# CORRELATION OF PHYSICAL ACTIVITY, FAST FOOD CONSUMPTION, AND FAMILY HISTORY WITH PRIMARY DYSMENORRHEA AMONG ADOLESCENT GIRLS

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## ABSTRACT

Primary dysmenorrhea is often experienced by adolescents with different levels of pain. Primary dysmenorrhea affects daily activities, especially in school-age adolescents, and has an impact on their academics and productivity at school. This study aimed to determine the factors associated with the incidence of primary dysmenorrhea in female students at SMP N 2 Karanglewas. This study used a quantitative approach with a cross-sectional research design, with a total sample of 87 respondents at SMP N 2 Karanglewas using a cluster random sampling technique. Data collection was carried out using a questionnaire. Data were analyzed using the chi-square test. There is a relationship between menarche age (p-value = 0.018); physical activity (p-value = 0.008); consumption of fast food (p-value = 0.009); and family history (p-value = 0.000); with primary dysmenorrhea. There is no relationship between the length of menstruation (p-value = 1,000); nutritional status (p-value = 0.556); and stress level (p-value = 0.798). There is a significant relationship between the age of menarche, physical activity, consumption of fast food, and family history with the incidence of primary dysmenorrhea in female students of SMP N 2 Karanglewas. Adolescents with a healthy lifestyle can reduce the risk factors for primary dysmenorrhea.

Keywords: Primary Dysmenorrhea, Menarche, Physical Activity, Fast Food Consumption, Family History

## INTRODUCTION

Menstrual pain or dysmenorrhea is pain that occurs during menstruation, especially in the lower abdomen, but can spread to the lower back, waist, pelvis, upper thighs and calves. This pain is usually accompanied by severe cramps that originate from uterine muscle contractions, which occur intensely when menstrual blood comes out of the uterus. The majority of women who menstruate have experienced cramps or abdominal pain to varying degrees. Dysmenorrhea is a gynecological problem that most commonly attacks adolescent girls. This pain is experienced by teenagers and this is not caused by disease, but is called primary dysmenorrhea (Leon-Larios et al. 2024; Nurwana, Sabilu & Fachlevy 2017; Soesilowati & Annisa 2016).

Dysmenorrhea has some detrimental consequences on the patients' daily activities. It leads to missed work and school time. Patients typically do not ask for help from others in this situation due to cultural issues. Identification of abnormal menstrual patterns during adolescence may permit early prevention of potential health concerns in adulthood (Abd El-Mawgod, Alshaibany & Al-Anazi 2016).

Dysmenorrhea is the most common menstrual problem in adolescent girls. On average, teenagers experience discomfort during menstruation such as stomach cramps, nausea, dizziness, and fainting. These complaints are also the reason why teenagers do not participate in school activities and decide not to do any activities (Indah & Susilowati 2022; Prihatin et al. 2022; Rudatiningtyas, Fitriyani & Rosita 2021). According to WHO, 1,769,425 people (90%) of women experience dysmenorrhea and 10-15% of them experience severe dysmenorrhea. This is supported by research in various countries with astonishing results, where the incidence of primary dysmenorrhea reported in each country reaches more than 50%. The prevalence of primary dysmenorrhea in young women in Indonesia reaches 60-75%.

The results of the 2017 Indonesian Demographic and Health Survey report show that teenagers experience menarche at the age of 12-14 years (76.6%). Someone who has their first menstruation at the age of less than 12 years is 1.6 times more likely to experience primary dysmenorrhea than those aged 12 years and over. Another factor related to dysmenorrhea is nutritional status (BMI), especially overweight. Excessive nutritional status (overweight) tends to experience menstruation earlier compared to other teenagers which is caused by hormones that play a role in the process of maturation of sexual organs (Soesilowati & Annisa 2016). According to another studies, anemia—defined as hemoglobin levels below normal limits (below 12 grams/dl)—may have an impact on dysmenorrhea. Blood cells' hemoglobin is helpful in binding oxygen; this oxygen supply is dispersed throughout the body to lessen ischemia, which can lead to dysmenorrhea. Teenagers who are anemic and inactive during their menstrual cycle may experience worsening pain (primary dysmenorrhea). Moreover, anemic individuals bleed more throughout their periods (Hamdiyah 2020; Kusumawardani & Cholifah 2018).

