Total	29	43.9	15	22.7	15	22.7	7	10.6	66	100	-0.693

The research results presented in Table 4 indicate that the majority (39.4%) of respondents who engaged in moderate physical activity did not experience dysmenorrhea. In contrast, respondents in the low physical activity category tended to experience severe (10.6%) dysmenorrhea. The statistical analysis revealed a p-value of 0.001 ($p < 0.05$), signifying a significant relationship between physical activity and dysmenorrhea. The correlation coefficient (r) of -0.693 indicates a strong negative correlation, which means that a higher level of physical activity is associated with a lower level of dysmenorrhea severity.

Based on Table 4, it can be seen that of the 26 respondents (39.4%) who had low physical activity, there were 3 respondents (4.5%) who did not have dysmenorrhea, 3 respondents (4.5%) who had mild dysmenorrhea, 13 respondents (19.7%) who had moderate dysmenorrhea, and 7 respondents (10.6%) who had severe dysmenorrhea. Meanwhile, of the 40 respondents (60.6%) with moderate activity, there were 26 respondents (39.4%) who did not have dysmenorrhea, 12 respondents (18.2%) who had mild dysmenorrhea, 2 respondents (3%) who had moderate dysmenorrhea, and no respondents with severe dysmenorrhea were found.

Physical activity or exercise is known to provide health benefits, including reducing the intensity and duration of menstrual pain. Some studies show that women who exercise regularly have lower levels of dysmenorrhea compared to those who are less physically active. Exercise can improve blood circulation, reduce prostaglandin levels, and help relieve stress, which often worsens menstrual pain. Physical activity contributes to weight regulation, energy metabolism balance, and bone and muscle health. These factors are essential during adolescence as a phase for building long-term health foundations. Furthermore, a lack of physical activity not only impacts physical health but also correlates with psychological disturbances such as stress, anxiety, and sleep disorders, which in turn can exacerbate dysmenorrhea symptoms¹³. Several factors may influence low physical activity among adolescent girls, including a sedentary lifestyle such as excessive gadget use, a lack of understanding regarding the importance of physical activity, minimal support from family and school environments, and a lack of adequate and easily accessible sports facilities. Additionally, a demanding academic schedule at school is a significant barrier to providing sufficient time for routine physical activity¹⁴.

Physical activity is a crucial element in maintaining optimal health and bodily functions, especially during adolescence, which is a vital period for growth and development. Global health organizations recommend that adolescents engage in moderate-to-vigorous physical activity (MVPA) for at least 60 minutes every day. These activities can include brisk walking, cycling, running, organized sports, or physical extracurricular activities organized by the school¹¹.

Low levels of physical activity in adolescent girls have been linked to various negative health impacts, one of which is an increased risk of dysmenorrhea. Adequate physical activity has been proven to lower prostaglandin levels—compounds that play a role in stimulating excessive uterine muscle contractions and causing pain during menstruation. Therefore, routine exercise can serve as an effective non-pharmacological strategy to reduce both the intensity and duration of menstrual pain¹².

Spearman's rank correlation test yielded a p-value of 0.001 ($p < 0.05$), indicating a significant relationship between physical activity levels and the severity of dysmenorrhea in adolescent girls. Furthermore, the correlation coefficient (r) of -0.693 demonstrates a strong negative correlation between the two variables. This implies that as the level of physical activity increases, the severity of dysmenorrhea experienced by adolescents significantly decreases. Physical activity stimulates the release of endorphins, which act as natural analgesics, promote relaxation, and provide temporary pain relief. Additionally, such activity supports vasodilation of the blood vessels in the reproductive area, thereby improving blood flow and helping to reduce the risk of menstrual pain¹⁵.

Another study further supports these results, noting that low physical activity is a risk factor that can exacerbate menstrual pain¹⁶. Dysmenorrhea is generally associated with increased prostaglandin levels, which cause excessive uterine contractions and a subsequent decrease in blood flow and oxygenation to the uterine tissue. Therefore, increasing regular physical activity serves as a potential preventive measure to mitigate dysmenorrhea complaints. Beyond physical activity, nutritional factors also play a role in influencing the severity of dysmenorrhea. According to previous research, adequate iron intake is crucial in preventing anemia, which can worsen conditions during menstruation. They also emphasize the importance of regular physical activity—particularly light-to-moderate intensity—in maintaining smooth blood circulation, stimulating endorphin production as a natural painkiller, and reducing muscle tension. The combination of good nutritional status and optimal physical activity is believed to provide protection against severe dysmenorrhea symptoms¹⁷.

CONCLUSION

The majority of respondents (60.6%) engaged in moderate physical activity, while the remaining 39.4% were categorized as having low physical activity. Regarding the severity of dysmenorrhea, more than half of the adolescent girls reported experiencing menstrual pain, consisting of 22.7% mild, 22.7% moderate, and 10.6% severe dysmenorrhea, while 43.9% did not experience any symptoms. The Spearman's rank correlation test results demonstrated a significant relationship between physical activity and dysmenorrhea ($p = 0.001$), with a strong negative correlation ($r = -0.693$). This indicates that as physical activity levels increase, the severity of dysmenorrhea tends to decrease. These results highlight the importance of promoting regular physical activity as an effective non-pharmacological approach to managing menstrual pain among adolescent girls. Higher levels of physical activity were associated with the lower the severity of dysmenorrhea experienced by female adolescents. These findings indicate the need for more intensive health education, both by schools and health workers.

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CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

The authors used ChatGPT (OpenAI, version GPT-5) to assist in improving the language and grammar of the manuscript. The authors reviewed and verified the content to ensure accuracy and integrity.

AUTHOR CONTRIBUTIONS

ANI conceptualized the study, performed the experiments, and wrote the original draft of the manuscript. NKS, NNB, and IPPSA supervised the research, reviewed the methodology, and edited the final manuscript. All authors contributed to the article and approved the submitted version.

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