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The relationship between physical activity and the incidence of dysmenorrhea among female adolescents

Maya Indria Prantini*, Sunarsih, Annisa Ermasari

Faculty of Health Sciences, Malahayati University

Corresponding author: *Email: Pmayaindria@gmail.com

Abstract

Background: Dysmenorrhea is one of the most common reproductive health disorders experienced by female adolescents, with a global prevalence reaching 60 - 90%. In Indonesia, more than 100,000 cases have been reported.

Purpose: To determine the relationship between physical activity and the incidence of dysmenorrhea among female adolescents.

Method: This study employed a quantitative method with a cross-sectional design. The population consisted of all female students who experienced dysmenorrhea at SMK PGRI Palas, with a sample of 50 respondents. Data were collected using a questionnaire. Data analysis was conducted through univariate and bivariate analyses using Fisher's Exact test to determine the relationship between variables.

Results: The results showed that the majority of respondents had moderate physical activity (76%), and 60% experienced dysmenorrhea. Fisher's Exact test indicated a significant relationship between physical activity and the incidence of dysmenorrhea ($p = 0.005$).

Conclusion: The results of the study showed that physical activity was significantly associated with the incidence of dysmenorrhea among female adolescents.

Keywords: Dysmenorrhea; Female Adolescents; Physical Activity; Reproductive Health.

INTRODUCTION

Dysmenorrhea is one of the most common reproductive health problems experienced by female adolescents and remains a global public health concern. The World Health Organization (WHO) in 2024 reported that approximately 60 - 90% of women worldwide experience dysmenorrhea, with the highest prevalence occurring among adolescents and young adults. Dysmenorrhea is generally characterized by lower abdominal pain during menstruation, which may be accompanied by nausea, vomiting, headache, diarrhea, fatigue, and back pain. This condition not only causes physical discomfort but also affects daily activities and the overall quality of life of women (Khoirunnisa & Humayrah, 2024).

Menstruation occurs when the inner lining of the uterus sheds and is released in a form known as

menstrual blood. Normally, a woman of childbearing age releases one egg (ovum) each month, and the resulting egg is released by the ovaries. A woman's first period is called menarche (Ganong, 2002). During menstruation, the problem experienced by almost all women is discomfort to severe pain; this is called menstrual pain (dysmenorrhea). According to data from the World Health Organization (WHO), the incidence of dysmenorrhea in Indonesia is 55% among productive age groups, with 15% of them complaining of limited activities due to dysmenorrhea (Kojo, Kaunang, & Rattu, 2021).

In Indonesia, dysmenorrhea remains a significant public health problem. Data from the Indonesian Ministry of Health in 2020 indicated that there were 107,673 cases of dysmenorrhea, with 64.24%

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classified as primary dysmenorrhea, which is predominantly experienced by female adolescents. In Lampung Province, the prevalence of adolescents experiencing dysmenorrhea and seeking health services was reported to range from 1.12–1.35%, and this condition has been associated with school absenteeism and decreased academic performance among female students (Lampung Provincial Health Office, 2020). Menstrual pain that is not properly managed can lead to impaired learning concentration, mood changes, anxiety, and decreased productivity (Fitriyani, Raharyani, & Romdiyah, 2024).

Clinically, dysmenorrhea is classified into primary and secondary dysmenorrhea. Primary dysmenorrhea occurs in the absence of any reproductive organ abnormalities and typically appears 6 - 12 months after menarche, whereas secondary dysmenorrhea is associated with pathological conditions such as endometriosis or uterine fibroids (Abdullah, Rosdianto, Adyani, Rosyeni, & Rusyanti, 2024). The primary mechanism of primary dysmenorrhea is related to increased production of prostaglandins, particularly prostaglandin $F_{2\alpha}$, which triggers excessive myometrial contractions, vasoconstriction, tissue ischemia, and the onset of menstrual pain (Manay, Ristiani, & Nelva, 2023).

Various factors are known to contribute to the occurrence of dysmenorrhea, including early menarche, family history, nutritional status, stress levels, sleep quality, smoking habits, and lifestyle (Fajria, Ramadani, & Saputra, 2024). One lifestyle factor that plays an important role is physical activity. Insufficient physical activity can lead to impaired blood circulation and reduced oxygen distribution to the pelvic tissues, thereby increasing pain perception during menstruation (Fitriyani et al., 2024).

