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THE RELATIONSHIP BETWEEN STRESS LEVELS AND MENSTRUAL CYCLE AMONG MIDWIFERY STUDENTS AT MEGAREZKY UNIVERSITY MAKASSAR

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Background: Stress is a common psychological factor that can disrupt hormonal balance and potentially affect the menstrual cycle. Midwifery students are considered a high-risk group for stress due to academic and clinical demands, which may influence their reproductive health. **Objective:** This study aimed to analyze the relationship between stress levels and menstrual cycle patterns among midwifery students at Megarezky University Makassar.
Methods: This cross-sectional study involved 40 female students selected through purposive sampling from a total population of 82 students enrolled in the 2024 academic year. Stress levels were measured using the validated Perceived Stress Scale (PSS-10), while menstrual cycle regularity was assessed both retrospectively and prospectively. Data were analyzed using the Chi-square test with a significance level of $p < 0.05$. **Results:** Of the 40 respondents, 52.5% experienced irregular menstrual cycles, while 47.5% reported regular cycles. Students with mild stress mostly had regular cycles (27.5%), whereas those with moderate stress were more likely to experience irregular cycles (30%). All respondents with severe stress (10%) reported irregular menstrual cycles. Statistical analysis revealed a significant relationship between stress levels and menstrual cycle regularity ($p = 0.03$). **Conclusion:** Higher stress levels were significantly associated with an increased likelihood of menstrual cycle irregularities among midwifery students. These findings underscore the importance of stress management interventions and mental health support to maintain reproductive health in academic settings.

Introduction

Menstruation is indeed a complex physiological process that serves as an important indicator of reproductive health in women. The menstrual cycle length and patterns can vary significantly among individuals and even within the same woman over time. According to Park et al., the normal menstruation cycle frequency ranges from 21–35 days, with a duration of 2–7 days. This study found that 93.0% of women with regular menstruation reported a normal cycle frequency, and 95.2% reported a normal duration. However, it is important to note that 55.9% of participants experienced heavy menstrual bleeding,

indicating that variations in menstrual flow are common (1). Interestingly, while the average cycle length is often cited as 28 days, research shows considerable variability. Li et al. analyzed data from over 378,000 users and 4.9 million natural cycles, revealing statistically significant relationships between cycle length variability and self-reported symptoms. This study highlights that women at different ends of the menstrual variability spectrum exhibit distinct cycle characteristics and symptom tracking patterns (2).

Variations in menstrual cycle length, duration, and bleeding volume suggest that, despite the existence of an established normal pattern, a considerable proportion of women experience menstrual irregularities. This phenomenon is also evident among undergraduate students, where the prevalence of menstrual cycle disturbances is notably high and influenced by multiple risk factors. The prevalence of menstrual irregularities among undergraduate students is notable, with one study reporting that 32.6% of participants experienced irregular menstrual cycles (3). Factors associated with menstrual irregularity include anemia, alcohol intake, insufficient sleep, perceived stress, iodine deficiency disorder, and being underweight (3). Further evidence from health science students suggests that the prevalence of menstrual disturbances is even higher in academic populations. Research among midwifery students at UNIKA St. Paulus Ruteng identified poor nutritional intake and low physical activity as significant predictors of irregular cycles (4), while a study at Universitas Indonesia found that more than 60% of students experienced menstrual irregularities, with diet and stress as dominant influencing factors (5).

Stress is a common psychological response to various external pressures, and it has been shown to significantly affect different aspects of health, including reproductive health. Several studies have reported associations between stress and menstrual cycle irregularities. However, contradictory findings have also emerged; for instance, some evidence indicates that women experiencing higher stress during the COVID-19 pandemic did not necessarily report more menstrual disturbances, and in certain cases, even fewer abnormalities were observed (6). Such inconsistencies highlight the need for further research, as differences in study design, population characteristics, and measurement methods may contribute to these variations. This study addresses this gap by focusing specifically on female health science students, particularly midwifery students, who face substantial academic stress. In addition, it considers lifestyle-related factors such as dietary habits and physical activity, thereby providing a more comprehensive understanding of the determinants of menstrual cycle regularity within this population.

Among university students, particularly those in demanding programs such as midwifery, stress levels are often heightened due to academic pressures, clinical practices, and personal challenges. Interestingly, while not specific to midwifery students, a study on medical faculty students found that menstrual disorders are among the most prevalent health issues for young female students in health science faculties. The study revealed that

moderate to high perceived stress was associated with an increased risk of premenstrual syndrome (PMS) (7). This suggests a potential link between stress levels and menstrual health that could be relevant to midwifery students as well. This study aims to investigate the relationship between stress levels and menstrual cycle patterns among midwifery students at Megarezky University Makassar. By understanding this relationship, we can gain insights into how stress affects menstrual health, providing valuable information for supporting the well-being of students in high-stress academic environments.

Materials and Methods

This research aims to analyze the relationship between stress levels (independent variable) and menstrual cycle patterns (dependent variable) among female students in the Midwifery Bachelor's program at Megarezky University Makassar. The study population comprised 82 students enrolled during the 2024 academic year (March–August). From this population, 40 students were selected using non-probability purposive sampling to ensure representation across semesters and age groups. Inclusion criteria were female students aged 18–25 years, actively enrolled during the study period, having experienced menstruation for at least the past 12 months, and willing to participate by signing informed consent. Exclusion criteria included having a diagnosed gynecological or endocrine disorder (e.g., polycystic ovary syndrome, thyroid disease), being pregnant or breastfeeding, or using hormonal contraceptives or medications affecting the menstrual cycle. Data collection was carried out between October and December 2024.

