



Factors Associated with Primary Dysmenorrhea Prevalence, Severity, and Self-Management Among Indonesian Adolescents: A School-Based Cross-Sectional Study

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Abstract

Primary dysmenorrhea (PD) is a common menstrual disorder that adversely affects adolescents daily activities and quality of life. However, evidence related to factors associated with its prevalence, severity, and self-management among Indonesian adolescents remains limited. Therefore, this study aimed to identify factors associated with the prevalence, severity, and self-management of PD among female adolescents. A school-based cross-sectional study was conducted among 464 female junior high school students in Yogyakarta, Indonesia. Data were collected using a validated questionnaire and analysed using chi-square tests, binary logistic regression, and ordinal logistic regression. The prevalence of PD was 73.3%, with most participants experiencing moderate severity (63.2%). After adjustment for potential confounders, age at menarche <12 years, a family history of dysmenorrhea, and frequent fast food consumption were independently associated with PD prevalence. Abnormal menstrual cycles were also independently associated with lower odds of PD compared with normal menstrual cycles (aOR = 0.59; 95% CI: 0.34–0.99). Frequent dysmenorrhea, irregular eating patterns, and frequent fast food consumption were independently associated with greater PD severity. The frequency and severity of dysmenorrhea were independently associated with the number of self-management strategies used. Eucalyptus oil (28.7%) and turmeric–tamarind herbal drinks (28.4%) were the most commonly reported self-management methods. These results may inform the development of future health education and self-management programs targeting modifiable lifestyle factors.

INTRODUCTION

Dysmenorrhea is a disease characterised by soreness associated with menstruation (American College of Obstetricians and Gynaecolo-

gists, 2024). This includes primary dysmenorrhea (PD), which occurs immediately after menarche without any identifiable underlying cause. Meanwhile, secondary dysmenorrhea develops later

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and is often related to other conditions, such as endometriosis (O'Reilly et al., 2012). Compared to PD, secondary dysmenorrhea is characterised by painful menstruation resulting from underlying pelvic pathology or an undiagnosed medical condition. Several studies have identified endometriosis as the leading cause of secondary dysmenorrhea among adolescents ("ACOG Committee Opinion No. 760," 2018).

Primary dysmenorrhea is believed to be associated with increased prostaglandin production, which is believed to contribute to cramping discomfort in the lower abdomen or pelvic area. It occurs before or during menstruation without conditions, such as endometriosis. The symptoms usually last between 1–3 days and are accompanied by unremarkable physical exams (Gutman et al., 2022). PD is common among females of reproductive age and is often ignored or inadequately handled, mainly because of multiple factors (Itani et al., 2022).

Previous studies have defined dysmenorrhea severity as the degree or intensity of menstrual pain. It is commonly classified according to pain intensity scores into mild (1–4), moderate (5–7), and severe (8–12) categories (Teherán et al., 2018). Individuals with more severe dysmenorrhea have been reported to experience intense acute pain (Rogers et al., 2024). Moderate to severe dysmenorrhea has been associated with increased psychological distress, specifically among used females. However, in the context of dysmenorrhea, job control levels have been reported to be a potentially adjustable factor (Matsumura et al., 2023).

Factors associated with dysmenorrhea include age, menstrual cycle length, menstrual duration, physical activity, regular eating habits, and sleep duration (Alatorre-Cruz et al., 2024). Other factors include menarche before age 12 (OR: 1.52; 95% CI: 1.06–2.16), depression, and insomnia (S. Liu et al., 2024). Previous studies have reported that menstrual cycle length is associated with the occurrence of PD, while a family history of dysmenorrhea is associated with both its occurrence and severity (Situmorang et al., 2024). Factors associated with pain intensity in PD among adult females include age, a history of dysmenorrhea since adolescence, and reduced sleep quality (Barbosa-Silva et al., 2024). Previous studies reported that sleeping less than seven hours and frequent fast food intake were significantly associated with severe PD (Al-Husban et al., 2022).