Based on data from the Karanglewas Community Health Center, anemia checks were carried out on several school-aged teenagers in Karanglewas District in 2022, there were 16.8% of teenagers experiencing anemia. In general, dysmenorrhea can interfere with everyday activities, particularly for adolescents in school. When dysmenorrhea strikes, young women who are participating in class can cause disruptions, lose interest, and struggle to focus, making it difficult for the teacher to present the content effectively. Severe dysmenorrhea in other circumstances can result in fainting and skipping school (Fitri 2020). Dysmenorrhea, which is prevalent in those between the ages of 15 and 17, can have an impact on educational achievement and attendance (BT et al. 2017; Rifati & Sudiarti 2020). Students with dysmenorrhea have disruptions in their academic performance, school attendance, and learning processes. More individuals with severe

dysmenorrhea skip class than those with mild or no dysmenorrhea (Abd El-Mawgod, Alshaibany & Al-Anazi 2016; Horvat et al. 2023).

Based on the results of a preliminary study conducted on several female students at SMP N 2 Karanglewas, dysmenorrhea was reported by five out of the nine girls surveyed. However, each person experiences dysmenorrhea or discomfort to varying degrees. Most people only feel stomach pain, but there are some who feel back pain all the way down to their thighs. SMP N 2 Karanglewas was the study site of choice since dysmenorrhea is an issue that affects adolescents and can develop two to three years following menarche. In addition, the prevalence of dysmenorrhea among teenagers—particularly students—is a concern that can undoubtedly interfere and disrupt learning activities at school.

## METHOD

This research uses a quantitative research design with a cross sectional approach. This research was conducted in September-November 2022 at SMP N 2 Karanglewas, Banyumas Regency. The population in this study were all active female students of SMP N 2 Karanglewas in 2022/2023 academic year (324 students). The number of samples was determined using purposive sampling technique and a sample of 87 respondents was obtained. The research sample was determined by applying specific criteria in order to provide a representative sample. Active female students in grades VII–IX who were menstruating and willing to complete a questionnaire were the inclusion criteria. In meanwhile, students who weren't there during the research's conduct were excluded.

The independent variables in this study were age at menarche, length of menstruation, nutritional status, stress level, physical activity, fast food consumption, and family history. The dependent variable in this study is primary dysmenorrhea. Primary dysmenorrhea is determined using the Numeric Rating Scale (NRS) to measure the pain scale in individuals according to the individual's subjectivity, however there are adjustments in this study so that the questionnaire is more relevant and easy to understand by participants.

Age of menarche was categorized as ≥12 years and <12 years. Length of menstruation was classified as normal (3-7 days) and hyper menorrhea if menstruation lasted more than 7 days. Meanwhile, nutritional status is categorized as normal if BMI is 18.5 - 25 and abnormal if BMI ≤18.5 or >25. Stress levels were measured using the Kessler Psychological Distress Scale (KPDS) which consists of 10 questions and aims to measure distress based on questions about anxiety and depressive symptoms experienced in the last month. The result is no stress if the score is less than 20, and stress if the score is above 20.

Meanwhile, physical activity is measured using the Global Physical Activity Questionnaire (GPAQ) to observe individual physical activity to estimate the level of work, travel and sports activity. This questionnaire consists of 16 questions. Light physical activity if the score is <600, moderate if the score is 600<3000 and heavy if the score is ≥3000. Fast food consumption asked about the frequency of consuming fast food in the last month and the results were categorized into rarely with a score of 1-25 and often with a score of 26-50. Family history aims to ask about the history of primary dysmenorrhea during menstruation in the participant's mother or biological sister.

Univariate analysis was used to determine the distribution of respondents' characteristics, numerical univariate analysis to see the average, standard deviation, minimum, and maximum values, and categorical univariate analysis to see the distribution of frequencies and percentages. Bivariate analysis was used to test the correlation between the independent variables (age at menarche, menstruation cycle, nutritional status, stress level, physical activity, fast food consumption and family history) with the dependent variable (the incidence of primary dysmenorrhea).

The researcher obtained ethical clearance from the Ethics Commission of Jenderal Soedirman University's Faculty of Health Sciences with number 912/EC/KEPK/XI/2022 prior to conducting the research. Subjects who agree to participate in the study as respondents will complete and sign

the questionnaire's Informed Consent form.

