

Analysis of Factors Related to Menstrual Disorders among Female Medical Students

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ABSTRACT

Background: Every woman can experience various disorders of menstruation, ranging from amenorrhea, oligomenorrhea, polymenorrhea, hypomenorrhea, hypermenorrhea, and dysmenorrhea. This study aimed to elucidate the factors related to menstrual disorders in female students of the faculty of medicine at Universitas Andalas.

Methods: The purpose of this case-control study is to determine factors that increase the likelihood of developing a disease by comparing a group of cases with a group of controls, focusing on their exposure status. The respondents to this study were teenagers aged 18-21 years. A sample of 108 female students was taken using consecutive sampling. Data collection from anthropometric measurements and questionnaires menarche age, The International Physical Activity Questionnaire (IPAQ), Food Frequencies Questionnaire (FFQ) and Pittsburg Sleep Quality Index (PSQI). The Chi-Square test was used to analyze the data.

Results: The result showed no significant relationship between menarche age (*p*-value 0.420), stress levels (*p*-value 0.406), and physical activity (*p*-value 0.348), with menstrual disorders. There was a relationship between nutritional status (*p*-value 0.001), sleep quality (*p*-value 0.002), and eating patterns (*p*-value 0.001) with menstrual disorders.

Conclusion: Diet is the factor most associated with menstrual disorders in female students, followed by sleep quality and nutritional status. The study recommends preventing menstrual disorders in female students by prioritising improvements in diet, sleep quality and nutritional status.

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INTRODUCTION

Menstrual disorders are still a common problem with a reasonably high incidence, especially in late adolescence. More than 75% of women experience menstrual disorders. While around 72% of Swedish women suffer from menstrual difficulties, 94.9% of American women experience them. Menstrual disorders affect 19.4% of non-pregnant South Korean women (Demir et al., 2021). WHO found that 45 percent of Indonesian women suffer from menstrual problems in a 2020 report. According to research by the Indonesian Ministry of Health in 2018, 13.7% of women in Indonesia aged between 10

and 59 years suffer from menstrual disorders at least once a year. As many as 19.1% of the Indonesian population suffers from menstrual disorders, placing West Sumatra Province in third place (Ani et al., 2022).

According to previous researchers, the majority of students (67%), who are mostly young adult women (33%), said that premenstrual syndrome (PMS) and dysmenorrhea are the symptoms that most interfere with their daily lives and learning abilities (Sianipar et al., 2023). Factors such as nutritional intake, stress levels, physical activity, food consumption, and sleep quality can all affect menstrual processes and increase the risk of menstrual problems. Previous research showed that among Korean adolescents examined, 19.4% had menstrual disorders (Septiani et al., 2021).

This is supported by research, who identified menstrual disorders as influenced by several factors, including how well a person controls their weight, how often they exercise, how much stress they experience, and how good their sleep quality is. Menstrual disorders can be influenced by food consumption, nutritional status, and anthropometric indices. Menstrual health is a multidimensional issue that requires both medical approaches and lifestyle changes for prevention and treatment (Dhar et al., 2023; Thakur et al., 2022).

Ignoring menstrual disorders will have an impact on the decline in women's quality of life because it will disrupt daily activities, inhibit ovulation in women, allowing polymenorrhea and oligomenorrhea due to the difficulty of fertilizing immature eggs and can cause more serious problems later on. Menstrual disorders, if not treated immediately and adequately, can cause infertility, anemia, and even early osteoporosis. Early detection and appropriate treatment are crucial to prevent long-term complications resulting from menstrual disorders (Anthon et al., 2024; Martire et al., 2024; Taheri et al., 2020).

Menstrual disorders are still a problem that is often found with a fairly high incidence rate. This occurs because of the lack of attention of teenagers regarding menstrual disorders and the causes of menstrual disorders. It is essential to provide health education and preventive efforts to adolescents who experience menstrual cycle irregularities. Prevention begins with knowing the factors influencing irregular menstruation to develop appropriate behavior (Anthon et al., 2024).

