



THE RELATIONSHIP BETWEEN STRESS LEVEL WITH MENSTRUAL CYCLE DISORDERS AMONG FEMALE ADOLESCENTS

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ABSTRACT

Adolescent represents a critical transitional stage characterized by biological, psychological, and social changes, including the onset of menstruation as an indicator of reproductive maturity. Menstrual cycle disorders are common among adolescents and may be influenced by several stress. This study aimed to examine the association between stress levels with menstrual cycle disorders among female adolescents. A quantitative analytic observational study with a cross-sectional design was conducted among 278 female students selected through proportionate stratified random sampling. Data were collected using a standardized structured questionnaires, interviews, and anthropometric measurements, and analyzed using the Chi-square test. The results showed that most respondents were 16 years old (53.2%), and menarche predominantly occurring at the age of 12 years old (43.2%). The majority had mild stress levels. Bivariate analysis revealed significant associations between stress level ($p = 0.000$; $p = 0.005$). The conclusion of the study is that stress levels the factors most closely related to menstrual cycle disorders in adolescent girls.

Keywords: adolescents; menstrual cycle disorders; stress

How to cite (in APA style)

Wibawa, C. N. N. S., Yaunin, Y., & Anggraini, F. T. (2026). The Relationship between Stress Level with Menstrual Cycle Disorders among Female Adolescents. *Indonesian Journal of Global Health Research*, 8(4), 137–142. <https://doi.org/10.37287/ijghr.v8i4.1984>.

INTRODUCTION

Menstrual disorders are a major reproductive health issue commonly experienced by adolescents, including irregular cycles, changes in menstrual blood volume, abnormal or prolonged bleeding, and dysmenorrhea (Irianti & Wahyuni, 2021). A cycle is considered irregular when it falls outside the normal 21–35 day interval or deviates from the expected pattern (Dewi & Chasanah, 2023). In Indonesia, data from the Riset Kesehatan Dasar (2018) show that 11.7% of adolescents aged 15–19 years experienced irregular menstrual cycles in the past year. West Sumatra ranks third highest, with a prevalence of 19.1%, including 14.9% in urban areas (KemenKes RI, 2019). Contributing factors include dietary patterns, nutritional status, stress, physical activity, fast food consumption, and sleep quality (Widodo, Wuriningsih, & Distinarista, 2025). Adolescents are particularly vulnerable to stress due to academic demands and examination pressure, which may affect menstrual patterns (Fadila, Su'udi, Sumiatin, & Wahyu, 2024).

According to the World Health Organization (2024), approximately 14% of adolescents aged 10–19 experience mental health disorders, with increasing trends in recent years (WHO, 2023). Data from UNICEF (2019), Badan Pusat Statistik, and the Kementerian Kesehatan Republik Indonesia (2020) indicate rising concerns in adolescent well-being, including mental health problems and risk behaviors, which are associated with reduced quality of life (Kemenkes RI, 2023). Physiologically, stress triggers the hypothalamic–pituitary–adrenal (HPA) axis, increasing cortisol levels. Elevated cortisol inhibits gonadotropin-releasing hormone (GnRH), reducing luteinizing hormone (LH) and follicle-stimulating hormone (FSH), thereby disrupting ovarian function and menstrual cycles (Kadir, 2010). High stress levels are associated with menstrual disorders such as amenorrhea, oligomenorrhea, and menorrhagia. However, findings remain inconsistent; for instance, a study by Atma Deviliawati (2020) found no significant association $p = 0.312$. A preliminary survey

conducted in April 2025 among 20 students at SMK N 6 Padang found that 45% experienced menstrual cycle disorders, while 63.6% of those with normal cycles reported moderate stress. Therefore, this study aims to analyze the relationship between stress levels and menstrual cycle disorders in adolescents.