## RESULTS AND DISCUSSION

The results showed that the majority of adolescent girls in this study experienced primary dysmenorrhea (54.02%) with moderate pain (34.48%), menarche at the age of less than 12 years (59.77%), normal nutritional status (62.07 %), normal menstrual duration (82.76%), do not feel stressed (70.11%), do light physical activity (42.53%), often consume fast food (56.32%), and have a family history with primary dysmenorrhea (59.77%). (Table 1)

Table 1. Frequency Distribution of Primary Dysmenorrhea, Age, Age of Menarche, Length of Menstruation, Nutritional Status, Stress Level, Physical Activity, Fast Food Consumption, and Family History among Female Students of SMP N 2 Karanglewas

| Variable | Category | Frequency | % |
|---|---|---|---|
| Primary Dysmenorrhea | No | 40 | 45,98% |
| | Yes | 47 | 54,02% |
| Degree of pain | No pain | 40 | 45,98% |
| | Mild | 11 | 12,64% |
| | Moderate | 30 | 34,48% |
| | Severe | 6 | 6,90% |
| Age | 12 years old | 23 | 26,44% |
| | 13 years old | 27 | 31,03% |
| | 14 years old | 26 | 29,89% |
| | 15 years old | 11 | 12,64% |
| Age at Menarche | ≥12 years old | 35 | 40,23% |
| | <12 years old | 52 | 59,77% |
| Menstruation Cycle | Normal | 72 | 82,76% |
| | Hypermenorrhea | 15 | 17,24% |
| Nutritional Status | Normal | 54 | 62,07% |
| | Deficiency | 33 | 37,93% |
| Stress Level | No | 61 | 70,11% |
| | Yes | 26 | 29,89% |
| Physical Activity | Medium | 33 | 37,93% |
| | Light | 37 | 42,53% |
| | Heavy | 17 | 19,54% |
| Fast Food Consumption | Rarely | 38 | 43,68% |
| | Frequently | 49 | 56,32 % |
| Family History | No | 35 | 40,23% |
| | Yes | 52 | 59,77% |

*Source: Processed Primary Data 2022*

The results of the chi square test showed that age at menarche, physical activity, consumption of fast food, and family history were associated with primary dysmenorrhea. Meanwhile, length of menstruation, nutritional status, and stress levels were not related to

primary dysmenorrhea in female students at SMP N 2 Karanglewas. (Table 2)

Table 2 Factors Affecting Primary Dysmenorrhea

| Variable | Category | Primary Dysmenorrhea | | | | *p-value* |
|---|---|---|---|---|---|---|
| | | No | | Yes | | |
| | | n | % | n | % | |
| Age at Menarche | ≥12 years old | 22 | 62,9 | 13 | 37,1 | 0,018 |
| | <12 years old | 18 | 34,6 | 34 | 65,4 | |
| Menstruation Cycle | Normal | 33 | 45,8 | 39 | 54,2 | 1,000 |
| | Hypermenorrhea | 7 | 46,7 | 8 | 53,3 | |
| Nutritional Status | Normal | 23 | 42,6 | 31 | 57,4 | 0,556 |
| | Deficiency | 17 | 51,5 | 16 | 48,5 | |
| Stress Level | No | 27 | 44,3 | 34 | 55,7 | 0,798 |
| | Yes | 13 | 50,0 | 13 | 50,0 | |
| Physical Activity | Medium | 10 | 30,3 | 20 | 69,7 | 0,008 |
| | Light | 17 | 45,9 | 23 | 54,1 | |
| | Heavy | 13 | 76,5 | 4 | 23,5 | |
| Fast Food Consumption | Rarely | 24 | 63,2 | 14 | 36,8 | 0,009 |
| | Frequently | 16 | 32,7 | 33 | 67,3 | |
| Family History | No | 26 | 74,3 | 5 | 25,7 | 0,000 |
| | Yes | 14 | 26,9 | 38 | 73,1 | |

*Source: Processed Primary Data 2022*

The results of the study showed that the factors associated with primary dysmenorrhea at SMP N 2 Karanglewas were age at menarche, physical activity, consumption of fast food, and family history. The age of menarche is related to primary dysmenorrhea. Previous research reported a relationship between age of menarche and dysmenorrhea among adolescent girls (Aulya, Kundaryanti & Rena 2021; Mouliza 2020; Nurwana, Sabilu & Fachlevy 2017; Shellasih & Ariyanti 2021; Soesilowati & Annisa 2016). Primary dysmenorrhea is 3.4 times more likely to occur in women who menarche at age 11 or younger than in women who menarche at age over 11 years old (Soesilowati & Annisa 2016). Menstrual pain will occur if menarche happens earlier than usual, when the cervix is still narrowing and the reproductive organs are not yet ready to undergo changes. Menarche can occur between the ages of 10 and 16 years. Nonetheless, if menarche happens between the ages of 12 and 14, it might be considered normal (Grandi et al. 2012). The results of the

IDHS (2017) also show that teenagers experience menarche at the age of 12-14 years. Recent research results report that an age at menarche of less than 12 years is at greater risk for primary dysmenorrhea.(Hu et al. 2020) As age increased, dysmenorrhea incidence decreased by 0.97 times (De Sanctis et al. 2016).

