ORIGINAL ARTICLE

Frequency and Factors Associated with Primary Dysmenorrhea among Adolescents Living in Kendari City, Indonesia: A Cross-Sectional Study

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ABSTRACT

Objective: This study aims to analyze the frequency and factors associated with primary dysmenorrhea among adolescents living in Kendari city, Indonesia.

Methods: This cross-sectional study was conducted at Junior School SMPN 20 Kendari City, Indonesia, from September 2022 to October 2022. Adolescents aged 12-15 years having menarche were included in the study. Primary dysmenorrhea was assessed as an outcome using a numeric rating scale. Moreover, associated risk factors such as menstruation duration, age at menarche, family income, nutritional status, and exercise habits were also noted.

Results: Of the total 173 adolescent girls, the mean age was 13.23 ±0.78 years. Primary dysmenorrhea was observed in 44 (25.4%) participants. A significant association of primary dysmenorrhea was found with age at menarche (p-value <0.001), family income (p-value <0.001), and exercise (p-value 0.004). The risk of primary dysmenorrhea was 7.16 times significantly higher in adolescents with menarche at 14-15 years (cOR 7.16, 95% CI 3.32 to 15.45, p-value <0.001). Similarly, adolescents with family income below the provincial minimum wage were 7.77 times significantly more likely to have primary dysmenorrhea (cOR 7.77, 95% CI 3.42 to 17.64, p-value <0.001). Furthermore, the risk of primary dysmenorrhea was approximately three times significantly higher in adolescents who did not perform exercise (cOR 2.76, 95% CI 1.35 to 5.65, p-value 0.005).

Conclusion: The study concludes that adolescents with an advanced age at menarche, lack of exercise , and low family income are at an increased risk of primary dysmenorrhea.

Keywords: Adolescent, Dysmenorrhea, Exercise, Nutritional Status.

INTRODUCTION

Adolescence, between 10-19 years, is a transition from childhood to adulthood.[1-3] In girls, adolescence is marked by the onset of menstruation. Generally, menstruation will give a painful sensation in the abdominal area, also known as dysmenorrhea. Dysmenorrhea refers to the symptoms experienced during menstruation, such as discomfort in the abdomen, cramping, and pain in the lower back.[4]

Dysmenorrhea is categorized into primary and secondary dysmenorrhea. Primary dysmenorrhea involves menstrual pain occurring without any abnormalities in the reproductive organs, whereas secondary dysmenorrhea involves menstrual pain alongside abnormalities in the genital anatomy. Pain in dysmenorrhea can be divided into three categories such as mild, moderate, and severe.[5]

Dysmenorrhea or menstrual pain is a gynecological complaint caused by an imbalance of the hormone progesterone in the blood, resulting in painful menstruation.[6] Direct causes and indirect causes can result in the occurrence of dysmenorrhea in young women. Direct causes include endocrine and myometrium factors, while indirect factors include age, menarche, family history, and exercise habits.[7] Risk factors for dysmenorrhea include psychological factors, body mass index (BMI), family history, exercise, age at menarche, menstrual cycle, alcohol consumption, and the influence of the hormone prostaglandin.[8]

Dysmenorrhea symptoms are felt in the form of lower cramps that radiate to the back of the legs.[9] Dysmenorrhea also harms adolescents, disrupting teaching and learning activities, losing focus during class, and having a tendency to sleep during teaching and learning activities.[10] These situations will affect achievement in the academic and non-academic fields. Many teenagers complain that they don't even want to go to school during menstruation. The more severe the pain experienced, the more disrupted learning activities.[11] The most widely felt effects of dysmeno-

rrhea are limited physical activity, social isolation, poor concentration, and absence from teaching and learning.[12]

The previously mentioned phenomenon confirms that adolescents dealing with primary dysmenorrhea experienced disruptions in their daily activities due to the accompanying pain, leading to school absenteeism and potentially lowering student achievement. Moreover, in Kendari City, particularly at the High School of Kendari in Southeast Sulawesi, cases of primary dysmenorrhea remain notably high. To the best of our knowledge, no research has been undertaken at this location regarding the risk factors associated with primary dysmenorrhea. This void in research prompts and motivates researchers to conduct a study aimed at analyzing the factors linked to primary dysmenorrhea among adolescents in Kendari City.

