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The relationship between overweight and stress towards the premenstrual syndrome in undergraduate students of midwife education, Airlangga University

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ABSTRACT

Premenstrual syndrome is one of the menstrual disorders that appear 7-10 days before menstruation comes and can disappear during menstruation, but can also continue afterwards. Indonesian women who experience premenstrual syndrome (PMS) are 80-90%. Adolescents aged 18-21 years (44.5%) and 22-25 years (22.5%) experience moderate to severe PMS. The purpose of this study was to analyze the relationship between overweight and stress on the incidence of premenstrual syndrome in undergraduate midwifery education students at Airlangga University. This research used observational analytic study method with cross sectional approach. The population was 283 people with a sample size of 138 people conducted by purposive sampling. The independent variables in this study were overweight and stress, while the dependent variable was the incidence of premenstrual syndrome. The instruments in this study used the SPAF questionnaire, DASS-42, and BMI calculation using body weight and height. The data were analyzed using Spearman correlation with $\alpha = 0.05$. The results of this study found that 32.6% of female students had overweight and obese BMI, 74% of female students experienced high to moderate stress, and 63% of female students experienced mild premenstrual syndrome. In the Spearman correlation test results, it was found that overweight and the incidence of premenstrual syndrome had a p value = 0.000 ($p < 0.05$) and the level of stress and the incidence of premenstrual syndrome with a p value = 0.000 ($p < 0.05$). There is an association between overweight and stress with the incidence of premenstrual syndrome (PMS).

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INTRODUCTION

Premenstrual Syndrome (PMS) is a set of symptoms in the form of physical, emotional, and behavioral disorders common in women of reproductive age during the luteal phase of the menstrual cycle. The premenstrual syndrome appears during the 7-10 days before menstruation starts and can disappear during the menstruation, but can also continue afterward (Suardi et al., 2022). According to WHO, the problems experienced by adolescents in the world are premenstrual syndrome disorders (38.45%), nutritional issues related to anemia (20.3%), learning disorders (19.7%), psychological disorders (0.7%), and obesity problems (0.5%) (Afrilia & Musa, 2020). Physical symptoms can include breast pain, abdominal pain, back pain, and headaches. Psychological symptoms include irritability, anxiety, nausea, depression, mood swings, changes in sleep patterns, changes in appetite, and behavioral symptoms such as loss of concentration, decreased work performance, and avoidance of social activities (Daniartama et al., 2021).

The incidence of premenstrual syndrome (PMS) in fertile women worldwide is high at 75%. 80-90% of Indonesian women with premenstrual syndrome (PMS) suffer symptoms that occasionally interfere with their daily lives (Zakaria et al., 2022). The prevalence of premenstrual syndrome (PMS) in students in Lebanon was 54.6%, in Sri Lanka 65.7%, in Iran 98.2%, in Brazil 39%, in Australia 44%, and in Japan 34%. Based on the results of the study, symptoms of premenstrual syndrome in Indonesia are experienced by 23% of adolescents (Nuvitasari et al., 2020). Adolescents aged 18-21 years (44.5%) and 22-25 years (22.5%) experience moderate to severe PMS (Himaya et al., 2021). In addition, adolescents who become students are mostly unmarried, so they rarely use contraception. Women who use nonhormonal birth control or do not use birth control have a 2.5 times chance of experiencing PMS (Puspitorini et al., 2007). Combined oral contraceptives containing drospirenone and aldactone can reduce fluctuations in the hormone estrogen, which causes PMS, thus reducing PMS symptoms such as breast tenderness and bloating (Nuriyeva & Bachmann, 2022).

The results of a study stated that 91% of the sample spent more time at home than before COVID-19 and that 22% of the samples experienced an increase in body weight of 2.5-5 kg. This increase in weight is due to increased eating frequency in response to stress and consuming snacks after dinner (Zachary et al., 2020). Women who are overweight can increase the risk of premenstrual syndrome (PMS). According to the results of the study, the BMI category with overweight had a 43.4 times risk of experiencing PMS. The conversion of androstenedione to estrogen increases so that it can be a source of PMS in women who are overweight (Daiyah et al., 2021). The results of the study stated that 39.6% of women who were overweight experienced PMS and 3.7% did not experience PMS, while women who were not overweight 32.1% experienced PMS and 24.5% did not experience PMS (Pasaribu et al., 2022).

