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Prevalence and Related Risk of Primary Dysmenorrhea Among Students in Boarding School: A Descriptive Study

Ridha Restila[1*], Dita Kartika Sari[2], Nurfi Pratiwi[3], Dian Adristi Chiara[4], Vania Syahla Melinda[4], Zellina Shaqueela Aleem[4], Noor Zakiyah Khaifah[4]

ABSTRACT

Primary dysmenorrhea (PD) is a lower abdominal or pelvic pain during menstruation and can have a negative impact on daily activities. This study aims to determine prevalence of PD and risk factors in boarding school students. A cross-sectional study was conducted among 130 boarding school students. The severity of PD was assessed with the Visual Analogue Scale (VAS). The students were also asked to complete the provided questionnaire. Haemoglobin (Hb) and anthropometric measurements were also taken. The risk factors studied were age, menstrual pattern, regular exercise, and nutritional status. The prevalence of PD was 96.2%. The severity of PD was 17.7% mild, 49.2% moderate, 23.8% severe, and 5.4% very severe. The most common symptoms felt by students were lower abdominal pain (84%), fatigue (50%) and headaches (34.62%). The median (min-max) of age was 16(14-18) years old. From menstrual pattern, 61.5% experiencing irregular menstrual patterns (early, late, or not sure) in the last 3 months. The median duration of menstruation was 7 (5-14) days, and 54.6% had 21-35 days length of menstrual cycle. Only 43.1% of students had regular exercise. The mean of Hb was 12.86±2.11 gr/dL. From nutritional status, there were 6% thinness, 71.5% normal, 13.1% overweight, and 10,8% obese. PD has a high prevalence among boarding school students. The pain experienced during menstruation can interfere with learning activities, academic achievements, and grades. Based on the results of identifying risk factors, the intervention should be made to prevent and reduce PD symptoms both pharmacologically and non-pharmacologically.

Keywords: boarding school, high school, primary dysmenorrhea, risk factors, student

Dysmenorrhea is a cyclic lower abdominal or pelvic pain cramps during menstruation. This usually makes women feel uncomfortable in their daily activities. The pain felt is not only in the lower abdominal area, but can also be felt in the lower back, legs and inner thighs.[1, 2] The cause of primary dysmenorrhea is not well established. However, experts mention that the pain linked to dysmenorrhea results from excessive production (hypersecretion) of prostaglandins and an increase of uterine contraction.[2, 3] Women experiencing dysmenorrhea have elevated levels of prostaglandins, with the highest concentrations during the first two days of menstruation.[4-6]

* *Corresponding Author* : ridharestila@lecturer.unri.ac.id
[1] Department of Public Health, Faculty of Medicine, Universitas Riau, Pekanbaru, Indonesia
[2] Department of Anatomy, Faculty of Medicine, Universitas Riau, Pekanbaru, Indonesia
[3] Department of Histology, Faculty of Medicine, Universitas Riau, Pekanbaru, Indonesia
[4] Faculty of Medicine, Universitas Riau, Pekanbaru, Indonesia

Dysmenorrhea is categorized into primary dysmenorrhea (PD) and secondary dysmenorrhea (SD).[1-3] Primary dysmenorrhea refers to menstrual pain that occurs without any pelvic pathology or diseases.[1, 7] It is one of the most prevalent gynecological conditions among young women [1]. The onset primarily happens in adolescence, typically within 6 to 24 months after menarche. The PD pain follows a distinct cyclical pattern, usually being most intense on the first day of menstruation and lasting up to 72 hours.[5] Other symptoms associated with primary dysmenorrhea include nausea, vomiting, diarrhea, lower back pain, migraines, dizziness, fatigue, and insomnia; also syncope and hyperthermia in rare cases.[7] Secondary dysmenorrhea shares similar signs and symptoms but arises from underlying pelvic conditions, such as endometriosis, adenomyosis, congenital anatomic abnormalities, or uterine fibroids.[2, 8, 9]