METHOD

This study employed a quantitative method with an observational analytic design to examine the relationship between variables. A cross-sectional approach was used, where data were collected at a single point in time during one data collection period. The study was conducted at a vocational high school, SMKN 6 Padang, located in East Padang, from June to October 2025. The population consisted of all female students in grades X and XI, totaling 726 individuals. The sample size was determined using the Isaac and Michael formula, resulting in a minimum of 252 respondents, with an additional 10% (26 respondents) as a reserve, yielding a total sample of 278 participants. Sampling was carried out using proportionate stratified random sampling, ensuring that each member of the population had an equal chance of being selected. SMKN 6 Padang has 29 classrooms for grades X and XI, and samples were randomly selected from each class proportionally. Inclusion criteria included willingness to participate, being a grade X or XI female student, and having experienced menstruation for more than three years. Exclusion criteria included having a current or previous diagnosis of mental disorders by a psychologist or psychiatrist, a history of abnormal bleeding outside the menstrual cycle (such as metrorrhagia or spotting), current use of hormonal medications (e.g., clomiphene citrate, levothyroxine, methimazole, leuprolide, nafarelin), and a history of reproductive organ diseases diagnosed by an obstetrician-gynecologist. The independent variable was stress level among adolescents, categorized as normal, mild, moderate, severe, and extremely severe, measured using a standardized the DASS-Y questionnaire consisting of 7 items (items 1, 6, 8, 11, 12, 14, and 18) with a scoring scale of 0 (never), 1 (sometimes), 2 (often), and 3 (always). The dependent variable was menstrual cycle disorders related to bleeding patterns influenced by stress, measured using a 10-item questionnaire (4 positive and 6 negative items). Data were analyzed using univariate and bivariate methods, with the Chi-square test applied to assess the relationship between variables.

RESULT

Table 1.
Distribution of Respondents' Characteristics by Age and Age at Menarche among Female Adolescents (n= 278)

Respondents' Characteristics	f	%
Age		
15 years	78	28,1
16 years	148	53,2
17 years	42	15,1
18 years	10	3,6
Age at Menarche		
10 years	49	17,6
11 years	65	23,4
12 years	120	43,2
13 years	38	13,7
14 years	6	2,1

Table 1, the univariate analysis shows that the majority of respondents were aged 16 years (53.2%), while the most common age at menarche was 12 years (43.2%). Table 2, among 278 female adolescent respondents, the majority had mild stress levels (31.3%), while 15.1% experienced severe stress. Table 3, the most frequent responses among female students of SMKN 6 Padang indicate that they sometimes feel angry over small things (40.3%), tend to overreact to situations (39.2%), feel overwhelmed by many things (31.3%), are easily offended (36%), and find it difficult

to relax (42.8%). The results also show that a considerable proportion of respondents reported always feeling annoyed when interrupted (37.8%) and easily irritated (36.3%).

Table 2.

Distribution of Respondents' Stress Levels among Female Adolescents (n= 278)

Stress Level	f	%
Normal	149	53,6
Mild	87	31,3
Severe	42	15,1

Table 3.

Distribution of Respondents' Stress Level Responses among Female Adolescents (n= 278)

No	Question	Never		Sometimes		Sering		Selalu	
		f	%	f	%	f	%	f	%
1.	I got upset about little things	28	10,1	112	40,3	80	28,8	58	20,9
2.	I found myself over-reacting to situations	57	20,5	109	39,2	79	28,4	33	11,9
3.	I was stressing about lots of things	86	30,9	87	31,3	68	24,5	37	13,3
4.	I was easily irritated	46	16,5	100	36,0	65	23,4	67	24,1
5.	I found it difficult to relax	62	22,3	119	42,8	51	18,3	46	16,5
6.	I got annoyed when people interrupted me	15	5,4	69	24,8	89	32,0	105	37,8
7.	I hated myself	26	9,4	71	25,5	80	28,8	101	36,3

Table 4.

Frequency Distribution of Menstrual Cycle Disorders among Female Adolescents (n= 278)

Menstrual Cycle Disorders	f	%
Normal	187	67,3
Abnormal	91	32,7

Table 4, among 278 female adolescent respondents at SMKN 6 Padang, 32.7% experienced menstrual cycle disorders.

Table 5.

Association between Stress Levels and Menstrual Cycle among Female Adolescents (n= 278)

Tingkat stres	Gangguan Siklus Menstruasi						<i>p-value</i>
	Tidak Normal		Normal		Total		
	n	%	n	%	n	%	
Normal	31	20,8	118	79,2	149	100	0.000
Ringan	30	28,5	57	58,5	87	100	
Berat	30	13,7	12	28,3	42	100	

Table 5, the statistical test showed $p = 0.000$, indicating a significant association between stress levels and menstrual cycle disorders among female adolescents. Adolescents with normal stress levels tended to have normal menstrual cycles, whereas those with mild stress levels mostly experienced menstrual cycle disorders. These findings suggest that increasing stress levels affect menstrual cycle regularity, with higher stress increasing the risk of menstrual cycle disorders in adolescents.