The novelty of this study lies in its analysis of the most dominant factors associated with menstrual disorders among medical students, who should have better knowledge about health than the general population. Unlike previous studies that have focused on adolescents or women in general, this study emphasises the specific context of medical students who face high academic demands. The results of this study can provide new insights for more appropriate prevention strategies for young women in higher education, particularly in the field of health. This research aimed to analyze factors related to menstrual disorders in female students of the Faculty of Medicine, Universitas Andalas.

MATERIALS AND METHODS

This research used case-control design. A case-control study design was chosen because it is effective for comparing risk factors between groups of students who experience menstrual disorders and those who do not, thereby enabling a clearer identification of causal factors (Dahlan, 2021). The study was conducted at Andalas University from July 2023 to August 2024.

The population in this study were female students of the Faculty of Medicine, Andalas University, batches of 2021, 2022, and 2023, and the research sample was 108 people using a consecutive sampling method. We used inclusion criteria, namely female

students with screening results experiencing menstrual disorders, aged 18-21 years, and willing to be research subjects to sign informed consent and exclusion criteria, namely not participating in all data collection and being married.

The independent variables were age of menarche, nutritional status, stress levels, physical activity, diet, and sleep quality, while the dependent variable was menstrual disorders. Data collection with anthropometric measurements and menarche age questionnaires to assess menarche age, Anthropometric measurements to assess nutritional status data collection was carried out by the Enumerator using a microtoise to measure height and analog or digital scales to measure weight. Perceived Stress Scale Questionnaire (PSS-10) to assess stress levels, The International Physical Activity Questionnaire (IPAQ) Questionnaire, Food Frequencies Questionnaire (FFQ) to assess diet, and Pittsburg Sleep Quality Index (PSQI) Questionnaire to assess sleep quality were analyzed using chi-square tests and logistic regression with significance criteria in the range $r = 0.576$, tabel $r = 0,361$, and a confidence value of Cronbach's $\alpha = 0.854$. Data were analyzed using the Chi-Square test.

Ethics Testing has been carried out on this study at the Health Research Ethics Committee of the Faculty of Medicine, Andalas University, and was declared to have passed with certificate number No: 369/UN.16.2/KEP-FK/2024. Ethical approval ensures that this research was conducted in accordance with the standards and ethical principles applicable to research involving human subjects. All respondents were given informed consent prior to participation, and their confidentiality and anonymity were strictly maintained throughout the study.

RESULTS

An explanation of the analysis of factors related to menstrual disorders in female students of the Faculty of Medicine, Andalas University, is explained in the table below.

Table 1. Analysis Factors Related to Menstrual Disorders in Female Students Faculty of Medicine, Universitas Andalas (n = 108)

Variable	Menstrual Disorders				OR (CI 95%)	p-value*
	Experiencing		Not Experiencing			
	n	%	n	%		
Eating Pattern						
Irregular	29	53.7	13	24.1	3.4 (1.4-8.1)	0.001
Regular	25	46.3	41	75.9		
Total	54	100	54	100		
Sleep Quality						
Poor	29	53.7	13	24.1	3.1 (1.2-7.8)	0.002
Good	25	46.3	41	75.9		
Total	54	100	54	100		
Nutritional Status						
Abnormal	30	55.6	18	33.3	1.4 (0.6-3.5)	0.001
Normal	24	44.4	36	66.7		
Total	54	100	54	100		

Note: n = number of observations; % = percentage of observations; * the Chi-Square test

Table 1 explains that dietary patterns, sleep quality, and nutritional status are associated with menstrual disorders. Respondents with irregular dietary patterns experienced menstrual disorders more frequently than those with regular dietary patterns (53.7% vs 24.1%; $p=0.001$) with an OR value of 3.4, meaning that respondents with irregular dietary patterns were 3.4 times more likely to experience menstrual disorders. Respondents with poor sleep quality also experienced menstrual disorders more often than those with good sleep (53.7% vs 24.1%; $p=0.002$) with an OR = 3.1, meaning they had a 3.1 times higher risk of experiencing menstrual disorders. In addition, respondents with abnormal nutritional status experienced more menstrual disorders than those with normal nutrition (55.6% vs 33.3%; $p=0.001$) with an OR = 1.4, indicating that they were 1.4 times more likely to experience menstrual disorders. Thus, irregular eating patterns, poor sleep, and abnormal nutritional status affect the incidence of menstrual disorders.