According to the World Health Organization (WHO), physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure, and it is recommended that adolescents engage in at least 60 minutes of moderate to vigorous intensity physical activity per day. Regular physical activity can improve blood flow, reduce muscle tension, and stimulate the release of endorphins that act as the body's natural analgesics, thereby potentially reducing the intensity of menstrual pain (Swandari, 2023).

Several studies have demonstrated an association between physical activity and the incidence of dysmenorrhea. Other study reported that female adolescents with low levels of physical activity had a higher risk of experiencing dysmenorrhea compared to those engaging in moderate physical activity (Hidayati & Gunawan, 2024). Similar findings were also reported who found a significant relationship between physical activity and complaints of primary dysmenorrhea (Wedantari, Sumadewi, & Suryantha, 2023). However, other studies have reported differing results, suggesting that this relationship may be influenced by factors such as the intensity of physical activity, nutritional status, stress levels, and other individual factors (Sipahelut, Sugesti, & Wulandari, 2023).

RESEARCH METHOD

This study employed a quantitative approach with an analytical observational design. The research design used was a cross - sectional study, in which data were collected at a single point in time to analyze the relationship between the independent and dependent variables.

The study was conducted at SMK PGRI Palas, South Lampung Regency, in 2025. The study population consisted of all female adolescents who had experienced menstruation at SMK PGRI Palas. A total sampling technique was applied, meaning that all members of the population who met the inclusion and exclusion criteria were included as research participants, resulting in a total of 50 respondents.

The independent variable in this study was physical activity, while the dependent variable was the incidence of dysmenorrhea. Physical activity was measured using the International Physical Activity Questionnaire (IPAQ), which categorizes respondents' physical activity levels into light, moderate, and vigorous based on MET-minutes per week. The incidence of dysmenorrhea was assessed using a menstrual pain questionnaire adapted to the respondents' conditions.

Data collection was carried out by distributing questionnaires to respondents after providing an explanation of the study objectives and procedures and obtaining informed consent. The collected data then underwent editing, coding, data entry, and cleaning prior to analysis. Data analysis was conducted using univariate analysis to describe the

Maya Indria Prantini*, Sunarsih, Annisa Ermasari

Faculty of Health Sciences, Malahayati University
Corresponding author: *Email: Pmayaindria@gmail.com

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frequency and percentage distributions of respondents' characteristics, levels of physical activity, and the incidence of dysmenorrhea. Bivariate analysis was subsequently performed to examine the relationship between physical activity and dysmenorrhea using the Chi-square test. If any cells

had an expected count of less than 5, Fisher's Exact test was applied. The relationship between variables was considered statistically significant if the p-value was < 0.05 , while a p-value ≥ 0.05 indicated no statistically significant relationship.

RESEARCH RESULTS

Table 1 Frequency Distribution of Respondents (N=50)

Variabel	Results	P-value
Age at Menarche (n/%)		
< 11 years	8/16.0	
≥ 11 years	42/84.0	
Menstrual Cycle (n/%)		
< 21 days	14/28.0	
21 – 35 days	24/48.0	
≥ 35 days	12/24.0	
Menstrual Cycle (n/%)		
< 21 days	14/28.0	
21 – 35 days	24/48.0	
≥ 35 days	12/24.0	
Duration of Menstruation (n/%)		
≤ 3 days	17/34.0	
5 – 7 days	16/32.0	
7 – 14 days	7/14.0	
≥ 14 days	10/20.0	
Physical Activity Level (n/%)		0.005
Light	9/18.0	
Moderate	38/76.0	
Vigorous	3/6.0	
Incidence of Dysmenorrhea (n/%)		
Yes	30/60.0	
No	20/40.0	

Based on table, the results of the study involving 50 female adolescents at SMK PGRI Palas, South Lampung Regency, showed that the majority of respondents were in the late adolescent age group. The distribution of respondents by educational level indicated that most participants were from grades XI and XII. In terms of age at menarche, most respondents experienced menarche at the age of ≥ 12 years, which falls within the normal age range for the

onset of menstruation among female adolescents. Regarding the duration of menstruation, the majority of respondents experienced menstrual periods lasting ≤ 7 days, which is considered within the normal physiological range. Overall, the characteristics of the respondents reflected relatively homogeneous biological conditions and reproductive development, thereby supporting the uniformity of the study

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subjects in analyzing the relationship between physical activity and the incidence of dysmenorrhea.