The prevalence of dysmenorrhea has a fairly wide range. Research indicates that between 41%

and 91.5% of young women, including those in school and university, experience dysmenorrhea.[8] Meanwhile, the global prevalence of PD among females of reproductive age ranges from 45% to 95%, with 2% to 29% reporting severe pain.[1, 5] A higher prevalence, typically between 70% and 90%, has been reported among younger women (under 24 years).[2] In students, a meta-analysis study shows that overall prevalence of PD was 66.1%. The highest prevalence of PD among students is 91% (95% CI 90%-93%) in study in Ireland.[10] Studies on the prevalence of primary dysmenorrhea have also been conducted in several regions across Indonesia. A survey conducted in Jakarta revealed that 92.5% of respondents experienced dysmenorrhea with varying degrees of pain intensity.[11]

There are two categories of risk factors for primary dysmenorrhea: non-modifiable and behavioral. Non-modifiable risk factors include a family history of dysmenorrhea, being under 20 years old (as symptoms tend to be more severe during adolescence), menarche occurring before age 12 (due to the early onset of ovulatory cycles), menstrual flow lasting longer than 7 days, and nulliparity. Body mass index (BMI) of less than 20 or more than 30, poor consumption of omega-3 from fish, smoking (nicotine causes vasoconstriction), coffee use (also causes vasoconstriction), and psychological symptoms like anxiety and depression are examples of behavioral risk factors. Moreover, a tense connection with the parents can contribute to dysmenorrheal pain[7]. Strict parenting, low parental support, and family discord may intensify both physical and emotional symptoms of primary dysmenorrhea [12].

Boarding schools in Indonesia implement structured routines and holistic learning, but students may face physical and psychological health challenges. This study aims to determine the prevalence of PD and risk factors in young female, especially boarding school students. Risk factors for primary dysmenorrhea also need to be identified to see if there is a possibility of PD in female students.

METHOD

Cross sectional study was conducted among 130 boarding school's students. Due to the limited population size, total sampling was employed as the sampling technique in this study. The study was located in Riau Province, one of the public boarding high schools in Riau Province. The severity of PD was assessed with Visual Analogue Scale (VAS).[1] The severity of PD was classified into five categories, they were no pain (score 0), mild (score 1-3), moderate (score 4-6), severe (score 7-9), and very severe (score 10). The students were also asked to fill out the questionnaire provided. Hemoglobin (Hb) and anthropometry were also measured. Concentration of hemoglobin was measured by Digital Hemoglobinometers. This method was commonly used in field settings as they are portable and provide an instant measurement of Hb.[13] Hemoglobin concentration was determined using a portable digital hemoglobin meter. Approximately 10–20 μL (0.01–0.02 cc) of capillary blood was obtained via fingertip puncture and applied onto a proprietary test strip. The device then utilized photometric detection to produce a quantitative measurement. The weight and height of students were measured by digital body weight scale and stadiometer. The other risk factors related to PD were age, menstrual cycle, and exercise regularly, which were obtained from the results of interviews using questionnaires. Data were analyzed descriptively and presented in the form of tables, figures, and narrative summaries. Categorical variables were reported as frequencies and percentages, while numerical variables were expressed as means with standard deviations or medians with minimum and maximum values, depending on data distribution. This study had approved by Ethical Review Board for Medicine and Health Research Fakultas Kedokteran Universitas Riau with ethical clearance number: B/089 UN19.5.1.1.8/UEPKK/2024.

RESULT

The result shows that 96.2% students have experience dysmenorrhea during menstruation. The median (min-max) of age was 16(14-18) years old. The severity of PD varied from no pain at all to very severe. The severity of PD was 17.7% mild, 49.2% moderate, 23.8% severe, and 5.4% very severe. The results of the interview showed that the symptoms felt by students during menstruation were: feeling unwell, fatigue, nausea, vomit, diarrhea, lower abdominal pain, and headaches. The most common symptoms felt by students were lower abdominal

pain (84%), fatigue (50%) and headaches (34.62%) (Figure 1).