A previous study reported that non-pharmacological therapy was more commonly used among females with family members experiencing dysmenorrhea (73.2%). This suggests that family self-care practices may have contributed to treatment preferences (Parra-Fernández et al., 2020). However, commonly used pharmacological and nonpharmacological self-care methods may not provide optimal pain relief (Armour, Parry, et al., 2019). This is because most self-care providers lack information about dysmenorrhea from their healthcare providers, showing the importance of healthcare professionals offering accurate information about the condition (Subasinghe et al., 2016). Therefore, this study aimed to identify factors associated with the prevalence, severity, and self-management of PD in adolescents. These results are essential to identify controllable and uncontrollable factors associated with the prevalence and severity of PD in adolescents. The results can serve as a basis for developing informative educational media tailored to adolescents' needs for managing PD.

METHOD

This cross-sectional study was conducted following ethical clearance from the study ethics committee of Jenderal Achmad Yani University (No. Skep/529/KEP/VIII/2024) and approval from the Youth and Sports Education Office of Yogyakarta City. Data collection occurred between December 2024 and February 2025, including female junior high school students in grades 8 and 9 in Yogyakarta, Indonesia.

The sampling technique was conducted in 5 stages, namely 1) simple random sampling by selecting 7 out of 54 junior high schools in Yogyakarta, 2) sampling based on the number of female students in grades 8 and 9 in each school with permission from the schools, 3) female students meeting the inclusion criteria (560 respondents), 4) students who agreed and were approved by their guardians to become respondents (493 respondents), 5) respondents who did not meet the exclusion criteria (464 respondents).

This study included 464 participants, exceeding the minimum sample size of 385 required for cross-sectional studies (Lemeshow et al., 1990). The inclusion criteria specified that participants must be menstruating adolescents aged 13 to 18 years. The exclusion criteria included students with uterine diseases or congenital abnormalities, such as endometriosis leading to secondary dysmenorrhea ("ACOG Committee Opinion No. 760," 2018); students using oral contraception; those with hormonal imbalances

or digestive disorders; and those on medication for diabetes mellitus, cancer, or anaemia, which are associated with the menstrual cycle and the severity of dysmenorrhea.

The screening questionnaire for menstrual history, dysmenorrhea, and daily activities was designed to identify the prevalence and factors associated with PD and its severity in adolescents. In addition, the questionnaire was developed based on a literature review of PD. Dietary habits and physical activity were intentionally assessed using brief self-reported items because the survey was administered in school settings with limited time for data collection. Similar simplified measures have been used in previous epidemiological studies to minimise respondent burden while capturing major lifestyle behaviours. The instrument for measuring severity used the WaLIDD score, which was translated and validated into Indonesian. Before its use, the questionnaire was reviewed by an expert panel made up of 6 professionals, including a methodologist, an obstetrics and gynaecology specialist, a general practitioner, a pharmacist, a clinical psychologist, and a linguist, achieving a content validity index of ≥ 0.83 . In addition to the experts' validation, the questionnaire was also validated by adolescents with PD (CVI 0.93). The reliability test with Alpha Cronbach resulted in a value of 0.725, while the test-retest reliability (ICC = 0.763; CI: 0.671–0.831).

Data collection was conducted using hard-copy questionnaires that screened for menstrual history, dysmenorrhea, and daily activity patterns. The questionnaires were distributed to students within the timeframe allowed by the schools. Before distribution, the informed consent forms were provided to the guardians of female students in grades 8 and 9 who met the inclusion criteria. The questionnaires were distributed to students who agreed to participate, whose guardians had granted permission to participate as respondents. In addition, the data were transferred to an electronic database to ensure accuracy between the data transfer and survey results. Students meeting exclusion criteria were not included in the data.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 30, which assessed the prevalence, severity, and self-management among respondents. Severity was evaluated with the WaLIDD score, categorised into 4 levels, namely no dysmenorrhea (score 0), mild dysmenorrhea (scores 1–4), moderate dysmenorrhea (scores 5–7), and severe dysmenorrhea (scores 8–12). The variables such as regular eating patterns, balanced nutritional in-

