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Differences in Body Image According to Dysmenorrhea Severity and Menstrual Cycle Regularity Among Adolescent Girls: A Cross-Sectional Study

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ABSTRACT

Background: Female adolescent perception of their body image can be influenced by biological factors such as menstruation and the pain it causes, which can lead to anxiety, a lack of self confidence, and a tendency to compare themselves with others. There has not yet been much research examining these three factors simultaneously, so it is not yet known which factor is the most dominant. This study aims to analyze differences body image based on the severity of dysmenorrhea and the menstrual cycle.

Subjects and Method: This quantitative cross-sectional study was conducted in five senior secondary schools in the city of Yogyakarta between February and April 2026, involving 336 adolescent girls aged 15–19 years who had been menstruating for at least two years since menarche, were willing to participate as respondents, and completed the entire questionnaire. Sampling techniques employed proportional stratified and consecutive sampling. Measured using the MBSRQ, NRS, and menstrual cycle questionnaire. Data were analysed using chi square test and binary logistic regression.

Results: Among adolescent girls, 12.8% have a negative body image. Adolescents with severe dysmenorrhea were 2.4 times more likely to have a negative body image perception (OR= 2.47; 95% CI= 1.11 to 5.49; p= 0.042), with irregular menstrual cycles were 0.5 times more likely to have a negative body image perception (OR= 0.53; 95% CI= 0.25 to 1.12; p= 0.144). Dysmenorrhea was significantly associated with body image (aOR= 2.39; 95% CI= 1.07 to 5.35; p= 0.034).

Conclusion: There are differences in body image based on the severity of dysmenorrhoea, but there are no differences in body image based on the menstrual cycle. These findings may be taken into account when assessing adolescents with dysmenorrhoea, by evaluating their body image.

Keywords: body image, dysmenorrhea, menstrual cycle, female adolescents

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BACKGROUND

Body image is defined as a person's thoughts, feelings, and perceptions about their body (Denich and Ifdil, 2015). Body image can be influenced by biological and psychological factors (Jebero et al., 2025). A poor body image can lead to psychological disorders such as stress, shame, low self-esteem, comparing oneself to others, and anxiety (Nazmi et al., 2025). It has been reported that 1.3% of adolescents aged 10–14 and 3.4% of adolescents aged 15–19 suffer from anxiety disorders, partly due to a poor body image (WHO, 2025). The prevalence of poor body image was 18.5% among 416 adolescents in Ethiopia (Jebero et al., 2025). A prevalence of very poor body image was also found among adolescent girls in Iran, at 16% of 396 (Baharvand et al., 2020). Quantitative research suggests that Indonesian girls' feelings of self-worth are negatively correlated with body image concerns (Almasith et al., 2018; Garbett et al., 2023). In Yogyakarta, 12.2% of 82 adolescent girls experienced negative body image (Shalita et al., 2024).

Adolescent girls pay more attention to their physical appearance than adolescent boys (Sulistyan et al., 2016). Concerns about body image peak during late adolescence (Nazmi et al., 2025). Late adolescents (ages 17–19) are 1.9 times more likely to experience body image dissatisfaction than middle adolescents (ages 14–16) (Jebero et al., 2025). Late adolescents tend to be in a volatile and emotional state due to rapid physical changes as well as numerous cognitive and social changes and more complex thinking (Denich and Ifdil, 2015).

Many factors can influence body image, including psychological factors such as self-esteem, depression, and anxiety, as well as biological factors such as BMI and hormonal changes during the menstrual cycle (Carr-Nangle et al., 1994). Normally, a woman's menstrual cycle lasts between 21 and 35 days, with menstruation occurring once per cycle, lasting 3 to 7 days, and involving a blood loss of 20 to 60 mL (Wang and Zhu, 2025). The prevalence of menstrual cycles among adolescents aged 10–14 years is 3.5% and among those aged 15–19 years is 11.7%, with higher rates in urban areas (Ministry of Health of the Republic of Indonesia, 2010). The prevalence of irregular menstrual duration is 43.8%, polymenorrhea 37.5%, and oligomenorrhea 19.3% (Karout et al., 2012). A study (Zafar et al., 2018) indicates that the prevalence of irregular menstrual cycles among adolescents is approximately 56.9%. According to a study (Carr-Nangle et al., 1994), changes in body image during the menstrual cycle are caused by emotional changes, physical symptoms such as pain, and mood swings. This suggests that unstable hormonal fluctuations can affect body perception.