DISCUSSION

According to the research findings, poor sleep quality is more likely to experience menstrual disorders than good sleep quality which indicates a relationship between poor sleep quality and menstrual disorders. The analysis obtained an OR value of 3.14, meaning that poor sleep quality has a 3.1 times higher chance of experiencing menstrual disorders than good sleep quality.

In line with the research findings, it was found that in female students, the proportion of poor sleep quality, was higher in causing menstrual cycle irregularities compared to the proportion of female students who had good sleep quality, who did not experience menstrual disorders. A study by Xianchen et al. (2017) also showed that poor sleep disorders had an effect on menstrual irregularities with an odds ratio (OR) = 1.46, Internal Confidence (CI = 95%) (Siregar et al., 2022)

Poor quality or lack of sleep can affect the secretion of hormones such as progesterone in a woman's body. When women get good or sufficient quality sleep, the body gets the chance to recover and has time to regulate hormone production optimally. Sleep problems affect hormonal balance and affect the hormone estrogen. The environment and lifestyle play an important role in producing hormones such as progesterone. Paying attention to and maintaining sleep quality can support ideal hormonal balance and maintain the reproductive system, especially during menstruation. Therefore, women need to maintain good sleep patterns and manage stress to support optimal reproductive health (Saras Tresno, 2024).

The results of the study also revealed that abnormal nutritional status contributed to the occurrence of menstrual disorders in female students. From the data on abnormal nutritional status, it can be seen that 30 (62.5) female students with this status experienced menstrual disorders more often than those with normal nutritional status. indicating a relationship between the quality of abnormal nutritional status and menstrual disorders. From this analysis, an OR value of 1.48 was obtained, which explains that female students with abnormal nutritional status are 1.48 times more likely to experience menstrual disorders than those with normal nutritional status.

In line with the research the results of the study showed that there were 25 respondents (39.1%) who had an abnormal menstrual cycle, of which 19 respondents (29.7%) had an obese nutritional status, while 39 respondents (60.9%) had a regular menstrual cycle (Desmawati et al., 2024). According to theory, lack or excess of nutritional status can cause disorders in reproductive function. Being underweight results

in decreased GnRH production function, which affects the production of FSH and LH hormones and negatively affects the menstrual cycle by inhibiting ovulation.

Abnormal nutritional status obesity has a detrimental impact on the human body including reproductive health. Specifically, obese women experience disorders of the pituitary-ovarian-hypothalamic axis and often suffer from menstrual dysfunction that causes anovulation and infertility. Women who have high levels of fat in their bodies will affect the hormone estrogen because apart from the ovaries, estrogen will also be produced by adipose tissue which makes estrogen abnormal, tending to be high. This unbalanced hormone production can cause disorders in the menstrual cycle that have a detrimental effect on the human body including reproductive health (Berliani et al., 2023).

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Good nutritional intake contributes significantly to achieving ideal body growth. This perfect body growth also includes brain development, greatly influencing individual intelligence. The most striking aspect of the community environment is the lack of individual knowledge about the nutrition their bodies need. Nutrition or food is not only required for growth, physical development, and mental health but is also essential for fertility (Mastuti., 2023).

The impact of nutritional conditions, especially excess nutrition in adolescents, can cause obesity. Other impacts besides obesity caused by excess nutrition can cause various health problems such as metabolic disorders, blood vessel blockages, diabetes, psychological problems, hypertension, heart disease, bone and joint disorders, and respiratory failure. Increasing awareness and knowledge about the importance of nutrition and its impact on nutritional status, such as regulating food consumption patterns. They are under balanced nutrition, improving nutritionally conscious behavior, doing physical activity every day, and maintaining health, as well as trying always to choose nutritious food while avoiding junk food are steps to prevent obesity and even being overweight and maintain normal nutritional status (Mastuti., 2023).