take, fast food consumption, and physical activity were categorised into 2 groups, including frequent when accomplished 3 or more times a week, and infrequent when accomplished less than 3 times a week. The Pearson chi-square test was used to identify factors associated with the prevalence, severity, and self-management of PD among adolescents. Variables that showed a significant association in the chi-square analysis ($p < 0.05$) were subsequently entered into the appropriate multivariable logistic regression model to identify factors independently associated with each study outcome and to estimate the magnitude of these associations using odds ratio (OR) or adjusted odds ratio (aOR). Binary logistic regression was performed to identify factors associated with the prevalence of PD, whereas ordinal logistic regression was used to identify factors associated with dysmenorrhea severity and self-management. All results reported in the manuscript were extracted directly from the IBM SPSS Statistics Version 30 output and were independently verified for consistency before manuscript submission.

RESULT AND DISCUSSION

Results

A total of 464 participants met the inclusion criteria for this study, with ages ranging from 13 to 16 years, with 340 (73.3%) experiencing dysmenorrhea. The frequency of dysmenorrhea was sometimes (occurring once every 3 months) (59.4%), with 63.2% experiencing moderate severity. According to the results of this study, a total of 37.4% took action to relieve pain. The most common non-pharmacological self-management methods included applying eucalyptus oil (28.7%) and drinking turmeric and tamarind herbal medicine (28.4%). Pharmacological analgesics were used by 12.7% of respondents, as shown in Table 1.

The factors associated with the prevalence of PD were detailed in Table 2. A total of 464 participants who met the inclusion criteria were included in the analysis. The results of the Chi-Square Test showed that eight of nine variables were significantly associated (p -value < 0.05) with the prevalence of PD in adolescents. Variables significantly associated with PD in the bivariate analysis were subsequently evaluated in the multivariable model. After adjustment, family history of dysmenorrhea remained the factor most strongly associated with PD prevalence (aOR=13.95; 95% CI: 7.31-26.62).

The analysis included 340 participants who experienced dysmenorrhea, as presented in Table 3. The chi-square test showed that four of the

eleven factors evaluated were significantly associated with the severity of PD among adolescents ($p < 0.05$). Ordinal logistic regression analysis identified the frequency of dysmenorrhea as the factor most strongly associated with PD severity.

As shown in Table 4, the chi-square test showed that two factors were significantly associated with dysmenorrhea self-management ($p < 0.05$). Ordinal logistic regression analysis further identified the frequency of dysmenorrhea as the factor most strongly associated with PD self-management.

Table 1. Respondent description

Variables	Category	Total n(%)
Age (years)	13	48(10.3)
	14	222(47.8)
	15	186(40.1)
	16	8(1.7)
Dysmenor- rhea	Yes	340(73.3)
	No	124(26.7)
Frequency of dysmen- orrhea	Infrequent	40(11.8)
	Sometimes	202(59.4)
	Frequent	98(28.8)
Severity of dysmenor- rhea	Mild	82(24.1)
	Moderate	215(63.2)
	Severe	43(12.6)
Self-man- agement treatments	None	100(29.4)
	1 treatment	127(37.4)
	2 treatments	89(26.2)
	3 treatments	22(6.5)
	4 treatments	2(0.6)
Type of treatment	Eucalyptus oil	108(28.7)
	Turmeric tamarind herbal drink	107(28.4)
	Warm water compress	89(23.6)
	Analgesic	48(12.7)
	Drink warm water	12(3.2)
	Sleep/rest	7(1.9)
	Consult a doctor	3(0.8)
	Patch	2(0.5)
	Drink coconut water	1(0.3)