METHODS

This cross-sectional study was conducted at junior school SMPN 20 Kendari City, Indonesia, from September 2022 to October 2022. The study followed all ethical licensing processes and was approved by the Health Research Ethics Committee of the Faculty of Medicine, Halu Oleo University (Registration Number: 055/UN29.171.3/ETIK/2022). Prior to filling out the questionnaire, the researcher provided detailed information about the research and obtained informed consent from the participants. Following this, participants signed a statement to confirm their willingness to be part of the study and proceeded to complete the questionnaire.

The study involved adolescents aged 12-15 years with menarche, experiencing and not experiencing menstrual pain for the last six months. Adolescents experiencing severe pain were excluded from the study. A non-probability convenience sampling technique was used for the selection of the participants.

The data collection tool utilized in this study was a questionnaire encompassing respondent details such as age, menstruation duration, age at menarche, family income [below or above provincial minimum wage: 2,993,730.98 Indonesian Rupiah (IDR)], nutritional status, and exercise habits. The questionnaire's validity was assessed by ten adolescent girls, resulting in a Cronbach's Alpha value of 0.807. This confirms the reliability of the questionnaire. The outcome of the study was primary dysmenorrhea. Primary dysmenorrhea was pain felt by participants during menstruation. To assess primary dysmenorrhea, a numeric rating scale was employed. This scale categorizes individuals into two groups: those experiencing primary dysmenorrhea and those not experiencing it, based on the assessment of pain intensity. It defines mild to moderate pain within a range of 2-6 on the scale as an indication of experiencing discomfort, while a scale reading of 0-1 denotes the absence of pain.

Adolescents' exercise habits were assessed by their engagement in regular physical activity, occurring at least three times a week. This encompasses activities such as gymnastics, jogging, or other training exercises. The criteria for this exercise habit are categorized as 'yes' if the adolescent consistently participates in sports and 'no' if they did not engage in regular physical activities. Nutritional status was determined by weight and age measurements, followed by the calculation of BMI, classified into the following categories: Underweight (BMI < 18.50 kg/m²), Normal (BMI 18.50 – 24.99 kg/m²), and Over weight/obese (BMI ≥ 25.00 kg/m²).

Data entry and analysis were done using a Statistical Package for Social Sciences (SPSS) version 20.0. Mean ±SD was computed for quantitative variables like age, while frequency and percentages were computed for categorical variables such a, age at menarche, family income, primary dysmenorrhea, length of menstruation, nutritional status, and exercise. Inferential statistics were explored using the Chi-square test to identify the association of primary dysmenorrhea with the general characteristics of adolescents. The p-value of ≤0.05 was considered statistically significant. Moreover, binary logistic regression was also applied to identify potential factors for primary dysmenorrhea.

RESULTS

Of the total 173 adolescent girls, the mean age was 13.23 ±0.78 years. The majority of the adolescents did experience early menarche and had their first menstruation between the ages of 12-13 years, i.e., 106 (61.3%), and their length of menstruation was more than five days, i.e., 124 (71.7%). More than half of the adolescents had family income above the provincial minimum wage 95 (54.9%), while 78 (45.1%) had family income below the provincial minimum wage. Most adolescents performed exercise 120 (69.4%), and percentages of underweight and normal weights were 46.2% and 40.5% respectively (Table 1).

Primary dysmenorrhea was observed in 44 (25.4%) participants, while 129 (74.6%) did not suffer from primary dysmenorrhea. A significant association of primary dysmenorrhea was found with variables age at menarche (p-value <0.001), family income (p-value <0.001), and exercise (p-value 0.004) (Table 2).