In this study, the menstrual cycle, nutritional status and stress level were not related to primary dysmenorrhea. Previous research reported no relationship was found between dysmenorrhea and stress levels and BMI (Tiwari et al. 2022). It was further reported that coping mechanisms had an insignificant relationship with dysmenorrhea among students (Nani, Ismawati & Girindra 2017). However, other research states that underweight and stress level has an effect on primary dysmenorrhea (Hu et al. 2020; Pundati, Sistiarani & Hariyadi 2016; Rogers et al. 2023).

Physical activity is associated with dysmenorrhea in adolescent girls. It has also been suggested that physical activity helps to lessen primary dysmenorrhea (Kusumaningrum et al. 2019; Matthewman et al. 2018; Rohmawati & Wulandari 2020; Shellasih & Ariyanti 2021). Previous research reported that teenagers who had less physical activity were 7.441 times more likely to experience dysmenorrhea compared to those with good physical activity. Teenagers still need to get health education with a focus on healthy living, sufficient vitamin consumption, mental stress reduction, proper sleep, and frequent exercise. This includes a warning against eating an imbalanced diet (Ardianto & Elisanti 2019). A majority of adolescent girls in this study exhibited low levels of physical activity, contributing to a higher incidence of primary dysmenorrhea. Physical activity among adolescent girls tends to be lower, especially in the current era characterized by sedentary lifestyles involving extensive use of social media, online streaming, and gaming.

Moderate-intensity physical exercise can alleviate dysmenorrhea symptoms by triggering the release of endorphins, natural pain relievers. These endorphins contribute to a sense of well-being and can reduce pain perception. Additionally, regular physical activity helps accelerate the

elimination of prostaglandins, hormones that contribute to menstrual cramps, from the uterine wall. Recent research supports these findings, with an Odds Ratio (OR) of 3.355 indicating a significant association between physical exercise and reduced dysmenorrhea (Nadila & Trisna 2023). Health workers through the UKS program are expected to increase the physical activity of young women through sports as a dysmenorrhea prevention program (Rohmawati & Wulandari 2020).

Fast food consumption is associated with the incidence of dysmenorrhea. Previous research reported an association between fast food consumption and dysmenorrhea (Aulya, Kundaryanti & Rena 2021; Nadila & Trisna 2023). It was further reported that consuming fast food increases a person's risk of experiencing dysmenorrhea (Nadila & Trisna 2023). Previous research reported that consuming sweet foods and drinks had a 4.8 times higher risk of causing primary dysmenorrhea (Ramadhan et al. 2023). Consuming three to four sugar-sweetened beverages daily was found to be substantially associated to an increased risk of dysmenorrhea (van Uden et al. 2023). The results of this study strengthen previous research which shows that there is a significant relationship between fast food consumption and primary dysmenorrhea. Therefore, information and knowledge is needed, especially on reproductive health in adolescents regarding primary dysmenorrhea, so that they can adopt a healthy lifestyle with regular exercise, adequate rest and consume healthy food and avoid fast food (Aulya, Kundaryanti & Rena 2021). Most adolescent girls in this study reported frequent consumption of junk food, primarily due to easy access to unhealthy snacks at school and the convenience of online food delivery. This dietary pattern is linked to nutrient deficiencies, hormonal imbalances, and an increased risk of severe primary dysmenorrhea. Addressing this issue requires collective efforts to encourage healthier eating habits among adolescent girls.

Adolescent girls who regularly consume fast food (food that is high in sugar, fat, calories, salt and has low nutritional content), have a higher

prevalence of dysmenorrhea than adolescent girls who rarely consume fast food. Consuming fast food can interfere with progesterone metabolism because it is rich in saturated fatty acids (Kanti, Verma & Singh 2020). Fast food is food that is low in micronutrients but high in fat and sodium. Fast food is not a healthy choice for daily intake due to its unbalanced nutritional composition. Fast food consumption frequency was found to be associated with menstruation abnormalities, specifically dysmenorrhea, according to a study that was conducted (Pramanik & Dhar 2014). Trans fatty acids, prevalent in fast food, can damage cell membranes, leading to increased prostaglandin production. Excessive prostaglandin levels are associated with primary dysmenorrhea, a condition characterized by painful menstrual cramps. Furthermore, frequent consumption of fast food has been linked to various menstrual irregularities, including oligomenorrhea (abnormally light menstrual bleeding), hypermenorrhea (abnormally heavy menstrual bleeding), and premenstrual syndrome (PMS) (Jaget Lakkawar et al. 2014). Excessive junk food intake is significantly associated with menstrual disorders. The menstrual cycle is a normal physiological process, but deviation from its regularity can cause several health problems in the future such as polycystic ovary syndrome, obesity, infertility, and hyperlipidemia (Latif et al. 2022).