Another factor that can affect body image is menstrual pain, or dysmenorrhea. Dysmenorrhea is defined as lower abdominal pain or cramping that occurs immediately before and/or during menstruation and lasts 48–72 hours (Berger et al., 2019). The global prevalence of dysmenorrhea is 90% (1,769,425 people), and in Indonesia it reaches 64.25% (107,673 people), with 54.89% experiencing primary dysmenorrhea (Fajrin et al., 2020). In Yogyakarta Province, the incidence of dysmenorrhea was 73.22% among 254 adolescent girls (Issabella et al., 2022). Primary dysmenorrhea not only causes physical discomfort but also significantly impacts women's psychological well-being (Staňková et al., 2024), elevated prostaglandin levels lead to reduced productivity, physical discomfort, mood swings, and other negative emotions (de Arruda et al., 2025).

Previous studies have examined the relationship between body image and the menstrual cycle as well as dysmenorrhea. However, the studies cited in this research generally evaluated these two relationships separately, and thus have not provided an overview of the interrelationship among these three variables within a single population or the influence of each factor. This understanding is important because negative body image among adolescents can have far-reaching effects on psychological well-being, nutritional status, academic concentration, risk of depression, and reproductive health behaviors. This is in line with Indonesian Ministry of Health Regulation No. 320 of 2020 on Professional Standards for Midwives in the sixth area, which states that midwives have the authority to design and provide reproductive health counseling for women. The counseling provided may cover both biological and psychological aspects. Based on the data above, this study aims to analyze the differences in the levels of dysmenorrhea and menstrual cycle patterns in relation to body image among adolescent girls.

SUBJECTS AND METHOD

1. Study Design

This was a cross-sectional study conducted at five high schools in the city of Yogyakarta, Indonesia, from February to April 2026.

2. Population and Sample

Negative body image peaks during late adolescence (Nazmi et al., 2025). Late adolescents tend to be emotionally unstable due to rapid physical changes and numerous cognitive and social changes, as well as more complex thinking (Denich and Ifdil, 2015). Adolescents are divided into two groups, young adolescents aged 10 to 14 years and older adolescents aged 15 to 19 years (WHO South-East Asia, 2017) . The population of this study focuses on older adolescents specifically high school girls in the city of Yogyakarta. The accessible population consisted of female students representing every type of high school, selected at random from public high schools, private high schools, public vocational high schools, private vocational high schools, public Islamic high schools, and private Islamic high schools. The sample size was calculated using the Slovin formula. The sampling techniques used were proportional stratified sampling and consecutive sampling, resulting in a total sample size of 338 adolescent girls based on the inclusion and exclusion criteria.

3. Study Variables

The independent variables in this study were dysmenorrhea and the menstrual cycle. The dependent variable was body image.

4. Operational Definition of Variables

Dysmenorrhea is level of pain experienced during the first 1–2 days of menstruation, without any underlying abnormalities.

Menstrual cycle is regular cycle includes 3 indicators: a cycle length of 21–35 days, a menstrual period lasting 3–7 days, and an average blood loss of <80 ml during the menstrual phase (2–6 pad changes per day) over the past 3 months. If ≥1 of these 3 indicators is not met, the cycle is considered irregular.

Body image is respondent's thoughts, perceptions, and feelings regarding body acceptance, body shape satisfaction, self-perceived beauty, and attitudes toward physical changes.

5. Study Instruments

Dysmenorrhea was measured using the Numerical Rating Scale (NRS) questionnaire, which has become the standard pain measurement tool by the National Initiative on Pain Control (NIPC). Dysmenorrhea is

categorized into three categories: mild, moderate, and severe. Menstrual cycles was measured using the Menstrual Cycle Questionnaire, from Suciati in Indonesia. This instrument measures menstrual cycles over the past three months, cycle length, and bleeding volume. Menstrual cycles are categorized into regular and irregular cycles. Body image was measured using the Multidimensional Body-Self-Relationship Questionnaire (MBSRQ). This instrument measures an individual's overall satisfaction with body shape with 34 items, consisting of 24 positive (favorable) statements and 10 negative (unfavorable) statements. It covers five components: appearance evaluation, appearance orientation, preoccupation with being overweight, body size categorization, and satisfaction with a specific body. It has a midpoint of 85, with a positive score of ≥ 85 and a negative score of <85.

6. Data analysis

Univariate analysis of categorical data was described in the form of frequency distribution (n) and percentage (%). Bivariate analysis used the chi-square test to analyze differences in body image based on dysmenorrhea levels and menstrual cycle. Multivariate analysis was conducted using binary logistic regression to determine the relationship between the level of dysmenorrhea and menstrual cycle on body image simultaneously. All statistical analyses were performed using statistical software (SPSS), with the significance level set at $\alpha = 0.05$.

