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The Impact of Stress Levels on Sleep Quality and Menstrual Patterns in Midwifery Students at the Ministry of Health Polytechnic of Padang

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ABSTRACT

This study aims to analyze the relationship between stress levels, sleep quality, and menstrual patterns in female Midwifery students at the Padang Ministry of Health Polytechnic. High academic stress in students often impacts their physical and mental health, including sleep quality and menstrual patterns. The study design used a correlational cross-sectional approach, involving 90 female students from the 2017-2019 intake who were selected using a purposive sampling technique. Data were collected through questionnaires to measure stress levels (Perceived Stress Scale), sleep quality (Pittsburgh Sleep Quality Index), and menstrual patterns. The results showed a significant relationship between stress levels and sleep quality (p = 0.007), with female students experiencing high stress tending to have poor sleep quality. However, no significant relationship was found between stress levels and menstrual patterns (p = 0.849), indicating that factors other than stress, such as diet and physical activity, may play a greater role in influencing menstrual patterns. This study recommends that educational institutions implement stress management programs to improve the quality of life and health of female students, especially in managing high academic stress.

Keywords: *Stress, Sleep Quality, Menstrual Patterns, Female Students*

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INTRODUCTION

Stress is the body's reaction to various pressures or challenges that can have positive or negative impacts on an individual. Students often perceive stress as a result of high academic workloads and the need to achieve optimal performance. Research by (Sari, 2020) indicates that pharmacy students are among the groups most vulnerable to academic stress, which can impact their quality of life, including sleep disturbances and reproductive health issues, such as menstrual irregularities. Therefore, it is important to understand the extent to which stress can affect sleep quality and menstrual cycles in midwifery students, which can directly impact their academic performance and well-being.

According to *World Health Organization* (WHO, 2019), more than 350 million people experience stress, making it the fourth leading cause of death worldwide. Previous research indicates that the prevalence of stress among university students worldwide ranges from 38% to 71%, while in Asia it is 39.5% to 61.3%. In Indonesia, approximately 10% of the total population experiences stress (Ruriyanti et al., 2023) . The prevalence of university students experiencing stress in Indonesia itself is 36.7% to 71.6% (Ambarwati et al., 2017) .

Every woman of reproductive age experiences the development of the endometrium (uterus) lining every month, caused by the decrease in estrogen and progesterone that occurs at the end of the ovarian cycle, also known as menstruation (Rukmadhata et al., 2025) . Menstruation is said to be regular if it occurs three times with the same periodic range every month (Hilda & et al., 2022) . A woman's menstrual cycle lasts between 21-35 days with an average cycle of 28 days. Typically, menstruation lasts between 2-8 days (average 6 days) (Villasari, 2021) .

During adolescence, the body undergoes many changes, both physical, psychological, and emotional. This period is also marked by increased nutritional needs, which, if not met, can lead to health problems, one of which is anemia, which is often related to an unbalanced diet (Fauziah et al., 2024) . Global research shows that anemia is a major health problem faced by adolescent girls, especially in developing countries like Indonesia, where the prevalence is high among adolescent girls, with iron deficiency being the main cause of anemia (World Health Organization (WHO), 2025) . Although many efforts have been made to address this problem, academic stress often worsens their physical and mental health conditions, including sleep quality and menstrual patterns.

Poor sleep quality can exacerbate the negative effects of stress, creating a harmful cycle that can impact overall health. Previous research suggests that stress can disrupt the body's circadian rhythm, impacting sleep quality and triggering sleep disorders such as insomnia. Disturbed sleep, in turn, can reduce the body's ability to cope with stress, exacerbating the mental and physical problems faced by college students (Andini et al., 2023) .

One of the factors that influence stress is menstrual patterns, which are caused by hormonal changes. Research conducted by Fitri et al. (2024) suggests that increased cortisol levels due to stress can disrupt the balance of estrogen and progesterone, which play a crucial role in regulating the menstrual cycle. Menstrual pattern disturbances, such as oligomenorrhea (longer menstrual cycles)

or amenorrhea (absence of menstruation), are often indicators of more serious health problems, including hormonal disorders caused by prolonged stress (Fitri et al., 2024) .