Family history was another factor associated with dysmenorrhea in this study. This supports other studies that found an association between dysmenorrhea and family history (Mouliza 2020; Shellasih & Ariyanti 2021). Teenagers with a family history of dysmenorrhea are seven times more likely to suffer from the dysmenorrhea than teenagers without a family history (Rifati & Sudiarti 2020). Previous research found that family history was 4.7 times more risky for primary dysmenorrhea (Molla et al. 2022; Ramadhan et al. 2023). According to other research, young women who have mothers who have experienced dysmenorrhea are 2,553 times at risk to suffer from primary dysmenorrhea (Hu et al. 2020).

Researchers have postulated several assumptions regarding the relationship between a family history of dysmenorrhea and primary dysmenorrhea in adolescent girls. A primary assumption is the existence of a genetic component, suggesting that specific genes may predispose individuals to dysmenorrhea. Additionally, hormonal imbalances, particularly involving prostaglandins, are hypothesized to contribute to the condition. Environmental factors such as diet, stress, and physical inactivity are also believed to exacerbate dysmenorrhea in genetically predisposed individuals. Moreover, psychological factors such as anxiety and depression may play a role, as individuals with a family history of dysmenorrhea may have a heightened pain perception. Furthermore, the influence of sociocultural factors and epigenetic mechanisms cannot be overlooked in understanding the complexity of this phenomenon.

Family history is a risk factor that can increase the occurrence of primary dysmenorrhea. Two out of three women who suffer from primary dysmenorrhea have a history of primary dysmenorrhea in their family (mother and/or sister) (Handayani & Rahayu 2014). Individuals with a family history of dysmenorrhea have a heightened risk of experiencing the condition due to genetic factors passed down through generations. These genetic traits are replicated during cell division, potentially increasing the likelihood of transmitting the condition to offspring. However, dysmenorrhea can often be prevented or managed through lifestyle modifications such as maintaining a balanced diet, limiting caffeine intake, engaging in regular physical activity, managing stress, and addressing psychological factors (Sadiman 2017; van Uden et al. 2023). Given the known effect of dysmenorrhea on academic achievement, school administrators might have a personal stake in providing students health education on this subject. The provision of additional services, such as access to painkillers and consultations with the school physician and nurse, must be included to health education (Abd El-Mawgod, Alshaibany & Al-Anazi 2016). Female students should receive appropriate management and

counseling to assist them deal with the difficulties associated with dysmenorrhea. In order to address the reproductive health needs of the female students, parents, school peer leaders, and school administration should also be provided with information, education, and support (De Sanctis et al. 2016).

xxx This study has several limitations, including a small sample size, a cross-sectional design, reliance on self-reported data, and the potential for confounding variables. The small sample size and cross-sectional design limit the generalizability of the findings and the ability to establish causal relationships. Additionally, the use of self-reported data is susceptible to recall bias and social desirability bias. To address these limitations, future research should employ a larger sample size, adopt a longitudinal design, validate the research instruments, conduct multivariate analysis, and combine self-reported data with objective measures

## CONCLUSION

Most of the female adolescents experienced primary dysmenorrhea (54.02%) with moderate pain (34.48%), menarche at the age of less than 12 years (59.77%), normal nutritional status (62.07%), long normal menstruation (82.76%), not experiencing stress (70.11%), doing light physical activity (42.53%), frequently consuming fast food (56.32%), and having a family history of primary dysmenorrhea ( 59.77%). There is a relationship between age at menarche, physical activity, consumption of fast food, and family history with the incidence of primary dysmenorrhea in female students at SMP N 2 Karanglewas. There is no relationship between menstrual duration, nutritional status, and stress levels with the incidence of primary dysmenorrhea in female students at SMP N 2 Karanglewas. Educational institutions are expected to be able to implement the healthy school concept by providing physical activity, providing education, and controlling fast food consumption. Female students are expected to be able to find more information about dysmenorrhea and implement healthy living behavior by actively participating in sports and other

physical activities at school and paying attention to food consumption.

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