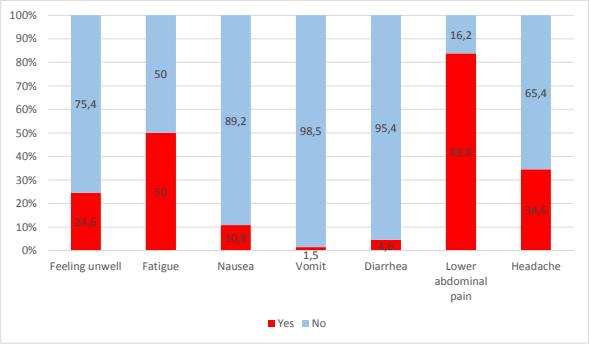

Figure 1 Symptoms during menstruation

Menstrual pattern and regular exercise habits ware also identified. The students were asked whether they have early or late menstruation, duration and length of menstrual cycle. We found 61,5% of students experiencing irregular menstrual patterns (early, late or not sure) in the last 3 months. The median duration of menstrual was 7 (5-14) days, and 54,6% had 21-35 days length of menstrual cycle. Only 43.1% of students had exercise regularly.

Malnutrition can occur in any age group, including adolescent girls. Haemoglobin and anthropometric measurements in this study were carried out to determine the nutritional status of students. The mean of Hb was 12.86±2.11 gr/dL. From nutritional status, there were 4,6% thinness, 71,5% normal, 13,1% overweight, and 10,8% obese (Table 1).

Table 1. Severity and Risk Factors of Primary Dysmenorrhea

Severity and Risk Factors	Frequency	Percentages
Severity		
No pain	5	3.8
Mild	23	17.7
Moderate	64	49.2
Severe	31	23.8
Very severe	7	5.4
Menstrual Cycle		
Early	29	22.3
On time	50	38.5
Late	43	33.1
Not sure	8	6.2
Duration of menstruation (median, min-max)	7 (5-14) days	
Length of menstrual cycle		
Less than 21 days	30	23.1
21-35 days	71	54.6
More than 35 days	13	10.0
Not sure	16	12.3
Regular Exercise		
Yes	56	43.1
No	74	56.9
Haemoglobin (gr/dL)	12.86±2.11 gr/dL	
Nutritional status		
Thinness	6	4,6
Normal	93	71,5
Overweight	17	13,1
Obese	14	10,8

DISCUSSION

The cause of primary dysmenorrhea is not well established. However, experts mention that the pain linked to dysmenorrhea results from excessive production (hypersecretion) of prostaglandins and an increase of uterine contraction.[2, 3] Primary dysmenorrhea refers to menstrual pain that occurs without any pelvic pathology or diseases.[1, 7] The global prevalence of PD among females of reproductive age ranges from 45% to 95%, with 2% to 29% reporting severe pain.[1, 5] A meta-analysis encompassing studies from China, Jordan,

Malaysia, Spain, Palestine, Ethiopia, Iran, and other countries reported an overall prevalence of primary dysmenorrhea (PD) among students of was 66.1%. [10] This study found that majority of students had experienced pain during menstruation. This finding is in line with research in Ireland with prevalence up to 91% (95% CI 90%-93%) [14] and Brazilian Woman.[15] The level of PD severity most commonly felt by female students in this study was at the moderate level. This finding is in line with other study conducted in other countries (Northwest Ethiopia, Brazil, India, and Iran) where the severity of PD varied, but most of them are at moderate level, then followed by mild and severe level.[15-18]

Dysmenorrhea is highly prevalent among adolescents (student age), with primary dysmenorrhea being the most common form, typically emerging within the first 6–12 months after menarche as ovulatory cycles begin. The pathophysiology is primarily linked to elevated levels of prostaglandins, particularly PGF2α, which induce uterine contractions and ischemia, resulting in menstrual pain and associated systemic symptoms such as nausea, headache, and fatigue.[19, 20] Adolescents are particularly vulnerable due to hormonal immaturity, psychosocial stressors, and lifestyle factors including poor sleep quality, low physical activity, and suboptimal nutrition. [19, 21] Studies report prevalence rates ranging from 45% to over 90%, with significant impact on daily functioning, academic performance, and emotional well-being.[19, 21] Despite its burden, dysmenorrhea remains underdiagnosed and undertreated, often normalized within cultural contexts that discourage open discussion of menstrual health.[19, 22]Addressing this issue requires comprehensive education, early screening, and accessible management strategies tailored to adolescent needs.