Poor sleep quality is also a highly prevalent issue among college students. A systematic review reported that approximately 63.3% of college students experience poor sleep quality, indicating that sleep disorders are a common problem in the academic environment. Phenomena such as *premenstrual dysphoric disorder* (PMDD) have also been found, with a prevalence of up to ~25.5% in female students, which is associated with poor sleep quality and severe psychological symptoms (Nanyonga et al., 2025) . The prevalence of premenstrual syndrome (PMSD) in Indonesia is 70-90% among women of childbearing age, and 2-10% experience severe symptoms of PMS (Hanin et al., 2021) .

Based on this background, understanding the relationship between stress and sleep pattern disorders and menstruation in female students is important. determining effective intervention strategies to improve their well-being. Therefore, this study aims to analyze the relationship between stress levels and sleep quality and menstrual cycle patterns in female students at the Padang Ministry of Health Polytechnic.

MET HODS

This study used a correlational design with a cross-sectional approach to analyze the relationship between stress levels, sleep quality, and menstrual patterns in midwifery students at the Padang Ministry of Health Polytechnic. This study can only demonstrate a relationship or association between these variables, but cannot prove that one variable causes changes in the other. In this study, stress levels were treated as the independent variable, as they were expected to influence sleep quality and menstrual patterns. Sleep quality and menstrual patterns were treated as the dependent variables, each influenced by the stress levels experienced by the participants.

The research was conducted in March 2022 March is a time when students generally experience higher levels of academic stress due to the burden of assignments and exam preparation. The study population consisted of all active eighth-semester female midwifery students. The sample was drawn using a purposive sampling technique involving 90 female students who met the inclusion and exclusion criteria. Inclusion criteria included female students who were menstruating, actively involved in academic activities, and willing to participate as respondents.

Prior to data collection, each respondent was given an explanation of the purpose, procedures, and benefits of the study, as well as potential risks. Respondents were then given sufficient time to read the information and were asked to sign a consent form as a sign of their agreement to participate in the study. Data were collected through a questionnaire that measured three main variables in this study. Stress was measured using the Perceived Stress Scale (PSS), which identifies mild, moderate, or severe stress levels based on the scores obtained. Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), which categorizes sleep quality as good, fair, or poor. Meanwhile, menstrual patterns were measured using a self-administered questionnaire that classified menstrual cycles as eumenorrhea, oligomenorrhea, polymenorrhea , or amenorrhea.

Menstrual patterns were measured using a self-administered questionnaire that classified participants' menstrual cycles into four categories: eumenorrhea (regular cycles between 21-35 days), oligomenorrhea (cycles longer than 35 days), polymenorrhea (cycles shorter than 21 days), and amenorrhea (no menstruation for more than 90 days). Respondents were asked to record their menstrual patterns over the past three months to ensure data accuracy. Data analysis was performed using SPSS version 22 software, using descriptive analysis techniques for respondent characteristics and the Spearman rho test to examine the relationship between variables.

RESULTS

1. Stress Level

Table 1. Distribution of Respondents According to Stress Level

Stress Level	Number of Respondents	Percentage (%)
Mild Stress	17	18.9
Moderate Stress	68	75.6
Severe Stress	5	5.6
Total	**90**	**100**

The analysis showed that the majority of respondents (75.6%) experienced moderate stress, reflecting the high level of pressure faced by female midwifery students at the Padang Ministry of Health Polytechnic. Only a small number of respondents experienced mild stress (18.9%) or severe stress (5.6%). These findings indicate that academic stress is a common problem faced by female students, given the high and competitive academic demands.

2. Sleep Quality

Table 2. Distribution of Respondents According to Sleep Quality

Sleep Quality	Number of Respondents	Percentage (%)
Good Sleep Patterns	22	24.4
Good Sleep Pattern	13	14.4
Bad Sleep Patterns	55	61.1
Total	**90**	**100**

The majority of respondents (61.1%) reported poor sleep quality, with many experiencing sleep disturbances such as insomnia or waking up in the middle of the night. Only 24.4% reported good sleep quality, while 14.4% reported fair sleep quality. These findings suggest that sleep disturbances are a common problem among female students, likely influenced by high levels of stress.