DISCUSSION

Respondents' Characteristics: Age and Age at Menarche

The analysis showed that the majority of respondents were aged 16 years (53.2%), with the most common age at menarche being 12 years (43.2%). This age corresponds to mid-adolescence, characterized by rapid growth, reproductive maturation, and increased psychosocial demands that may elevate stress risk. Biologically, the neuroendocrine system at this stage is not yet fully stable. The hypothalamic–pituitary–ovarian axis is still maturing and sensitive to stress. Activation of the hypothalamic–pituitary–adrenal axis increases cortisol levels, which can inhibit GnRH release and lead to menstrual cycle irregularities. Although most respondents experienced menarche at a normal age, menstrual cycle stability is often not fully established, particularly within the first 2–5 years post-menarche. Therefore, age and age at menarche should be considered alongside stress and nutritional status. These findings align with literature indicating that menstrual disorders in adolescents are generally functional due to hormonal imbalance rather than organic causes.

Stress Level

The analysis showed that among 278 female adolescents, the majority had mild stress levels 31.3%, while 15.1% experienced severe stress. This condition reflects psychological pressure that may disrupt emotional well-being and, in some cases, requires further attention such as counseling support and adaptive coping strategies (Dewi & Chasanah, 2023). Globally, the World Health Organization reports that approximately 14% of adolescents aged 10–19 years experience mental health disorders (World Health Organization, 2024). In Indonesia, about 34.9% of adolescents aged 10–17 years experience mental health problems, including symptoms similar to stress, anxiety, or mood disturbances. This proportion is relatively consistent with the finding of 31.3% mild stress among respondents in this study, indicating common psychological distress among adolescents (Seran, Purwati, & Safitri, 2024). Many cases may remain undetected due to their subclinical nature, as reported by UNICEF (UNICEF, 2021). At the age of 16 years (mid-adolescence), individuals are more emotionally vulnerable due to biological changes and social pressures, often with limited coping capacity (Luo, Li, Chen, & Wang, 2025). Stress can disrupt the hypothalamic–pituitary–adrenal axis, increase cortisol levels, and inhibit GnRH release, thereby affecting reproductive function and menstrual cycles (Alghani, Sari, Septiani, & Utama, 2024).

The most common responses in this study indicated that respondents sometimes felt angry over small matters 40.3%, overreacted to situations 39.2%, felt overwhelmed by many things 31.3%, were easily offended 36%, and had difficulty relaxing (42.8%). In addition, many respondents reported always feeling annoyed when interrupted 37.8% and easily irritated 36.3%. The prevalence of severe stress 15.1% is higher than the nationally reported prevalence of diagnosed mental disorders, likely because screening tools such as DASS-Y can detect psychological distress, including cases not yet clinically diagnosed. These findings suggest that stress among female adolescents is significant and has the potential to develop into mental health disorders if not properly addressed (Darmiati, 2022). The study also highlights the presence of a group of 16-year-old female adolescents experiencing substantial psychological distress that has not yet been detected within formal mental health services. Therefore, these findings emphasize the importance of school-based screening using instruments such as DASS-Y as a preventive strategy to identify and manage psychological problems early before they progress into clinical mental disorders (Evelyn, 2024). Overall, these results reinforce that mid-adolescent females are particularly vulnerable to early-stage psychological distress and support national data indicating that a substantial proportion of adolescents experience emotional distress. Thus, this study underscores the importance of promotive and preventive approaches to adolescent mental health, even at mild symptom levels, to prevent progression into more severe conditions.

Menstrual Cycle Disorders

The analysis showed that among 278 female adolescents, 32.7% experienced menstrual cycle disorders, with the majority aged 16 years 68.9%. This indicates that nearly one-third of adolescents experience menstrual irregularities, making it a significant reproductive health concern in this population. This condition is associated with the immaturity of the hypothalamic–pituitary–ovarian axis during adolescence, resulting in fluctuations in reproductive hormones (Alghani, Sari, Septiani, & Utama, 2024). Most respondents experienced menarche at the age of 12 years 69.2%, which is within the normal range. However, during early to mid-adolescence, although menarche occurs within the normal physiological range 11–14 years, the reproductive system is still undergoing hormonal maturation. Adolescents with normal menarche age generally exhibit more stable ovarian follicle development and gonadotropin hormone responses (FSH and LH), which may reduce the risk of menstrual cycle disorders. Nevertheless, physiologically, the hypothalamic–pituitary–ovarian axis has not yet reached full stability (Anjarsari & Sari, 2020). This hormonal immaturity leads to fluctuations in estrogen and progesterone, which are essential in regulating the menstrual cycle, thereby increasing susceptibility to disorders such as oligomenorrhea, polymenorrhea, or irregular cycles (Asasih, 2021).