The symptoms associated with primary dysmenorrhea include nausea, vomiting, diarrhea, lower back pain, migraines, dizziness, fatigue, insomnia, and, in rare cases, it can cause syncope and hyperthermia.[7] This study found that the most common symptoms felt by students were lower abdominal pain (84%), fatigue (50%) and headaches (34.62%). This finding is in line with other study among female students at Gondar town preparatory school, Northwest Ethiopia with most common complaining symptoms are abdominal pain, back pain, headache and fatigue.[16]

Primary dysmenorrhea can be caused or related by many factors such as diet, exercise, reproductive hormones and lifestyle of behaviour. For hormones, the development of dysmenorrhea was affected by prostaglandin, estrogen, oxytocin, vasopressin, etc. Higher serum vasopressin and estradiol concentrations as well as lower oxytocin and PGF2α levels were associated with higher risk of primary dysmenorrhea.[23] Reproductive hormones also affected woman's menstrual cycle and length. Research conducted on high school students in Jakarta found that almost half of the respondents experienced irregular menstruation such as abnormal menstrual length and abnormal menstrual cycle. However, no significant relationship was found with the incidence of dysmenorrhea.[24] The correlation between menstrual cycle and dysmenorrhea was still cannot be concluded because the results of various studies are inconsistent. Several studies hypothesize that hormonal imbalances serve as the underlying mechanism linking the two conditions.[25-28] Irregular menstrual cycles are often indicative of hormonal dysregulation, particularly involving estrogen and progesterone, which can disrupt ovulatory function and elevate endometrial prostaglandin levels key mediators of uterine contractions and menstrual pain.[25] Other study also found that students with bleeding duration can increase more chance of getting dysmenorrhea.[29, 30]

Lack of exercise and sedentary lifestyle are problems in teenagers. This study found that only 43.1% of students had exercise regularly. This result is in line with the findings by Setiawati, 2019 which showed that half of students have low level in sport habits (52.6%).[31] Physical inactivity is associated with increased severity of primary dysmenorrhea, potentially due to elevated prostaglandin levels, reduced endorphin production, and impaired pelvic circulation.[32] However, previous studies still show inconsistent results. It can be significantly related [33-36] or not. [16]

The other factor that may contributed to occurrence of dysmenorrhea is nutritional status. Previous study shows that there is a difference in average BMI between groups experiencing dysmenorrhea and those not experiencing dysmenorrhea.[37] The results from systematic review

study found that overweight and obesity may not be linked to primary dysmenorrhea, while being underweight may raise the chance of developing primary dysmenorrhea.[38]

The school environment plays a pivotal role in shaping adolescents' physical and psychosocial health, including menstrual well-being. While some boarding schools may face challenges related to nutrition, stress, and menstrual health literacy, it is important to recognize that not all boarding environments are disadvantageous. In fact, several institutions have demonstrated proactive efforts to support adolescent girls during menstruation. For example, Rahmatullah Islamic Boarding School provides facilities and infrastructure to support the physical fitness for their students. This school also allocates one day per week for sports activities such as soccer, volleyball, and pencak silat, to prevent students from getting bored and, most importantly, to ensure their physical fitness is maintained. [39] Similiarly, a study in East Java found that over 50% of students received menstrual health information from teachers, and most had access to clean water, sanitary pads, and private latrines.[40] These findings suggest that when boarding schools invest in nutritionally adequate meals, health education, and supportive infrastructure, they can offer a protective environment that promotes menstrual well-being. Thus, the impact of boarding school settings on dysmenorrhea is not universally negative, but rather contingent on the quality of care, resources, and institutional commitment to adolescent health.

CONCLUSION

Primary dysmenorrhea (PD) has a high prevalence among boarding school students. The majority of students with PD experienced moderate to severe symptoms, with nearly half reporting moderate pain. This study found that the risk factors for dysmenorrhea that need to be considered are irregular menstruation (early or late) and exercise. Considering the common presence of these two factors within the participants in the study.The pain experienced during menstruation can interfere with learning activities, academic achievements and grades. Based on the results of identifying risk factors, the intervention should be made to prevent and reduce PD symptoms both pharmacologically and non-pharmacologically.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this study.

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