This study used a questionnaire as the primary data collection tool. Stress levels were measured with the Perceived Stress Scale (PSS-10), a widely validated instrument that assesses perceived stress during the past month. Scores were categorized as mild (0–13), moderate (14–26), or severe (27–40). Menstrual cycle patterns were assessed both retrospectively, by asking respondents about their cycles prior to the study, and prospectively, by having them record their cycles during the study period. A cycle was defined as “regular” if its length ranged from 21–35 days, while cycles outside this range were categorized as “irregular”.

Results

This study involved 40 female midwifery students at Megarezky University Makassar. The age distribution of respondents is presented in Table 1, providing an overview of the sample characteristics before analyzing the relationship between stress levels and menstrual cycles

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Table-1. Distribution of Respondents' Characteristics by Age

Age	Frequency	Percentage (%)
17 – 20 years	12	30
21 – 24 years	27	67.5
>24 years	1	2.5
Total	**40**	**100**

Source: Primary Data 2024

Based on Table 1, most respondents were in the 21–24 age group (67.5%), followed by the 17–20 age group (30%), and only a few were over 24 years old (2.5%). This distribution shows that the majority of respondents fall into the early adulthood category, which is a phase of life synonymous with college and high academic demands.

Table-2. The Relationship Between Stress Levels and Menstrual Cycles Among

Stress Level	Menstrual Cycle				Total		*p-value*
	Regular		Irregular				
	n	%	n	%	n	%	
Light Stress	11	27,7	5	12,5	16	40	0.03
Moderate Stress	8	20	12	30	20	50	
Severe Stress	0	0	4	10	4	10	
Total	**19**	**47,5**	**21**	**52,5**	**40**	**100**	

Based on Table 2, of the total 40 respondents, 52.5% experienced irregular menstrual cycles, while 47.5% had regular cycles. Respondents with mild stress mostly showed regular cycles (27.5%), although 12.5% of them still experienced irregularities. In the moderate stress group, respondents who experienced irregular cycles (30%) were more numerous than those with regular cycles (20%). Meanwhile, all respondents with severe stress (10%) reported irregular menstrual cycles. Statistical test results showed a p-value of 0.03 ($p < 0.05$), indicating a significant relationship between stress levels and menstrual cycle regularity. Thus, the higher the stress levels experienced by midwifery students, the greater the likelihood of menstrual cycle irregularities.

DISCUSSION

This study confirmed a significant association between stress levels and menstrual cycle patterns among female students. Higher stress levels were linked to an increased likelihood of irregular menstrual cycles, as evidenced by the fact that all students with severe stress experienced irregular cycles (8,9). The physiological mechanism underlying this relationship can be explained by the activation of the hypothalamic-pituitary-adrenal (HPA)

axis during stress, which elevates cortisol levels. Increased cortisol may suppress the hypothalamic-pituitary-gonadal (HPG) axis, disrupting the pulsatile release of gonadotropin-releasing hormone (GnRH) and altering the secretion of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) (10). These hormonal disruptions can impair ovarian function, leading to irregular menstrual cycles (11). Psychological stress may also affect menstrual regulation indirectly through behavioral changes, such as sleep disturbances and altered eating patterns, which influence hormonal balance.

While nearly half of the students with mild to moderate stress maintained regular menstrual cycles, the reasons for this variability remain unclear. Factors such as individual resilience, lifestyle habits, or dietary components may play a role (12). However, these factors were not directly measured in this study and should be considered as hypotheses for future research. Not all studies have reported the same findings; some research during the COVID-19 pandemic found no significant changes in menstrual patterns despite increased stress levels. Differences in population characteristics, environmental stressors, and research methodologies (e.g., app-based tracking versus direct survey) may explain these discrepancies, highlighting the importance of contextual factors in interpreting results.

This study has limitations, including a relatively small sample size (n = 40), which limits generalizability, and a cross-sectional design that prevents causal inference. Additionally, menstrual cycle data were self-reported, potentially introducing recall bias. Despite these limitations, the study provides valuable insights into the biological and psychological mechanisms linking stress and menstrual cycle irregularities. Future studies with larger, longitudinal designs are recommended to confirm these associations and explore potential protective factors such as dietary phytoestrogens.

Conclusion

This study demonstrated a significant relationship between stress levels and menstrual cycle regularity among female students of the Midwifery Bachelor's Program at Megarezky University Makassar in 2024. The findings highlight that higher levels of stress are associated with an increased likelihood of irregular menstrual cycles. This emphasizes the important role of psychological well-being in maintaining reproductive health. From a broader perspective, these results underline the need for universities, particularly health-related study programs, to pay closer attention to students' mental health. Implementing stress management programs, counseling services, and lifestyle education may help students cope with academic and personal pressures, thereby supporting both their psychological and reproductive health.

However, this research was limited by its relatively small sample size and the cross-sectional design, which prevents the establishment of causal relationships. Future studies with larger samples and longitudinal or experimental designs are recommended to explore

the causal mechanisms linking stress and menstrual health, as well as the potential protective role of dietary factors such as soy-based food consumption.

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