3. Menstrual Pattern

Table 3. Distribution of Respondents According to Menstrual Pattern

Menstrual Pattern	Number of Respondents	Percentage (%)

Eumenorrhea	77	85.8
Oligomenorrhea	7	7.8
Polymenorrhea	5	5.6
Amenorrhea	1	1.1
Total	**90**	**100**

The results showed that the majority of respondents (85.8%) experienced normal menstrual cycles (eumenorrhea). Only a small proportion of respondents experienced menstrual irregularities, such as oligomenorrhea (7.8%), polymenorrhea (5.6%), and secondary amenorrhea (1.1%). These findings indicate that although the majority of female students experience normal menstrual cycles, menstrual irregularities still occur in a small proportion.

4. The Relationship between Stress and Sleep Quality

Based on the results of the study, it was shown that the higher the stress level experienced by female students, the worse their sleep quality. The majority of female students with moderate stress (50%) and severe stress (4.4%) had poor sleep quality. Conversely, female students with mild stress tended to have better sleep quality than the high stress group. This indicates a linear relationship pattern, where increasing stress is directly proportional to increasing sleep disturbances. The results of the Spearman rho test (0.431) showed a significant relationship between stress levels and sleep quality with a p-value = 0.0 0 7, which means that the higher the stress level, the worse the respondents' sleep quality. This can be interpreted into the categories with the following results:

Table 4. Relationship between Stress Levels and Sleep Quality

Stress Level	The incidence of Sleep Quality						Total	p-value
	Good sleep patterns		Good Sleep Pattern (%)		Poor Sleep Pattern (%)			
a. Mild stress	8	8.9%	3	3.3%	6	6.7%	17 (18.9%)	
b. Moderate stress	14	15.6%	9	10.0%	45	50.0%	68(75.6%)	
c. Severe stress	0	0.0%	1	1.1%	4	4.4%	5 (5.6%)	0.007
Total	22	24.4%	13	14.4%	55	61.1%	90 (100.0%)	

5. The Relationship between Stress and Menstrual Patterns

The table shows that most female students, whether under mild, moderate, or severe stress, still experienced normal menstrual cycles (eumenorrhea). In the moderate stress group, 65.6% of respondents had normal cycles. Meanwhile, menstrual disorders such as oligomenorrhea, polymenorrhea, and amenorrhea were only experienced by a small proportion of respondents. This pattern illustrates that changes in the menstrual cycle do not consistently follow changes in stress

levels . The Spearman rho test yielded p = 0.849 and a Spearman's rho value of 0.054, indicating no significant relationship between stress levels and menstrual patterns. In other words, stress is not a dominant factor influencing the regularity of the menstrual cycle in female students in this study.

Table 5. Relationship between Stress Levels and Menstrual Patterns

Stress Level	The incidence of Sleep Quality								Total	p-value
	Eumenorrhea (%)		Oligomenorrhea (%)		Polymenorrhea (%)		Amenorrhea (%)			
a. Mild stress	14	15.6%	2	2.2%	1	1.1%	0	0.0%	17 (18.9%)	0.849
b. Moderate stress	59	65.6%	4	4.4%	4	4.4%	1	1.1%	68(75.6%)	
c. Severe stress	4	4.4%	1	1.1%	0	0.0%	0	0.0%	5 (5.6%)	
Total	77	85.6%	7	7.8%	5	5.6%	1	1.1%	90 (100.0%)	

DISCUSSION

1. Stress Level

The results showed that the majority of respondents (75.6%) experienced moderate stress, while 18.9% experienced mild stress, and only 5.6% experienced severe stress. These findings reflect the high prevalence of academic stress among female midwifery students at the Padang Ministry of Health Polytechnic. This is in line with previous research showing that high levels of academic stress in nursing students are thought to be due to the often dense curriculum in nursing programs, combining theoretical lectures, clinical practice, and related assignments. Students must face an intensive study load to learn complex and diverse material. Furthermore, nursing students often struggle to balance intense academic demands with the need to maintain their mental, physical, and social health. Concerns about balancing academic and personal life can exacerbate stress (Dodikrisno E Manery et al., 2024) . Furthermore, stress in medical students is generally caused by high academic demands, an intense study load, and anxiety about achieving adequate academic results (Zidna Muthiah et al., 2024).

The stress theory used in this study is the transactional stress model proposed by Lazarus and Folkman (1984). According to this theory, stress arises when individuals perceive that environmental demands exceed their coping abilities. Therefore, students often experience stress related to academic demands that test not only intellectual abilities but also physical and emotional ones (Lintang et al., 2024) .