Discussion

The analysis showed a significant association between age at first menstruation (menarche) and the prevalence of dysmenorrhea, consistent with a previous study (Mizgier et al., 2025). Early

menarche (<12 years) was significantly associated with PD, as also reported in a previous study (Hu et al., 2020). Menarche occurring at a younger age was generally associated with earlier reproductive maturation and may be accompanied by greater fluctuations in estrogen and prostaglandin levels (Guarneri & Kamboj, 2019). Another study suggested that elevated prostaglandin levels are associated with stronger uterine contractions (American College of Obstetricians and Gynecologists, 2024), which are associated with menstrual pain (Itani et al., 2022).

The menstrual cycle was the time span between the first day of a period and the first day of the next. A normal cycle was generally considered to be 21 to 35 days, with a menstrual period lasting 3 to 7 days (Abreu-Sánchez et al., 2020). In this study, the menstrual cycle was significantly associated with dysmenorrhea in the bivariate analysis. After adjustment for potential confounders, adolescents with abnormal menstrual cycles had lower odds of PD than those with normal menstrual cycles (aOR = 0.59, 95% CI: 0.34–0.998). This result differed from previous studies that reported a higher prevalence of dysmenorrhea among females with abnormal menstrual cycles (J. Liu et al., 2024). The discrepancy may reflect differences in participant characteristics, residual confounding, or other unmeasured factors.

Previous studies have suggested that irregular menstrual cycles may be associated with dysmenorrhea through hormonal imbalance and increased prostaglandin production (MacLean & Hayashi, 2022). However, this study found an inverse association between abnormal menstrual cycles and PD after adjusting for potential confounders. This result contrasts with previous reports and may reflect residual confounding, differences in participant characteristics, or other unmeasured factors. Therefore, the observed association should be interpreted cautiously.

Having a mother or sister with dysmenorrhea was significantly associated with the prevalence and severity of dysmenorrhea. According to (J. Liu et al., 2024), this association may be attributed to a significant genetic relationship between mothers and daughters (Champion et al., 2021). In twin studies, PD was influenced by genetic factors (Aouad et al., 2022). Previous studies suggest that genetic factors were related to the COX-2 gene polymorphism -1195G>A, which has been associated with increased prostaglandin levels and a higher risk of dysmenorrhea (Olasore et al., 2022). A family history of dysmenorrhea was the strongest factor associated

Table 2. Factors associated with primary dysmenorrhea

Variables	Category	Primary dysmenor- rhea		χ^2 p-value ¹	aOR (95%CI) p-value ²
		Yes n(%)	No n(%)		
Menstrual and dysmenorrhea history					
Age of men- arche	≥12 years	191(67.0)	94(33.0)	14.776	Ref
	<12 years	149(83.2)	30(16.8)	<0.001* 2.51(1.49-4.24)	
Menstrual cycle length	21-35 days	261(75.9)	83(24.1)	4.578	Ref
	<21 or >35 days	79(65.8)	41(34.2)	0.032* 0.59(0.34-0.99)	
Menstrual duration	3-7 days	294(72.4)	112(27.6)	0.050	-
	<3 or >7 days	46(79.3)	12(20.7)	1.233 0.267	
Family history of dysmenor- rhea	No	141(56.0)	111(44.0)	84.526	Ref
	Yes	199(93.9)	13(6.1)	<0.001* 13.95(7.31-26.62)	
Daily activity patterns					
Sleep duration	≥8 hours	189(69.5)	83(30.5)	4.823	Ref
	<8 hours	151(78.6)	41(21.4)	0.028* 1.47(0.89-2.43)	
Regular eating patterns	Regular	128(67.4)	62(32.6)	0.132	Ref
	Irregular	212(77.4)	62(22.6)	5.734 0.017* 1.44(0.86-2.41)	
Balanced nutri- tion	Frequent	137(67.2)	67(32.8)	0.172	Ref
	Infrequent	203(78.1)	57(21.9)	6.961 0.008* 1.65(0.98-2.76)	
Fast food intake	Infrequent	102(67.1)	50(32.9)	0.059	Ref
	Frequent	238(76.3)	74(23.7)	4.395 0.036* 1.91(1.15-3.20)	
Physical activ- ity	Frequent	149(68.7)	68(31.3)	0.013*	Ref
	Infrequent	191(77.3)	56(22.7)	4.428 0.035* 1.61(0.98-2.64)	