The majority of respondents had a moderate level of physical activity, accounting for 76%, while 18% engaged in light physical activity and only 6% had vigorous physical activity. These findings indicate that most female adolescents have been physically active in their daily lives, whether through school-related activities, household chores, or light exercise. This suggests that the majority of female adolescents at SMK PGRI Palas are sufficiently physically active, although they have not yet reached the vigorous activity category. These data are important for further analysis, as adequate physical activity is believed to help reduce the risk of dysmenorrhea.

Table shows that 30 respondents experienced dysmenorrhea, while 20 respondents did not report such complaints. This indicates that more than half of the respondents experienced menstrual pain during their menstrual cycles. The high incidence rate further emphasizes the importance of interventions targeting risk factors for dysmenorrhea. In addition, these data

provide a basis for identifying groups that require Education or further management. This frequency also reflects that dysmenorrhea remains a common reproductive health problem among adolescents. The results of Fisher's Exact Test showed a p-value of 0.005 ($p < 0.05$), indicating a statistically significant relationship between physical activity and the incidence of dysmenorrhea among female adolescents.

These findings suggest that respondents with lower levels of physical activity have a higher risk of experiencing dysmenorrhea compared to those with moderate and vigorous levels of physical activity. Light physical activity, which was predominant among respondents experiencing dysmenorrhea, may result in suboptimal blood circulation, thereby increasing uterine contractions and exacerbating menstrual pain. In contrast, more intense and regular physical activity can help improve blood flow to the pelvic area and stimulate the release of endorphins, which play a role in reducing pain perception.

DISCUSSION

Based on the study results, the majority of respondents had a moderate level of physical activity, accounting for 76%, while 18% engaged in light physical activity and only 6% performed vigorous physical activity. These findings indicate that most female adolescents are physically active in their daily lives, whether through school-related activities, household chores, or light exercise. However, the intensity and regularity of the physical activity performed have not yet been fully optimal. Physical activity is an important component of a healthy lifestyle, as it plays a role in maintaining physical fitness, improving blood circulation, and helping regulate hormonal balance related to the menstrual cycle.

Adolescence is a transitional period marked by physical, emotional, and psychological changes. Adolescence, the period between 10 and 19 years of age, is a period of reproductive maturation, often referred to as puberty. It is during this time that adolescents often face challenges during menstruation (Sagita, Minata, Amalia, & Rahmadhani, 2023). Adolescence is a transitional period marked by physical, emotional, and psychological changes. Adolescence, the period

between 10 and 19 years old, is a period of reproductive organ maturation, often referred to as puberty. It is during this period that adolescents often face menstrual problems (Puspita, Agushyvana, & Dharminto, 2019).

Dysmenorrhea is a medical condition that occurs during menstruation that can interfere with activities and requires treatment characterized by pain or soreness in the abdominal and pelvic areas. Dysmenorrhea occurs in 30-75% of women and requires treatment. In Indonesia, it is estimated that around 55% of productive women experience dysmenorrhea. As many as 15% of them report that their activities are limited due to dysmenorrhea. The cause of dysmenorrhea is still not clearly known because of many causal factors such as psychological, individual, blockage in the cervical canal, female reproductive organs, endocrine, allergies, and nutritional intake (Ariesthi, 2020).

Regular physical activity is known to provide various physiological benefits, particularly in relation to the reproductive health of female adolescents. Physical activity can increase blood flow to the pelvic organs, thereby helping to reduce muscle tension and improve oxygen supply to uterine tissues. In addition,

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physical activity stimulates the release of endorphins that function as natural analgesics, thereby reducing the perception of pain experienced during menstruation. Therefore, physical activity is often recommended as a non-pharmacological approach for the prevention and management of dysmenorrhea (Yusuf, 2022).

The study results indicate that the incidence of dysmenorrhea remains relatively high, with 60% of respondents experiencing menstrual pain. This high prevalence suggests that dysmenorrhea continues to be a common health problem among female adolescents and may affect comfort, learning concentration, and daily productivity. Dysmenorrhea generally occurs because of increased prostaglandin levels that trigger excessive uterine contractions. In addition to hormonal factors, the occurrence of dysmenorrhea is also influenced by lifestyle factors such as levels of physical activity, stress, sleep quality, and unbalanced dietary patterns (Abdullah et al., 2024).