7. Research Ethics

The research ethical clearance approval letter was obtained from Medical and Health Research Ethics Committee (MHREC) Faculty Of Medicine, Public Health, and Nursing, Gadjah Mada University-Dr.Sardjito General Hospital, No.KE/-FK/0624/EC/2026, on April 9, 2026.

RESULTS

1. Characteristics of the Study Participants

This study involved 336 high school girls who were currently enrolled and met the inclusion and exclusion criteria. Inclusion criteria: adolescent females aged 15–19 years, who had been menstruating for ≥2 years since menarche, and who were willing to participate as respondents and complete the questionnaire in full. Exclusion criteria: currently diagnosed with or having a history of gynecological disorders such as endometriosis, PMOS, or uterine fibroids; currently using hormonal contraception or pain relievers. Respondent characteristics are presented in Table 1.

Table 1. Respondent Characteristics (n=336)

Characteristics	Category	Frequency	Percentage (%)
Age	15 years	48	14.29
	16 years	189	56.25
	17 years	84	25
	18 years	15	4.46
Age at menarche	≤ 10 years	41	12.2
	11 years	109	32.44
	12 years	92	27.38
	13 years	51	15.18
	14 years	33	9.82
	≥ 15 years	10	2.98
Body Image	Positive	293	87.2
	Negative	43	12.8
Dysmenorrhea	Mild	171	50.89

Characteristics	Category	Frequency	Percentage (%)
	Moderate	123	36.61
	Severe	42	12.5
Menstrual cycle	Regular	280	83.33
	Irregular	56	16.67

1. Bivariate Analysis

Table 2 shows that adolescents with severe dysmenorrhea are 2.47 times more likely to have a negative body image than those with mild dysmenorrhea (OR= 2.47; 95% CI = 1.11 to 5.48; p= 0.042). There is a positive association between severe dysmenorrhea and negative body image (OR > 1). Severe dysmenorrhea is a risk factor for the occurrence of negative body image. Meanwhile, adolescents with irregular menstrual cycles are 0.52 times more likely to experience negative body image than adolescents with regular menstrual cycles (OR= 0.52; 95% CI= 0.24 to 1.12; p= 0.144).

Table 2. Differences in body image based on dysmenorrhea and the menstrual cycle (an analysis by Chi Square)

Variables	Body Image				OR	p
	Negative		Positive			
	n	%	n	%		
Dysmenorrhea						
Severe	10	23.8	32	76.2	2.47	0.042
Mild	33	11.2	261	88.8		
Menstrual cycle						
Irregular	11	19.6	45	80.4	0.52	0.144
Regular	32	11.4	248	88.6		

2. Multivariate analysis

Based on Table 3, adolescents with severe dysmenorrhea are 2.39 times more likely to experience negative body image than adolescents with mild dysmenorrhea (aOR= 2.39; 95% CI= 1.06 to 5.34; p= 0.034). Adolescents with irregular menstrual cycles are 0.54 times more likely to experience negative body image than adolescents with regular cycles (aOR= 0.54; 95% CI = 0.25 to 1.17; p = 0.124).

Table 3. The result of binary logistic regression analysis

Independent Variables	aOR	95% CI		p
		Lower Limit	Upper Limit	
Dysmenorrhea	2.39	1.06	5.34	0.034
Menstrual Cycle	0.54	0.25	1.17	0.124
n observation=336				

DISCUSSION

Differences in body image based on the severity of dysmenorrhea

The results of the analysis indicate that adolescents with severe dysmenorrhea were 2.4 times more likely to have a negative body image perception. This is consistent with a study (Ambresin et al., 2012) involving a similar population adolescents aged 16–20 in high schools and vocational high schools which found that those with severe dysmenorrhea are 1.5 times more

likely to experience body dissatisfaction than those without severe dysmenorrhea. This is consistent with a study (Zulimartin et al., 2025) on mild dysmenorrhea, in which adolescents were still able to carry out their daily activities, so the impact on body perception remained minimal. At more severe pain levels, adolescents began to feel disrupted, uncomfortable, and unproductive, because their bodies were perceived as a source of pain and a limitation on their activities.

On the other hand, a study by Prameswari et al. (2023) shows that not all adolescents with dysmenorrhea automatically experience negative body image, the relationship between dysmenorrhea and body image is not always consistent because it is influenced by many psychosocial factors such as social media, body-shaming behavior, and self-esteem. Differences in research findings may be due to variations in the body image instruments used. This study employed the MBSRQ, which includes measures of both satisfaction and dissatisfaction, whereas other instruments, such as the BSQ, focus more on dissatisfaction.