Table 3 reveals binary logistic regression analysis for predicting primary dysmenorrhea among adolescents. At the univariate level, all variables presented in Table 3 showed significant odds ratios. The risk of primary dysmenorrhea was 7.16 times significantly higher in adolescents' age at menarche 14-15 years as compared to adolescents' age at menarche 12-13 years (cOR 7.16, 95% CI 3.32 to 15.45, p-value <0.001). Similarly, adolescents with a family income below the provincial minimum wage were 7.77 times significantly more likely to have primary dysmenorrhea as compared to adolescents with family income above the provincial minimum wage (cOR 7.7, 95% CI 3.42 to 17.64, p-value <0.001). Moreover, the risk of primary dysmenorrhea was approximately three times significantly higher in adolescents who did not perform exercise when compared with their counterparts. Furthermore, the findings of the multivariable analysis showed that after adjusting the variables mentioned in Table 3, the risk of primary dysmenorrhea in adolescents with menarche at 14-15 years increased up to 11.53.

DISCUSSION

Adolescence signifies a transitional phase between childhood and adulthood, marked by significant anatomical and physiological changes, especially in the maturation of sexual organs. This developmental stage is commonly referred to as puberty.[13] Among the many processes of sexual maturation experienced by adolescent girls during puberty, the onset of their first menstruation, known as menarche, stands out. However, a frequent occurrence during this period is the experience of excessive pain known as dysmenorrhea, which manifests before or during menstruation. Dysmenorrhea represents one of the most prevalent gynecological issues among adolescent girls.[14,15] Hence, this study aims to analyze the determinants contributing to primary dysmenorrhea in young women.

Women with early menarche suffered significantly more from dysmenorrhea than women with late menarche. Based on the theory, menarche at an earlier age causes the reproductive organs to not function optimally and are not ready to undergo changes so that pain occurs with menstruation. The results of this study are in line with research by Hatmanti *et al.* Who reported that there is a relationship between early menarche and primary dysmenorrhea in class VIII students of SMPN 20 Surabaya.[16]

Our study results revealed an association between family income and risk of primary dysmenorrhea. This was consistent with other studies that have shown that socioeconomic status influences the severity of menstruation pain.[17] For instance, a study performed with 581 women aged 18-45 years in central North

Table 1: General characteristics of adolescents (n = 173)

	n (%)
Early Menarche Age	
12-13 years old	106 (61.3)
14-15 years old	67 (38.7)
Family Income	
Above Provincial Minimum Wage	95 (54.9)
Below Provincial Minimum Wage	78 (45.1)
Length of Menstruation (days)	
≤ 5	49 (28.3)
> 5	124 (71.7)
Nutritional Status	
Underweight	80 (46.2)
Normal	70 (40.5)
Overweight/Obese	23 (13.3)
Exercise	
Yes	120 (69.4)
No	53 (30.6)

-Provincial minimum wage: 2,993,730.98 Indonesian Rupiah (IDR)
All data presented as number (%)

Table 2: Association between primary dysmenorrhea and general characteristics of adolescents (n = 173)

Characteristics	Primary Dysmenorrhea		p-value
	Suffering (n= 44)	Not Suffering (n= 129)	
Early Menarche Age			
12-13 years old	12 (11.3)	94 (88.7)	<0.001*
14-15 years old	32 (47.8)	35 (52.2)	
Family Income			
Above Provincial Minimum Wage	9 (9.5)	86 (90.5)	<0.001*
Below Provincial Minimum Wage	35 (44.9)	43 (55.1)	
Length of Menstruation (days)			
≤ 5	16 (32.7)	33 (67.3)	0.170
> 5	28 (22.6)	96 (77.4)	
Nutritional Status			
Underweight	21 (26.3)	59 (73.8)	
Normal	17 (24.3)	53 (75.7)	0.960
Overweight/Obese	6 (26.1)	17 (73.9)	
Exercise			
Yes	23 (19.2)	97 (80.8)	0.004*
No	21 (39.6)	32 (60.4)	

-Provincial minimum wage: 2,993,730.98 Indonesian Rupiah (IDR)
* p-value ≤ 0.05 (Chi-Square test)

Table 3: Binary logistic regression analysis for predicting primary dysmenorrhea among adolescents' aged 12-15 years (n = 173)