The COVID-19 pandemic can also cause psychological changes triggered by fear, depression, anxiety, and feelings of lack of confidence. The research results show that 37% of adolescents experienced stress during the COVID-19 pandemic and female adolescents tended to experience more stress, 38.74% compared to males, 26.24% (Pertiwi et al., 2021). Stress as a psychological factor can cause premenstrual syndrome (PMS). Changes in learning methods and more learning tasks that have become more and more with a short deadline for collecting assignments during the pandemic have caused students who carry out the distance learning process to experience stress. According to the research results, 57% of female students experienced stress with severe PMS levels (Damayanti & Samaria, 2021).

Previous research showed that undergraduate midwifery education students at Airlangga University 65.5% experienced mild PMS and 35.5% severe PMS (Alvionita, 2016; Masruroh & Muniroh, 2021). In addition, the research results on midwifery students at Brawijaya University stated that 70.3% experienced moderate PMS, and 29.7% experienced mild PMS (Afifah et al., 2020). Meanwhile, the results of the researcher's survey of PMS on 15 undergraduate midwife education students showed that 86.7% experienced PMS with 33.3% experiencing moderate PMS

and 46.7% experiencing mild PMS, showing a negative impact in the form of feelings of discomfort and disruption of productivity in carrying out daily activities. Severe premenstrual syndrome has a detrimental impact. Students who experience premenstrual syndrome (PMS) will experience decreased activity, difficulty concentrating, and impaired social interaction (Ilmi & Utari, 2018). According to the research results, of women who experienced PMS 48.9% disrupted efficiency and productivity, 19.45% disrupted social activities, 19.1% disrupted friend/family relationships, and 60.4% had difficulty concentrating (Tuto et al., 2019). This study aims to analyze the relationship between stress and the incidence of premenstrual syndrome in bachelor midwifery education students at Airlangga University. As for the benefits to be achieved from this study is to help respondents know their nutritional status after measuring weight and height, stress levels, PMS levels, and knowledge about PMS and how to prevent and overcome it.

RESEARCH METHOD

This study used an observational analytic research method with a cross-sectional approach. The population used in this study were Bachelor of Midwifery Education students of Universitas Airlangga semesters 2, 4, 6, and advanced program. The sample size in this study was calculated using a comparison of two proportions and obtained a sample size of 138 people. The study was conducted at the Midwife Education Study Program, Universitas Airlangga, which began in May - August 2023. The independent variable in this study are overweight and stress, while the dependent variable is premenstrual syndrome. The researcher used purposive sampling to select the sample based on inclusion and exclusion criteria. Subjects who agreed to the informed consent were measured for height and weight to determine BMI values, then filled out a questionnaire by writing their identity and filling out a questionnaire consisting of two parts, namely the Depression Anxiety Stress Scales (DASS-42) to rate stress levels, and the Shortened Premenstrual Assessment Form (SPAF) to rate premenstrual syndrome levels. Questionnaires were collected by the author in person and processed to determine scores. Data processing techniques include editing, scoring, coding, data entry, tabulating, and cleaning. The data analysis method uses univariate to see the frequency distribution and bivariate analysis to see the relationship between two variables with Spearman's rho correlation with $\alpha = 0.05$. Statistical test results if the p-value <0.05 means a significant relationship between the independent and dependent variables.

RESULTS AND DISCUSSIONS

Results

The characteristics of respondents in this study include age, age of menarche, and contraceptive use.

Table 1. Characteristics of respondents

Characteristics	Frequency	Percentage
Age		
18 years	9	6,5
19 years	27	19,6
20 years	39	28,3
21 years	31	22,5
22 years	4	2,9
23 years	14	10,1
24 years	14	10,1
Age of menarche		
10 years	2	1,4
11 years	11	8,0
12 years	46	33,3
13 years	44	31,9

Characteristics	Frequency	Percentage
14 years	22	15,9
15 years	13	9,4
Contraception		
Not using contraception	138	100
Other than the Combination Pill	0	0
Combination Pill	0	0

The age of the research subjects obtained was in the range of 18 to 24 years. The research subject was dominated by the age range 20 to 21 years. The majority of research participants who experienced their first menstruation had normal menarche between the ages of 12 and 14 (81,1%), late menarche > 14 years (9,4%), and menarche age fast <12 years (9,4%). All research subjects did not use contraception (100%).

Table 2. Distribution of subjects based on BMI

BMI	Frequency	Percentage
Not Overweight	93	67,4
Overweight	24	17,4
Obesity	21	15,2

Table 2 shows that most participants have a BMI not overweight 67.4% and 32.6% of respondents have a BMI overweight and obesity.

Table 3. Distribution of subjects based on stress

Stress Levels	Frequency	Percentage
Normal	36	26,0
Mild	40	29,0
Medium	31	22,5
Severe	31	22,5

Table 3 shows that most participants experience mild stress (29%), moderate (22.5%), and severe (22.5%) levels.