The results of the study found that the age of menarche was not related to menstrual disorders because there were more female students who experienced normal menarche than female students who experienced early menarche. In line with (Pratiwi et al., 2024) who said that early menarche tends to have a higher chance of experiencing menstrual disorders than experiencing menarche at a normal age limit, but occurs due to other factors such as endocrine disorders, brain tumors, disorders such as stress and heavy exercise. In contrast to the findings of of 1323 adolescents, they said that early menarche has a significant relationship with the regularity of the menstrual cycle.

Several mechanisms that link the age of menarche with menstrual disorders can be explained through several factors, the first of which is Hormonal Changes menarche marks the beginning of the reproductive hormonal cycle. An earlier or later age of menarche can affect the pattern of hormone secretion, resulting in an imbalance in hormones such as estrogen and progesterone, which play an important role in regulating the menstrual cycle. This hormonal imbalance can even cause ovarian dysfunction which can cause disorders such as amenorrhea or dysmenorrhea (Sherwood, 2020).

Based on the findings of the research results, stress levels are not related to menstrual disorders, this is because the researcher did not consult with experts in the field before distributing the questionnaire. It is feared that the questionnaire was not filled out correctly so that the results were inaccurate in line with research the relationship between stress levels and menstrual disorders in adolescent girls that normal stress levels experience more menstrual disorders than abnormal menstruation (Wanggy et al., 2022).

According to the theory, when women experience physical stress, the hormone Corticotrophic Releasing Hormone (CRH) will increase. The CRH hormone will suppress the production of GnRH in the hypothalamus. In addition, CRH also stimulates adrenocorticotropin hormone (ACTH) which will stimulate the release of glucocorticoids in the suprarenal glands or also called cortisol, adrenaline and adrenal. Then results in suppression of the hypothalamus so that Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH) are not secreted where FSH and LH are used to produce estrogen which plays an important role in the menstrual process (Pratiwi et al., 2024).

Physical activity research is not significant in determining the occurrence of menstrual disorders. Physical activity indicators in research can have an indirect impact on menstrual disorders but through other indicators that form and determine these factors to impact each other, for example stress. Different from the findings identified that there is a close relationship between physical activity and menstrual disorders, physical exercise can affect the hormonal cycle, when women do heavy physical exercise, the body will experience physical stress which will then increase the hormone CRH (Botutihe et al., 2022).

The CRH hormone will suppress the production of GnRH in the hypothalamus. In addition, CRH also stimulates adrenocorticotropin hormone ACTH which will stimulate the release of glucocorticoids in the supra renal glands or also called cortisol, adrenaline and adrenals. Then it causes pressure on the hypothalamus so that FSH and LH are not secreted where FSH and LH are used to produce estrogen which plays an important role in the menstrual process (Botutihe et al., 2022).

The limitations of this study are that the researcher did not explore in more depth the perceptions of each research respondent regarding factors of menstrual disorders, the researcher did not examine other factors such as endocrine disorders, brain tumors and diet that could possibly affect menstrual disorders and the researcher did not consult with experts in the field before distributing the questionnaire, it is feared that the questionnaire will not be filled out correctly so that the results are less accurate.

CONCLUSION

Based on research findings, there is a relationship between diet, sleep quality, and nutritional status with menstrual disorders. While age of menarche, stress levels, and physical activity do not have a relationship with menstrual disorders. Diet is the variable most related to menstrual disorders in female students of the Faculty of Medicine, Universitas Andalas, followed by sleep quality and nutritional status. It is expected that the Faculty of Medicine, Andalas University can provide information on factors related to menstrual disorders in female students such as using leaflets or interesting and creative electronic media so that they are easily accessed and understood by female students.

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