The researchers' assumption is that high stress levels can impact students' quality of life, including sleep quality and reproductive health . The importance of stress management among students cannot be ignored. Therefore, the researchers assume that high stress levels among female

Midwifery students at the Padang Ministry of Health Polytechnic can disrupt their physiological balance. The researchers recommend that universities provide more counseling and stress management programs to help students better manage academic pressure. These programs can help students develop healthy coping strategies to reduce the negative impact of stress on their physical and mental health.

2. Sleep Quality

The majority of respondents in this study (61.1%) reported poor sleep quality, while only 24.4% reported good sleep quality. These findings indicate a high prevalence of sleep disorders among female midwifery students at the Padang Ministry of Health Polytechnic.

Previous research has shown that many college students experience poor sleep quality due to a lack of exercise. The more physical activity a person engages in, the higher their fitness level. Every individual is required to fulfill basic human needs, one of which is sleep. Young adults often experience sleep disturbances and changes in sleep patterns (Arasy et al., 2023) .

Based on these findings, the researchers assumed that the high number of activities carried out at night alters a person's sleep patterns. However, lack of sleep can have numerous impacts, from health to academic performance, especially among teenagers. Adolescent sleep patterns require more attention because they are related to their performance in college. Teenagers need seven to eight hours of sleep per day. The researchers also recommend training in healthy sleep habits, such as relaxation techniques and good time management, to reduce sleep disorders among students.

3. Menstrual Pattern

Most of the respondents in this study (85.8%) experienced normal menstrual cycles (eumenorrhea), while only a small proportion experienced menstrual disorders such as oligomenorrhea (7.8%), polymenorrhea (5.6%), and secondary amenorrhea (1.1%).

The menstrual cycle sometimes fluctuates each month, resulting in menstrual irregularities. The disorders that arise vary and can occur during, before, or after menstruation, including premenstrual syndrome, dysmenorrhea, menstruation, and hypermenorrhea. The early days of menstruation are vulnerable to menstrual disorders, such as delayed, irregular, painful, and heavy bleeding, which can disrupt the productivity of adolescent girls and require treatment (Rukmadhata et al., 2025) .

The impact of menstrual cycle irregularities that are not addressed properly and timely can lead to infertility, excessive blood loss, and anemia. Other impacts include affecting fertility, uterine cancer, polycystic ovary syndrome, uterine polyps, and ovarian cysts. Every woman experiences menstrual irregularities that occur before or during menstruation. These disorders include polymenorrhea, oligomenorrhea, and amenorrhea. These disorders can occur due to various factors such as physical activity and stress (Hilda & et al., 2022) .

The researchers recommend that future research consider other factors that influence the menstrual cycle, such as medical history, diet, and genetics. Further research with larger samples and longitudinal designs is also needed to gain a deeper understanding of the relationship between stress and menstrual disorders.

4. The Relationship between Stress Levels and Sleep Quality

The results showed a significant relationship between stress levels and sleep quality, with a p-value of 0.007. The higher the stress levels experienced by female students, the poorer their sleep quality. Most respondents experiencing moderate and severe stress reported poor sleep. These findings suggest that stress plays a significant role in disrupting sleep quality, reflecting the importance of stress management for improving students' quality of life, especially in demanding academic contexts. These results align with previous research that found stress can disrupt circadian rhythms and cause sleep disorders, such as insomnia (Andini et al., 2023) .

The link between stress and sleep quality is the hypothalamic-pituitary-adrenal (HPA) axis theory, which explains how chronic stress can affect the nervous system and disrupt sleep (McEwen, 2007). The HPA axis is activated when the body responds to stress, triggering the release of the hormone cortisol by the adrenal glands. Cortisol, known as the stress hormone , functions to help the body cope with stress by increasing alertness and energy. However, high cortisol levels over a long period of time can disrupt the circadian rhythm, which regulates sleep-wake cycles. High cortisol can cause sleep difficulties, both in terms of difficulty falling asleep and poor sleep quality. (Yuliadi, 2021) .

In this study, moderate and severe stress levels were found in 75.6% and 5.6% of respondents, respectively, with more than 60% of them reporting poor sleep quality . This reflects the negative effect of stress on sleep quality , which is in line with previous findings showing that higher stress levels are often associated with sleep disturbances. (Andini et al., 2023) . This mechanism can be explained by the HPA axis , where increased stress increases cortisol production , which in turn disrupts the balance of circadian rhythms and sleep quality (Septianingsih, NLR, 2020) .