According to data from the Kementerian Kesehatan Republik Indonesia through Riskesdas (2018), approximately 11.7% of adolescents in Indonesia experience irregular menstruation (KemenKes RI, 2019). The higher proportion observed in this study suggests that menstrual cycle disorders remain relatively prominent in the study setting. Menstrual irregularities in adolescents may be influenced by multiple factors, including hormonal imbalance, psychological stress, nutritional status, and dietary intake. During adolescence, the endocrine system regulating estrogen and progesterone is not yet fully stable, making menstrual cycles more susceptible to disruption (Hall & Hall, 2021). Overall, these findings confirm that menstrual cycle irregularities in adolescents are influenced by hormonal imbalance and stress. Therefore, early detection, reproductive health education, and promotive and preventive approaches are essential to prevent long-term impacts on reproductive health in adulthood.

Association between Stress Levels and Menstrual Cycle Disorders

The Chi-square analysis showed that 74.1% of respondents with severe stress experienced menstrual cycle disorders, whereas 79.2% of those with normal stress levels had regular menstrual cycles. The statistical test indicated a highly significant association $p = 0.000$, suggesting that higher stress levels are associated with an increased likelihood of menstrual cycle disorders among adolescents. These findings are consistent with Dewi et al. (2025), who reported a significant relationship between stress and menstrual cycles $p = 0.003$ (Dewi, Zamaa, Sari, Syahri, & Hardianti, 2025), and are further supported by Septiani et al. (2021), who found that female adolescents with severe stress had a 6.607 times higher risk of experiencing menstrual disorders compared to those with normal stress levels (Septiani, Minata, & Afrika, 2021). According to the stress coping theory proposed by Richard Lazarus and Susan Folkman, maladaptive coping increases cortisol levels, which suppress hypothalamic activity, disrupt reproductive hormonal balance, and contribute to menstrual cycle disturbances (Brown, Martin, Waldron, & Bruinvels, 2024).

Higher stress levels in Generation Z compared to previous generations are influenced by intensive exposure to social media, increasing academic demands, and uncertainty about the future, particularly among female adolescents. Recent studies indicate that adolescent girls in this generation are more vulnerable to psychological stress due to digital social comparison, body image pressure, and performance demands, which trigger chronic stress responses through activation of the hypothalamic–pituitary–adrenal (HPA) axis (Kadir, 2010). Prolonged activation of the HPA axis increases cortisol secretion, which inhibits GnRH release and disrupts FSH and LH regulation, thereby contributing to menstrual cycle disorders. Furthermore, adolescents with moderate to high stress levels have a greater risk of experiencing oligomenorrhea and irregular menstrual cycles compared to those with low stress levels (Fitri, Hafizhah, Kiswanto, Zaharani, & Fitri, 2023). However, contrasting findings were reported by Seran et al. (2024), who found no significant association between stress levels and menstrual cycle irregularities $p = 0.105$ (Seran, Purwati, & Safitri, 2024). Overall, the findings of this study emphasize that higher stress levels increase the risk of menstrual cycle disorders, reinforcing that stress is not only a psychological factor but also has direct physiological implications for the reproductive system.

Biologically, stress activates the hypothalamic–pituitary–adrenal (HPA) axis, leading to increased cortisol secretion. Chronically elevated cortisol inhibits the release of gonadotropin-releasing hormone (GnRH), thereby disrupting luteinizing hormone (LH) and follicle-stimulating hormone (FSH) secretion, which are essential for ovulation. This imbalance results in menstrual irregularities such as amenorrhea, oligomenorrhea, or altered cycle length (Lestari, 2015). From a psychosocial perspective, adolescents are highly vulnerable to stress due to biological changes, academic demands, and social pressures. Uncontrolled stress can trigger neuroendocrine responses that affect the reproductive system, explaining the high prevalence of menstrual disorders in this age group.

CONCLUSION

Based on the study results, the majority of respondents were 16 years old, with the most common age at menarche being 12 years. Most respondents had mild stress levels, and there was a significant association between stress levels and menstrual cycle disorders among female adolescents at SMKN 6 Padang.

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