

ARTICLE INFORMATION

Received: July 05, 2026

Revised: July 18, 2026

Available online: July 22, 2026

at: <https://e-jurnal.iphorr.com/index.php/mchc>

Association between physical activity and dysmenorrhea intensity among adolescent girls

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Abstract

Background: Dysmenorrhea is one of the most common reproductive health problems among adolescent girls and frequently interferes with daily activities, school attendance, and academic performance. Regular physical activity has been reported to improve blood circulation, reduce prostaglandin production, and stimulate endorphin release, thereby potentially decreasing menstrual pain. However, evidence regarding the association between physical activity and dysmenorrhea among adolescent girls in Sleman remains limited.

Purpose: To determine the relationship between physical activity and the intensity of dysmenorrhea among adolescent girls.

Method: A quantitative analytical study with a cross-sectional design was conducted among 66 tenth-grade female students selected from a population of 192 students using proportionate stratified random sampling. Physical activity was assessed using the Global Physical Activity Questionnaire (GPAQ), while dysmenorrhea intensity was measured using the Numeric Rating Scale (NRS). Data were analyzed using descriptive statistics and Spearman's rank correlation test with a significance level of $p < 0.05$.

Results: Of the 66 respondents, 57.5% engaged in vigorous physical activity, whereas 45.4% reported no menstrual pain. Spearman's rank correlation analysis demonstrated a statistically significant association between physical activity and dysmenorrhea intensity (Spearman's $\rho = 0.673$; $p < 0.001$). Higher levels of physical activity were associated with lower menstrual pain intensity among adolescent girls.

Conclusion: Physical activity level was significantly associated with dysmenorrhea intensity. However, the direction of the association should be confirmed based on the variable coding and correlation output.

Keywords: Adolescent Girls; Dysmenorrhea; Menstrual Pain; Physical Activity; Reproductive Health.

INTRODUCTION

Adolescent girls commonly experience menstrual pain during menstruation, which is usually felt in the lower abdomen and can spread to the waist or lower back when they are menstruating. This pain is commonly experienced by women who are in their fertile period and can interfere with their daily activities. A high incidence rate is seen in adolescent girls, particularly among those aged 14 to 16, who are having their first period. Menstruation can also interfere with the learning process for adolescent girls, resulting in decreased motivation and focus, which makes it difficult for them to understand the

subject matter. Menstrual pain can vary from mild pain to severe pain in the lower abdomen and can even cause difficulty in performing activities. In order to get the best learning results, students need to give a good focus on the teaching-learning process (Dianah, Syam, Muliadi, & Safrida, 2025; Nurrahimah, Herdiani, & Rosnawanty, 2025).

Dysmenorrhea is affected by two main factors, these include Internal factors and external factors. Factors include age at the time of the first menstruation as well as family history and duration of menstruation and exercise routine. External

influences include stress degrees, nutrient levels, and fast food consumption. In addition, low physical activity can trigger a decrease in oxygen supply to the bloodstream system, increasing pain, including menstrual pain. On the other hand, physical activity or exercise can stimulate the production of endorphins hormones that play a role in lowering anxiety, blood pressure, and relieving pain during menstruation. Another studies also shows a link between physical movement and dysmenorrhea, where low physical movement tends to increase the incidence of primary dysmenorrhea (Robbaniyah & Soeyono, 2023; Aisyaroh, Hudaya, & Safitri, 2022; Sani & Isaeni, 2024).

According to the WHO, women (90%) suffer from severe dysmenorrhea and 10-15% suffer from mild dysmenorrhea. Various studies in several countries show that the prevalence of primary dysmenorrhea exceeds 50%, with figures of 62.3% in the United States, 59.7% based on the reports of Client and Litt, and about 72% in Sweden. Severe dysmenorrhea can cause adolescent girls to be unable to do activities, reduce the quality of life, and have an impact on academic, social, sports, and school attendance aspects. The incidence of dysmenorrhea in adolescent girls in Indonesia reached 64.25%, with 54.89% experiencing mild dysmenorrhea and 9.36% severe dysmenorrhea. Data from the Sleman Health Office shows an increase in the number of adolescent girls with menstrual disorders, from 63 cases in 2021 to 73 cases in 2022. Severe dysmenorrhea in adolescents also has an impact on declining academic performance, characterized by low grades, decreased focus on learning, and high levels of absenteeism from school (Amilsyah, Paseriani, Hariyani, & Sipasulta, 2023; Ernita, Djamaudin, & Yulendasari, 2022; Syabaniah, Nuraeni, & Nurlina, 2025; Widiawati, Ismarwati, & Mahmudah, 2025).