	Univariable analysis		Multivariable analysis	
	COR (95% CI)	p-value	aOR (95% CI)	p-value
Early Menarche Age				
12-13 years old	1		1	
14-15 years old	7.16 (3.32 to 15.45)	<0.001*	11.53 (2.28 to 58.27)	0.003*
Family Income				
Above Provincial Minimum Wage	1		1	
Below Provincial Minimum Wage	7.77 (3.42 to 17.64)	<0.001*	3.26 (1.05 to 10.11)	0.040*
Exercise				
Yes	1		1	
No	2.76 (1.35 to 5.65)	0.005*	0.20 (0.05 to 0.80)	0.024*

-Provincial minimum wage: 2,993,730.98 Indonesian Rupiah (IDR)
COR: Crude odds ratio, aOR: Adjusted odds ratio, CI: confidence interval, *p-value ≤ 0.05

Carolina indicated that low income increased the development of dysmenorrhea and dyspareunia.[18] Another study conducted in Ethiopia among 440 female university students showed that the risk of primary dysmenorrhea was nearly five times higher among students whose monthly income was less than nine USD than those whose monthly income was greater than 18 USD.[19]

Physiologically, the prolonged duration of menstruation correlates directly with increased uterine contractions, leading to continued secretion of prostaglandins by the body. Consequently, this often

results in painful sensations during the menstrual period.[20] This study aimed to investigate the possible link between extended menstrual duration and the experience of dysmenorrhea among adolescent girls in Kendari City. Surprisingly, the analysis results revealed no significant association between the length of menstruation and the incidence of dysmenorrhea. A previous study affirmed that urban adolescents undergo lifestyle changes, including insufficient exercise, consumption of non-nutritious foods, smoking, and illicit drug use, which are strongly linked to menstrual irregularities, the severity of dysmenorrhea, and other factors triggering diseases. This pattern contrasts significantly with adolescents living in rural areas.[21] The present study established a connection between nutritional status and the prevalence of dysmenorrhea among adolescent girls, corroborating earlier research. Another study finding indicated that adolescent girls with abnormal nutritional status have a significantly higher likelihood of experiencing dysmenorrhea compared to those with normal nutritional status.[22]

Exercise refers to a deliberate and organized physical activity involving repetitive body movements designed to enhance physical fitness.[23] Types of exercise include aerobic and anaerobic. Insufficient exercise can significantly contribute to the occurrence of dysmenorrhea. During dysmenorrhea, there is reduced optimal oxygen distribution to the reproductive organs, which can further induce vasoconstriction.[24,25] Regular exercise facilitates the optimal distribution of oxygen across the body's tissues, nearly doubling the amount of oxygen delivered per minute, particularly in blood vessels affected by vasoconstriction. Regular exercise will lead to a decrease in the incidence of dysmenorrhea.[17,26] The current study reports that there is a relationship between exercise habits and the incidence of primary dysmenorrhea in young women. This finding corroborates the findings of previous studies, which reported a significant relationship between exercise habits and the incidence of dysmenorrhea. In this study, several students reported exercising but still suffered from primary dysmenorrhea.[27,28] People must exercise regularly and correctly because it will only be efficient and fruitful if it is less than or more than the measure.

There are some limitations in this study. Firstly, the cross-sectional design restricts the establishment of causal relationships among variables. Secondly, the reliance on self-reported data may introduce recall and reporting bias, affecting the accuracy of responses. Additionally, the study's generalizability may be limited as it focuses on a specific demographic of adolescent girls. For future research, it is recommended to employ a longitudinal study design to better understand the temporal relationships and causality between variables associated with primary dysmenorrhea. Utilizing objective measures, such as clinical assessments and self-reports, could enhance the reliability of data collection. Exploring the influence of additional lifestyle factors, like dietary habits and stress, could provide a more holistic perspective. However, this study's strength lies in its extensive sample size, the multitude of variables studied, and simultaneous testing.

CONCLUSION

In conclusion, primary dysmenorrhea among adolescents in Kendari City is associated with age at menarche, family income, and lack of exercise. Adolescents with a later age at menarche, lack of exercise activities, and lower family income emphasized the heightened risk of primary dysmenorrhea. Notably, regular exercise was identified as a protective factor. These findings underscore the multifaceted nature of factors contributing to primary dysmenorrhea in adolescents.

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