Model performance	
Likelihood Ratio χ^2	134.619
Model p-value	<0.001
Nagelkerke R ²	0.367
Hosmer–Lemeshow χ^2	12.967
Hosmer–Lemeshow p-value	0.113
Overall classification accuracy	80.00%

*p-value¹: Pearson's chi-square test; *significance level $p < 0.05$*

*p-value²: Binary logistic regression; *significance level $p < 0.05$; aOR (adjusted odds ratio)*

Table 3. Factors associated with primary dysmenorrhea severity

Variables	Category	Primary dysmenorrhea severity			χ^2	aOR (95%CI)
		Mild	Moderate	Severe		
		n(%)	n(%)	n(%)	<i>p-value</i> ¹	<i>p-value</i> ²
Menstrual and dysmenorrhea history						
Age of men- arche	≥12 years	32(16.8)	135(70.7)	24(12.6)	0.967	-
	<12 years	30(20.1)	98(65.8)	21(14.1)	0.617	
Menstrual cycle length	21-35 days	46(17.6)	180(69.0)	35(13.4)	0.287	-
	<21 or >35 days	16(20.3)	53(67.1)	10(12.7)	0.866	
Menstrual duration	3-7 days	53(18.0)	204(69.4)	37(12.6)	0.979	-
	<3 or >7 days	9(19.6)	29(63.0)	8(17.4)	0.613	
Family history of dysmenor- rhea	No	24(17.0)	99(70.2)	18(12.8)	0.334	-
	Yes	38(19.1)	134(67.3)	27(13.6)	0.846	
Onset of dys- menorrhea	After menarche	33(19.9)	114(68.7)	19(11.4)	1.267	-
	Since menarche	29(16.7)	119(68.4)	26(14.9)	0.531	
Frequency of dysmenorrhea	Infrequent	15(37.5)	24(60.0)	1(2.5)	60.813	Ref
	Sometimes	43(21.3)	147(72.8)	12(5.9)	<0.001*	2.46(1.18-5.11)
	Frequent	4(4.1)	62(63.3)	32(32.7)		0.010* 16.53 (6.81 - 40.13) <0.001*
Daily Activity Patterns						
Sleep duration	≥8 hours	34(18.0)	140(74.1)	15(7.9)	10.951	Ref
	<8 hours	28(18.5)	93(61.6)	30(19.9)	0.004*	1.35(0.84-2.19)
Regular eating patterns	Regular	33(25.8)	87(68.0)	8(6.3)	13.988	0.239 Ref
	Irregular	29(13.7)	146(68.9)	37(17.5)	<0.001*	2.58 (1.56-4.25) <0.001*

Variables	Category	Primary dysmenorrhea severity			χ^2	aOR (95%CI)
		Mild	Moderate	Severe		
		n(%)	n(%)	n(%)	<i>p-value</i> ¹	<i>p-value</i> ²
Balanced nutri- tion	Frequent	28(20.4)	96(70.1)	13(9.5)	3.123	-
	Infrequent	34(16.7)	137(67.5)	32(15.8)	0.210	
Fast food intake	Infrequent	30(29.4)	63(61.8)	9(8.8)	13.097	Ref
	Frequent	32(13.4)	170(71.4)	36(15.1)	0.001*	2.32(1.38-3.90)
						0.002*
Physical activ- ity	Frequent	25(16.8)	107(71.8)	17(11.4)	1.394	-
	Infrequent	37(19.4)	126(66.0)	28(14.7)	0.498	
Model performance						
Likelihood Ratio χ^2 (<i>p</i>)						85.392(<0.001)
Pearson goodness-of-fit χ^2 (<i>p</i>)						45.700(0.214)
Deviance goodness-of-fit χ^2 (<i>p</i>)						44.755(0.243)
Nagelkerke R ²						0.273
Test of Parallel Lines χ^2 (<i>p</i>)						8.311(0.140)