Researchers hypothesize that the academic stress experienced by female Midwifery students at the Padang Ministry of Health Polytechnic affects their sleep quality, which in turn impacts their physical and mental health. With high academic demands and busy schedules, students often experience difficulty sleeping, leading to prolonged sleep disturbances. Researchers also hypothesize that stress not only affects sleep but can also impact their academic performance and overall well-being.

5. The Relationship between Stress Levels and Menstrual Patterns

Bivariate test results showed no significant relationship between stress and menstrual patterns, with a p-value of 0.849. Most respondents (85.6%) experienced normal menstrual cycles (eumenorrhea), while only a small proportion experienced menstrual disorders such as

oligomenorrhea (7.8%) and polymenorrhea (5.6%). These findings indicate that stress does not directly affect menstrual cycle regularity in the female students in this study.

This study aligns with previous research showing that menstrual disorders are often not solely caused by stress but also influenced by other psychosocial factors, such as social anxiety and lack of social support. In this study, although academic stress levels were quite high among respondents, other factors not measured in this study may also play a significant role in influencing menstrual patterns, potentially explaining the absence of a significant relationship between stress and menstrual patterns (Sari, 2020) . This contrasts with other studies that do not align with previous research that states a positive and fairly strong relationship between work stress levels and menstrual cycle disorders. This indicates that the higher the level of work stress experienced, the greater the likelihood of menstrual cycle disorders (Wigati & Risnawati, 2025) .

A relevant theory to explain menstrual patterns is the endocrine theory, which states that stress can affect hormones that regulate the menstrual cycle, such as estrogen and progesterone (Amalia et al., 2023) . Increased cortisol levels due to stress can disrupt the hormonal system, which can affect the regularity of the menstrual cycle. However, in this study, although a small number of respondents experienced menstrual disorders, the majority still had normal menstrual cycles. The researchers assume that although stress can affect menstrual patterns, other factors not analyzed in this study, such as a healthy diet and adequate physical activity, may be able to mitigate the negative impact of stress on the menstrual cycle.

Researchers assume that stress can affect menstrual patterns, but the effect may not be significant because many other factors play a role. One possibility is that genetic factors or an individual's medical history influence menstrual patterns. Researchers also assume that the menstrual pattern disturbances reported in this study among female students are more influenced by factors such as diet, exercise, and medication use, which could not be fully controlled for in this study design.

CONCLUSIONS

Based on the results of research conducted on female midwifery students at the Padang Ministry of Health Polytechnic, it can be concluded that high stress levels are significantly associated with poor sleep quality. Female students experiencing moderate and severe stress tend to have poorer sleep patterns than those experiencing mild stress. These results suggest that academic stress can disrupt female students' sleep quality, impacting their physical and mental well-being.

However, no significant association was found between stress levels and menstrual patterns in female students. Most respondents still had normal menstrual cycles (eumenorrhea), although a small number experienced menstrual disorders such as oligomenorrhea and polymenorrhea. This suggests that while stress can affect hormones, other factors such as diet, physical activity, and medical conditions may play a more significant role in influencing menstrual patterns.

Based on these findings, educational institutions are expected to consider implementing more intensive stress management programs, such as counseling, relaxation technique training, and

better time management to help students cope with stress, thereby improving their quality of life, including sleep quality and academic well-being.

While these findings provide valuable insights, this study has several methodological limitations that should be noted. First, the cross-sectional design used does not allow for causal inferences between the variables studied. Second, self-reported measurements by participants may contain social or memory biases, which could affect the accuracy of the data. Third, unmeasured confounding factors, such as diet, physical activity levels, or other psychosocial factors, may have influenced the results. Finally, this study used only a sample from a single location, which limits the generalizability of the findings to the broader student population.

For future research, it is recommended to use a longitudinal design to examine the causal relationship between stress, sleep quality, and menstrual patterns. Larger studies with more diverse samples from different universities or regions could provide a more representative picture. Furthermore, future research could also account for other confounding factors, such as diet, exercise habits, and social support, which may influence sleep quality and menstrual patterns in college students.

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