The relationship between physical activity and the incidence of dysmenorrhea in this study showed statistically significant results. Fisher's Exact Test yielded a p-value of 0.005 ($p < 0.05$), indicating a significant association between physical activity and the incidence of dysmenorrhea. All respondents with light physical activity experienced dysmenorrhea, whereas in the moderate and vigorous physical activity groups, a larger proportion of respondents did not experience dysmenorrhea. These findings suggest that the lower the level of physical activity, the higher the risk of menstrual pain.

Physiologically, regular physical activity can help reduce excessive prostaglandin production, improve blood flow to the pelvic region, and promote relaxation of the uterine muscles, thereby preventing excessive contractions that cause pain. Physical activity also contributes to reducing stress levels and enhancing emotional stability, which indirectly influences pain perception. Consistent light to moderate - intensity exercise has been shown to help stabilize hormones involved in the menstrual cycle (Manay et al., 2023).

The findings of this study are in line with those reported which reported a significant association between physical activity and the incidence of dysmenorrhea, in which adolescents with low levels of physical activity had a higher risk of experiencing dysmenorrhea compared to those who were

physically active. Although some studies have reported different results, overall, physical activity has been shown to have a protective role against the occurrence of dysmenorrhea (Hidayati & Gunawan, 2024; Wedantari et al., 2023).

Previous research has shown a relationship between physical activity (p-value = 0.000), nutritional status (p-value = 0.038), and stress levels (p-value = 0.030) and the incidence of dysmenorrhea. This means there is a relationship between physical activity, nutritional status, and stress levels and the incidence of dysmenorrhea (Aprilia, Prastia, & Nasution, 2022). Other research results showed that 35.9% of the sample engaged in light physical activity, and the p-value between physical activity and the incidence of primary dysmenorrhea was 0.003, indicating a relationship between physical activity and the incidence of dysmenorrhea (Wulandari & Widiyaningsih, 2023).

Lack of physical activity is a contributing factor to menstrual pain. Exercise is one way to help relieve dysmenorrhea. In addition to physical activity, adolescents often experience physical and psychological problems. The body begins producing excess hormones, including adrenaline, estrogen, progesterone, and prostaglandins, which cause menstrual cramps due to strong uterine contractions. The pain varies from person to person depending on the amount of stress (Fadjriyaty & Samaria, 2021). Adolescent female students should engage in moderate physical activity to balance school activities and their health. Aim for at least 150-300 minutes of moderate-intensity aerobic physical activity. Limit the amount of time spent on these activities and avoid excessive movement to help reduce the long-term negative impacts (Kusumo, 2020).

Based on the study findings and supporting theoretical evidence, it can be concluded that physical activity plays an important role in reducing the risk of dysmenorrhea among female adolescents. Regular and sustained physical activity can be considered an effective non-pharmacological strategy for the prevention and management of menstrual pain. Therefore, promotive efforts through health education in the school environment are needed to encourage female adolescents to adopt an active lifestyle as part of maintaining reproductive health.

Maya Indria Prantini*, Sunarsih, Annisa Ermasari

Faculty of Health Sciences, Malahayati University
Corresponding author: *Email: Pmayaindria@gmail.com

CONCLUSION

The results of the study indicate that physical activity is significantly associated with the incidence of dysmenorrhea among female adolescents. The majority of respondents had a moderate level of physical activity (76%), while only a small proportion engaged in light or vigorous physical activity. The incidence of dysmenorrhea remained relatively high, affecting 60% of respondents. Analysis using Fisher's Exact Test showed a statistically significant relationship between physical activity and the incidence of dysmenorrhea ($p = 0.005$). Female adolescents with lower levels of physical activity tended to have a higher risk of experiencing menstrual pain. These findings emphasize that adequate and regular physical activity may serve as an effective non-pharmacological approach to reducing the risk of dysmenorrhea among female adolescents.

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Maya Indria Prantini*, Sunarsih, Annisa Ermasari

Faculty of Health Sciences, Malahayati University
Corresponding author: *Email: Pmayaindria@gmail.com

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