Table 4. Distribution of subjects based on premenstrual syndrome

PMS Levels	Frequency	Percentage
Normal	4	2,9
Mild	87	63,0
Medium	47	34,1
Severe	0	0

Table 3 shows that most participants experienced symptoms of premenstrual syndrome with mild levels of PMS symptoms (63%).

Table 5. Distribution of correlation between overweight and premenstrual syndrome

BMI	Premenstrual Syndrome						Total		p-value	r
	Normal		Mild		Medium					
	f	n	f	n	F	n	f	n		
Not Overweight	4	4,3	71	76,3	18	19,4	93	100	0,000	0,445
Overweight	0	0,0	9	37,5	15	62,5	24	100		
Obesity	0	0,0	7	33,3	14	66,7	21	100		

Table 5 shows that participants in the non-overweight BMI category experienced mostly mild PMS symptoms (76.3%). Moderate PMS symptoms mostly were experienced by respondents with overweight BMI category (62.5%) and obese BMI (66.7%). The statistical test results obtained a

value of p = 0.000 (p <0.05) means there is a relationship between overweight and premenstrual syndrome in undergraduate students of Midwifery Education Universitas Airlangga with a value of r = 0.445 where the strength of the correlation is sufficient and the relationship between the two variables is unidirectional.

Table 6. Distribution of correlation between stress and premenstrual syndrome

Stress Levels	Premenstrual Syndrome						Total		p-value	r
	Normal		Mild		Medium					
	f	n	f	n	f	n	f	n		
Normal	4	11,1	32	88,9	0	0,0	36	100	0,000	0,700
Mild	0	0,0	37	92,5	3	7,5	40	100		
Medium	0	0,0	12	38,7	19	61,3	31	100		
Severe	0	0,0	6	19,4	25	80,6	31	100		

Table 6 shows that most respondents with normal stress and mild stress experienced mostly mild PMS, and respondents with moderate and large mostly experienced moderate PMS. The statistical test results showed that the p-value = 0.000 (p < 0.05) means there is a relationship between stress and premenstrual syndrome in undergraduate midwifery education students at Airlangga University with a value of r = 0.700 where the strength of the correlation is strength and the relationship between the two variables is unidirectional.

Discussions

Relationship between Overweight and Premenstrual Syndrome

Students who are overweight and obese also need to be considered. In this study, the prevalence of respondents with overweight and obese BMI categories was higher than the prevalence in East Java. In 2018, the prevalence of adolescent nutritional status in East Java was 11.3% and 5.1% (Buanasita & Hatijah, 2022). Women with overweight and obese BMI also need to be considered because they can trigger degenerative diseases (type 2 diabetes mellitus, coronary heart disease, stroke and certain cancers). In addition, having an overweight BMI can lead to decreased self-confidence and discrimination from the surrounding environment (Kirana & Wirjatmadi, 2023). Academic demands encourage students to consume food outside the home, which can lead to an unbalanced diet and can contribute to weight gain in college students (Urbanetto et al., 2019).

The results of this research indicate that there is a relationship between overweight and premenstrual syndrome in undergraduate midwife education students at Airlangga University. The results of this study are in line with the research of Mostafa et al., (2023) that respondents with excess BMI (overweight and obese) had the highest percentage of moderate severity PMS and the lowest mild severity PMS with a value of r = 0.368 & p-value = 0.0001 indicating a statistically significant positive correlation with sufficient strength of the relationship between overweight and PMS in young women. The results of research by Lu et al., (2022) stated that women with PMS risk were significantly higher in women with BMI> 25.0 kg/m2 compared to women with BMI ≤ 25.0 kg/m2. This study is in line with some research results because women who are overweight experience an increase in the percentage of fat in the body. This results in a greater risk of experiencing inflammation which can increase the risk of experiencing PMS (Ramadani, 2018). Women with a BMI category that is not overweight who experience PMS can be influenced by other factors such as family history, age, stress, nutrient consumption, lack of physical activity, and nutritional status (Daniartama et al., 2021). However, the results of this study contradict the results of Ilmi & Utari (2018) which state that nutritional status has no relationship with premenstrual syndrome. Respondents in the study with normal BMI experienced more moderate to severe PMS than respondents with overweight and obese BMI did not experience PMS because the population in the study had almost the same level of education, stress level, lifestyle, and activity.