*p-value*¹: Pearson's chi-square test; *significance level $p < 0.05$

*p-value*²: Ordinal logistic regression; *significance level $p < 0.05$; aOR (adjusted odds ratio)

Table 4. Factors associated with number of self-management treatments

Variables	Category	Number of self-management treatments			χ^2	aOR (95%CI)
		No	1 treatment	>1 treatment	<i>p-value</i> ¹	<i>p-value</i> ²
		n(%)	n(%)	n(%)		
Dysmenorrhea history						
Frequency of dysmenorrhea	Infrequent	19(47.5)	15(37.5)	6(15.0)	17.51	Ref
	Sometimes	65(32.2)	73(36.1)	64(31.7)	0.002*	1.95(1.02-3.72)
				0.043*		
	Frequent	19(19.4)	33(33.7)	46(46.9)	3.10(1.48-6.51)	
					0.003*	
Severity of dysmenorrhea	Mild	27(43.5)	21(33.9)	14(22.6)	13.26	Ref
	Moderate	69(29.6)	85(36.5)	79(33.9)	0.010*	1.53(0.89-2.61)
				0.122		
	Severe	7(15.6)	15(33.3)	23(51.1)	2.48(1.12-5.48)	
					0.025*	
Model performance						
Likelihood Ratio χ^2 (<i>p</i>)						22.760(<0.001)

Variables	Category	Number of self-management treatments			χ^2	aOR (95%CI)
		No	1 treatment	>1 treatment	p -value ¹	
		n(%)	n(%)	n(%)	p -value ²	
Pearson goodness-of-fit χ^2 (p)						4.913(0.961)
Deviance goodness-of-fit χ^2 (p)						5.181(0.952)
Nagelkerke R ²						0.073
Test of Parallel Lines χ^2 (p)						0.698(0.952)

*p-value¹: Pearson's chi-square test; *significance level $p < 0.05$*
*p-value²: Ordinal logistic regression; *significance level $p < 0.05$; aOR (adjusted odds ratio)*

with PD prevalence, as shown in an Iranian study (Adib-Rad et al., 2022). Family history may reflect shared genetic susceptibility that is associated with PD.

Sleep duration was significantly associated with PD in the bivariate analysis. However, the association was no longer statistically significant after adjustment for potential confounders. Similarly, a study conducted in Korea identified sleep quality as the most significant risk factor for premenstrual syndrome and PD (Jeong et al., 2023). One possible explanation is that sleep disturbances have been associated with alterations in hormone production and release, which may contribute to menstrual disorders (Jiao et al., 2025). Previous studies suggest that sleep disturbances also played an important role in the inflammatory resolution process (Engert et al., 2023) and raised prostaglandin D2 (PGD2) levels (Sang et al., 2023).

Irregular eating patterns, infrequent nutritional intake, and frequent fast-food consumption were associated with dysmenorrhea in the bivariate analysis. However, after adjustment for potential confounders, only frequent fast-food consumption remained independently associated with the prevalence of PD, while both irregular eating patterns and frequent fast-food consumption remained independently associated with dysmenorrhea severity. Previous studies in Japan showed that deficiencies in animal protein, vitamins, and associated fatty acids, as well as breakfast and bathing frequency, were related to the severity of menstrual pain (Naraoka et al., 2023). Meal timing has been associated with human physiology, and irregular eating patterns may adversely affect individual health (BaHammam & Pirzada, 2023). Physiological disturbances may be associated with alterations in steroid hormone

production, which have been linked to increased prostaglandin levels (Fujiwara et al., 2020). Increased prostaglandin levels have been associated with stronger uterine contractions and menstrual pain (Itani et al., 2022).