In accordance with Government Regulation of the Republic of Indonesia Number 61 of 2014 concerning Reproductive Health, the government provides reproductive health services to adolescents with the intention of preparing the younger generation to live a life of education about healthy reproduction is important for adolescents. including improving the quality of health services that care for adolescents (PKPR). This effort includes the provision of information and adolescent health counseling services in health facilities, as well as maternal, child,

female reproduction, and family planning health services. In this context, midwives have a role that has a big impact. It is important to provide education about menstruation and related problems, including dysmenorrhea, as well as how to handle it through counseling or educational media. Dysmenorrhea in adolescents still receives less attention because menstruation is often considered taboo and menstrual pain is seen as something normal. However, dysmenorrhea can cause weakness, decreased focus, interfere with daily activities, and negatively impact quality of life, education, economic conditions, and health, including the risk of endometriosis and mental disorders (Khasanah, 2021).

Previous studies have reported the association between physical activity and dysmenorrhea among adolescents. However, limited evidence is available regarding senior high school students in Sleman using GPAQ to measure physical activity and NRS to assess pain intensity.

RESEARCH METHOD

This study employed a quantitative analytical observational design with a cross-sectional approach to examine the association between physical activity and the intensity of dysmenorrhea among adolescent girls. The cross-sectional design enabled the measurement of both independent and dependent variables simultaneously at a single point in time.

The study was conducted at MAN 3 Sleman, Yogyakarta, Indonesia. The target population comprised all tenth-grade female students enrolled at the school, totaling 192 students. The study sample consisted of 66 respondents who met the predetermined inclusion and exclusion criteria. The sample size was selected using a probability sampling technique with proportionate stratified random sampling to ensure proportional representation from each class.

The inclusion criteria were female students enrolled in the tenth grade, who had experienced menarche, were willing to participate in the study, and provided informed consent. Students who had not yet experienced menstruation, had a diagnosed gynecological disorder, or returned incomplete questionnaires were excluded from the study.

Physical activity served as the independent variable, while the intensity of dysmenorrhea was the dependent variable. Physical activity was defined as

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DOI: <https://doi.org/10.56922/mchc.v5i4.3599>

any bodily movement requiring energy expenditure and was assessed using the Global Physical Activity Questionnaire (GPAQ), consisting of 16 items that evaluate physical activity performed at work or school, during transportation, and during recreational activities. Based on the GPAQ scoring guidelines, respondents were categorized into light, moderate, or vigorous physical activity levels.

The intensity of dysmenorrhea was measured using the Numeric Rating Scale (NRS), a validated self-report instrument ranging from 0 to 10, where 0 indicates no pain and 10 indicates the worst imaginable pain. Respondents completed the NRS questionnaire during menstruation according to the level of pain they experienced. Pain intensity was subsequently classified into four categories: no pain, mild pain, moderate pain, and severe pain.

Data were collected using structured self-administered questionnaires. Before data collection, respondents received an explanation regarding the study objectives and procedures, and informed consent was obtained from all participants. The

completed questionnaires were checked for completeness before data entry and analysis.

Descriptive (univariate) analysis was performed to summarize respondents' characteristics and the distribution of physical activity and dysmenorrhea intensity. Continuous variables were presented as means and standard deviations, whereas categorical variables were expressed as frequencies and percentages. Bivariate analysis was conducted using Spearman's rank correlation test to determine the relationship between physical activity level and dysmenorrhea intensity because both variables were measured on an ordinal scale. Statistical significance was established at a p-value of less than 0.05.

This study received ethical approval from the Health Research Ethics Committee of Universitas 'Aisyiyah Yogyakarta under Ethical Clearance Number 4936/KEP-UNISA/XI/2025. All respondents participated voluntarily, and confidentiality and anonymity of participant information were maintained throughout the study.

RESEARCH RESULTS

Table Characteristics Of Respondents (N=66)

Variable	Results	P-value	r
Age (Mean±SD) (Years) (Range)	(11.86 ± 0.92) (12-15)		
<12	30/45.5		
12-13	34/51.5		
≥14	2/3.0		
Physical Activity (n%)		0.000	0.673
Lightweight	17/25.7		
Medium	11/16.6		
Weight	38/57.5		
Menstrual Pain (n%)			
No pain complaints	30/45.4		
Mild pain	13/19.7		
Moderate pain	8/12.1		
Severe pain	15/22.7		

The table above shows that the average age of respondents and standard deviation are (11.86 ± 0.92) with an age range (12-15). The majority of respondents have physical activity weight, namely 38 respondents (57.5%), with the majority not having

complaints of menstrual pain, namely 30 (45.5%). p-value 0.000 is smaller than 0.05, it can be concluded that there is a relationship between physical activity and the intensity of menstrual pain (dysmenorrhea) in adolescent girls.