Overweight women have an increased percentage of fat in the body. In adipose tissue, androgens convert into estrogens, affecting estrogen metabolism. Increased adiposity may contribute to the symptoms of water retention in PMS (El-Banna et al., 2019). Increased estrogen can affect the body's chemical metabolism (vitamin B6) that functions to control serotonin production, causing serotonin levels in the brain to decrease if the BMI category is higher, which affects emotional and behavioral PMS symptoms such as anxiety, depression, irritability, aggression (Noviyanti et al., 2021). In the luteal phase when there is an increase in estrogen, it will cause PMS by increasing endometrial thickening. Estrogen will increase arachidonic acid which is the precursor to prostaglandins that cause uterine contractions that will cause pain. Prostaglandin imbalance also causes nausea, pain, and drowsiness which include the criteria for PMS (Daniartama et al., 2021).

Relationship between Stress and Premenstrual Syndrome

Factors that trigger stress after the COVID-19 pandemic include changes in learning media from online to face-to-face, fear of still being infected with COVID-19, and economic disruption (Suwannakul et al., 2023). Each respondent has a different level of stress. This is because each person has a certain level of tolerance to pressure that causes stress (Afriyanti & Lestiawati, 2021). The results of Rezaei et al., (2020) stated that 56% of midwifery students in Iran experienced stress during clinical training. The results of Wynter et al., (2021) show that midwifery students in Australia with mild stress 14,8%, moderate stress 15,0%, and severe stress 15,4%. This research is in line because it can cause academic demands, the amount of material that must be learned and mastered, busy lecture schedules, and changes in learning media.

The results of this research indicate that there is a relationship between stress and premenstrual syndrome in undergraduate midwife education students at Airlangga University. The results of this study are in line with the research of (Prihatanti et al., 2022) that the level of stress in midwifery students of the Poltekkes Kemenkes Banjarmasin is associated with an increase in symptoms of premenstrual syndrome with a value of $p = 0.036$ ($p < 0.05$). The results of research by Nuvitasari et al., (2020) stated that the level of stress is related to premenstrual syndrome with $p = 0.0001$ ($p < 0.05$) and a value of $r = 0.681$ means the strength of the correlation is strength and the relationship between the two variables is unidirectional. This study is in line with some research results because many respondents experience stress which is a factors that can exacerbate PMS symptoms. Symptoms of premenstrual syndrome will be more visible in women who continue to experience psychological pressure (Ramadani, 2018). Women who have normal stress in this study experience PMS assumed because of other unexamined factors that can cause premenstrual syndrome (PMS). The research results by Nandakumar et al., (2023) stated that besides stress, other factors that can cause PMS are sleep quality, nutritional status, unhealthy food consumption, and physical activity. However, this study is also not in line with the results of research by Wahyuni et al., (2018) which states that there is no relationship between premenstrual syndrome (PMS) and stress. In this study, it was due to the percentage of stressed respondents who did not experience PMS as much as 69.0% and assumed that respondents in that study could cope with stress well, less diverse age characteristics, different activities, and different environments.

Each respondent has a different level of stress. This can be because each person has a certain level of tolerance to pressure that causes stress (Afriyanti & Lestiawati, 2021). Under stressful conditions, stimulation of the HPA axis results in the secretion of corticotropin-releasing factor (CRH) in the hypothalamus. CRF then stimulates the pituitary into adrenocorticotropic (ACTH), 8-lipotropin, and 3-endorphins (Kageyama et al., 2021). ACTH increases when stress causes the hormone cortisol to increase which binds to progesterone receptors that can cause a decrease in progesterone levels so that it will cause symptoms of premenstrual syndrome (Utomo, 2019). In addition, the cortisol produced can inhibit the secretion of GnRH which affects the secretion of FSH and LH in the adenohypophysis to decrease, affecting folliculogenesis and

steroidogenesis (estrogen and progesterone) resulting in hormonal imbalances that cause PMS symptoms (Valsamakis et al., 2019).

CONCLUSION

This study contributes to understanding the relationship between overweight, stress, and the incidence of premenstrual syndrome (PMS) in midwifery education students at Airlangga University. The results of the data analysis found that a small proportion of midwifery students of Universitas Airlangga have overweight and obese BMI, most experience mild to severe stress, and most experience mild PMS symptoms. The results of this research indicate that there is a relationship between being overweight and stress with premenstrual syndrome (PMS) in undergraduate midwifery students of Universitas Airlangga.

The limitation of this study is that the data obtained depends on the respondent's willingness to answer questions on the questionnaire honestly. Researchers experienced difficulties during data collection because not all female students who met the sample criteria were willing to be weighed. It is expected that it can be used as a reference and comparison for further research in knowing the relationship between overweight and stress to the incidence of premenstrual syndrome and can add other variables that can affect premenstrual syndrome.

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