Physical activity has been associated with the prevalence of dysmenorrhea in previous studies. Although the prevalence of PD was higher among adolescents with infrequent physical activity, the association was not statistically significant after adjustment for potential confounders. Previous evidence suggests that regular physical activity may improve blood circulation to the heart and other organs (Nystoriak & Bhatnagar, 2018). Improved blood flow has been proposed to be associated with lower prostaglandin accumulation in the uterus, which may contribute to alleviating menstrual pain (Dehnavi et al., 2018). Although physical activity was not associated with dysmenorrhea severity in this study, previous studies have suggested that regular physical activity may reduce pain severity through activation of the mesolimbic dopaminergic network (Tanaka et al., 2023). Previous studies have also reported that regular physical activity is associated with lower dysmenorrhea severity and, in some settings, may be more effective than analgesics in reducing pain intensity (Armour, Smith, et al., 2019).

The frequency of dysmenorrhea was the strongest factor associated with its severity, and severe pain more often occurred in individuals who experienced it consistently compared to those who experienced it sometimes or infrequently. This result may be related to heightened pain sensitivity reported in previous studies (Payne et al., 2019). Increased pain sensitivity has been associated with greater pain intensity (Fortún-Rabadán et al., 2023) and has also been associated with a greater likelihood of developing other

chronic pain conditions (Iacovides et al., 2015).

Individuals who consistently experienced severe dysmenorrhea were more likely to engage in self-management practices than those with infrequent or mild dysmenorrhea. Consistent with previous studies, females with frequent dysmenorrhea were more likely to seek treatment (Esan et al., 2024), and females with severe dysmenorrhea used more self-management techniques than those with mild dysmenorrhea (Rogers et al., 2021). A combination of pharmacological and non-pharmacological strategies was essential for optimal pain management (Jogna et al., 2025) and was more effective in reducing pain intensity (J. Liu et al., 2025).

Limitations

This study has several limitations. Its cross-sectional design precludes causal inference, and unmeasured confounders, including body mass index (BMI), psychological stress, socioeconomic status, caffeine intake, and other lifestyle factors, may have contributed to the observed associations. Additionally, dietary habits and physical activity were assessed using self-reported measures rather than validated instruments, which may have introduced measurement bias. These unmeasured factors may have confounded the observed associations and should be considered in future prospective studies.

CONCLUSION

In conclusion, the prevalence of primary dysmenorrhea (PD) among adolescent girls in junior high schools in Yogyakarta was high (73.3%), with most participants experiencing moderate severity (63.2%). After adjustment for potential confounders, age at menarche <12 years, a family history of dysmenorrhea, and frequent fast food consumption were independently associated with higher odds of PD, while abnormal menstrual cycles were independently associated with lower odds of PD (aOR = 0.59, 95% CI: 0.34–0.99). Frequent dysmenorrhea, irregular eating patterns, and frequent fast food consumption were independently associated with greater PD severity. In addition, the frequency and severity of dysmenorrhea were independently associated with the number of self-management strategies used. Most adolescents reported using nonpharmacological self-management approaches, particularly eucalyptus oil application and turmeric–tamarind herbal drinks.

This study identified several factors independently associated with PD, including non-modifiable factors (age at menarche and family

history) and potentially modifiable lifestyle factors, such as dietary habits. These results may help inform future health education and self-management programs. However, the effectiveness of interventions targeting these factors should be confirmed through longitudinal and intervention studies.

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DECLARATION OF GENERATIVE AI

This manuscript received limited assistance from an AI-based language tool (Quillbot and ChatGPT) for language refinement and grammar checking. The authors critically reviewed and finalized all content and accept full responsibility for the published work. No AI tools were used in data analysis or the interpretation of findings.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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