Dysmenorrhea occurs when the hypothalamus releases gonadotropin releasing hormone (GnRH), stimulating the anterior pituitary to secrete FSH and LH, which in turn trigger the release of estrogen and progesterone (Wang et al., 2023). Increased estrogen stimulates progesterone secretion, progesterone plays a role in increasing prostaglandins, including prostaglandin E2 and F2α (Goss, 2023). The release of prostaglandins causes myometrial contractions, vasoconstriction, and uterine ischemia, which are perceived as pain (Gutman et al., 2022). Pain is considered a stressor for the hypothalamus, the hypothalamus releases the hormone CRH, which signals the anterior pituitary to release the hormone ACTH. ACTH travels to the adrenal glands, triggering the release of the hormone cortisol. When the pain is stronger, more cortisol is produced, affecting feelings of anxiety, negative self-perception, negative thoughts, and body dissatisfaction (Wang et al., 2023).

Differences in body image based on the menstrual cycle

The results of this study indicate that there are no differences in body image based on the menstrual cycle. This is consistent with the findings of (Fukaya et al., 2016), who noted that the relationship between the menstrual cycle and body image in adolescents continues to yield varied and inconsistent results across different populations. The psychological impact of menstruation varies from person to person, depending on adolescents' psychological adaptability and social environment. However, these findings are inconsistent with a study by Nuriannisa and Faradiba (2023) that demonstrated a significant association between body image and the menstrual cycle. Differences in research findings may be influenced by population characteristics, culture, social environment, and the body image measurement instruments used.

During the menstrual cycle, fluctuations in the hormones estrogen and progesterone occur, affecting changes in the central nervous system's sensitivity to the neuroactive steroid hormone alopregnanolone, which plays a key role in mood regulation (Schiller et al., 2014). Allopregnanolone interacts with neuronal receptors, such as gamma-aminobutyric acid (GABA). Allopregnanolone works by increasing the GABA neurotransmitter to inhibit neuronal activity (McEvoy and Osborne, 2019). With a regular cycle, hormonal fluctuations are predictable, and the body is able to adapt. If the cycle is irregular, hormonal fluctuations trigger inconsistent alopregnanolone levels,

thereby disrupting emotional stability (Fitri et al., 2024).

The relationship between the severity of dysmenorrhea and the menstrual cycle and body image

The results of the simultaneous analysis of the two variables showed that the severity of dysmenorrhea remained significantly associated with body image after controlling for the menstrual cycle variable, whereas the menstrual cycle remained unrelated to body image. Dysmenorrhea is associated with body image, whereas the menstrual cycle is not associated with body image. This is because dysmenorrhea can cause physical discomfort, disruption of daily activities, mood swings, and a decline in quality of life (Gutman et al., 2022). A study (Situmorang et al., 2025) shows that dysmenorrhea affects the quality of life, mental health, and academic performance of adolescent girls. Adolescents are more likely to have negative perceptions of their bodies because the body is perceived as a source of pain, limitations, and discomfort (Tas and Zincir, 2021). Meanwhile, the condition of a regular or irregular menstrual cycle does not have a direct effect that is felt by the body, unlike dysmenorrhea, where pain is immediately felt as the body's response (Islamy, 2019).

Body image is particularly important for adolescent girls, as the physical changes they experience during the transition from childhood to adulthood will impact their subsequent developmental stages (Puspasari, 2019). Menstrual disorders such as irregular cycles and dysmenorrhea are both linked to the HPO and HPA axes. The HPO axis (hypothalamic-pituitary-ovarian) not only regulates reproduction but also interacts with the central nervous system, which governs emotions, perceptions, and subjective experiences related to the body. The HPA axis (hypothalamic-pituitary-adrenal), as the body's stress response center, has a direct influence on the reproductive system. Elevated cortisol levels can disrupt the hormonal balance necessary for regular ovulation and menstruation.

It can be concluded that there are differences in body image based on the severity of dysmenorrhea, and there are no differences in body image based on the menstrual cycle. The severity of dysmenorrhea is associated with body image, whereas the menstrual cycle shows no association with body image. The limitations of this study include the relatively homogeneous characteristics of the respondents, potential recall bias due to the study involving menstrual experiences from three months prior, and the failure to account for anticipated dropouts; two respondents did not meet the criteria, resulting in a total of 336 respondents out of the minimum required 338. Future research is recommended to include respondents with more heterogeneous characteristics to broaden data variation, such as variations between urban and rural areas and schools with specific cultural contexts. Additionally, it is hoped that provisions for anticipated dropouts can be incorporated into the sample design. The results of this study can serve as a basis for integrating body image assessments, particularly for adolescent girls experiencing dysmenorrhea. The results of these assessments can be used to identify adolescents who require psychological counseling or referral to professionals based on their needs.

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CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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