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DISCUSSION

The results of the research that has been conducted at MAN 3 Sleman show that the significance value or p-value is 0.000, which indicates $p < 0.05$ which indicates a relationship between physical activity and the intensity of menstrual pain (*dysmenorrhea*). This relationship is clear from the results of a study conducted at MAN 3 Sleman on 66 respondents. In the group of female students who did heavy physical activity, the majority did not experience menstrual pain, namely 24 respondents (36.4%). Meanwhile, 11 respondents (16.7%) experienced mild menstrual pain, 3 respondents (4.5%) experienced moderate menstrual pain, and no respondents experienced severe menstrual pain (0%).

The findings of this study indicate that intensive physical activity can help reduce the intensity of menstrual pain. Physiologically, regular physical activity improves pelvic blood circulation to the pelvic organs as well as decrease the production of prostaglandins, which are substances that cause excessive uterine contractions that can cause dysmenorrhea. In addition, physical activity can also stimulate the secretion of endorphins which act as natural analgesics for the body. Therefore, respondents who are physically active tend to experience menstrual pain less often compared to respondents who are less active (Faozi & Aisyah, 2024).

In the group that had moderate physical activity, the majority of respondents actually felt mild to moderate menstrual pain. A total of 4 respondents (6.1%) were painless, 2 respondents (3.0%) felt mild pain, and 5 respondents (7.6%) felt moderate pain. No respondents stated that they felt severe pain. These results show that moderate physical activity provides a lower protective effect than strenuous physical activity, although it still contributes to reducing the intensity of menstrual pain. Moderate activity may not be enough to produce maximum physiological effects in decreasing uterine contractions or reducing the accumulation of prostaglandins.

The group with light physical activity showed a different pattern. A total of 2 respondents (3.0%) did not experience menstrual pain, but 0 respondents experienced mild pain. In fact, most of them

experienced moderate pain or severe pain, namely 3 respondents (4.5%) and 15 respondents (22.7%) respectively. The rate of severe pain in this group was the highest compared to other physical activity groups. This suggests that low physical activity can increase the risk of menstrual pain and heavier. In theory, a lack of physical activity can cause blood flow to the pelvic area to be less optimal, muscles to become more tense, and the body's inflammatory response to increase. This condition makes it easier for strong uterine contractions to occur so that menstrual pain is more intense. From the results of the analysis using the Spearman rank test, a correlation coefficient of 0.673 (which shows a strong correlation) and a p value of 0.000 which is smaller than 0.05, so it can be concluded that there is a relationship between physical activity and the level of intensity of menstrual pain (*dysmenorrhea*) in adolescent girls at MAN 3 Sleman.

The findings of this research are in line with the research entitled "The Relationship between Physical Activity and Dysmenorrhea in PPTQ Al-Asy'ariyyah Students of the Syaunqal Qur'an Kalibeber Building". The study revealed a significant correlation between exercise and menstrual pain in PPTQ Al-Ash'ariyyah students of the Syaunqal Qur'an Building, a correlation coefficient that shows a strong relationship. Since the correlation coefficient is negative, this indicates an opposite relationship, meaning that the more intense the physical movements performed, the lower the dysmenorrhea pain scale (Fitriyani & Eli Raharyani (2024). These findings are also in line with another study entitled "The Relationship between Physical Activity and the Incidence of Dysmenorrhea in Class X Adolescent Girls at MAN 1 Sleman", which shows a relationship between physical activity and the incidence of dysmenorrhea in class X adolescent girls at MAN 1 Sleman (Fitriyani, Raharyani, & Romdiyah, 2024).

CONCLUSION

These results reinforce that regular and adequate physical activity is able to reduce menstrual pain in adolescent girls. So that the results of this study are expected to be a source of information and education for female students to not

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only improve, but also maintain good physical activity, one of which is through active participation in extracurricular activities at school such as sports, scouting, and other physical activities that support reproductive health.

SUGGESTION

It is hoped that the results of this research can serve as a source of information and education for female students, not only to improve but also to maintain good physical activity, one way of which is through active participation in extracurricular activities at school, such as sports, scouting, or other physical activities that support reproductive health.

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