

THE CORRELATION BETWEEN HEMOGLOBIN LEVELS AND THE SEVERITY OF PREMENSTRUAL SYNDROME (PMS) AMONG STUDENTS IN THE FACULTY OF MEDICINE AT WIJAYA KUSUMA UNIVERSITY, SURABAYA, CLASS OF 2019

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ABSTRACT

Hemoglobin is a protein particle found in red blood cells that functions to transport oxygen (O₂) from the lungs to all body tissues and carry carbon dioxide (CO₂) gas from the tissues back to the lungs. Low levels of hemoglobin can affect various functions of hemoglobin in the body. A state of low hemoglobin levels can cause a decrease in the flow of oxygen in the blood, which can also lead to a decrease in blood flow to the myometrium, which results in an increase in uterine muscle contractions, causing menstrual pain, which is one of the symptoms of Premenstrual Syndrome (SPM). Premenstrual syndrome (SPM) is a group of somatic disorders and emotional and behavioral symptoms that occur in the luteal phase of the menstrual cycle that women experience during the week or two before menstruation. This research aims to determine the relationship between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students of the Faculty of Medicine at Wijaya Kusuma University, Surabaya, Class of 2019. This study used an observational analytical research design. This study employed an observational analytical research design. The results of the analysis indicated a correlation between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students of the Faculty of Medicine at Wijaya Kusuma University, Surabaya, Class of 2019. This was evidenced by the significance value during the Spearman Correlation test being 0.022 (< 0.05). This indicated that there was a relationship between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students of the Faculty of Medicine at Wijaya Kusuma University, Surabaya, Class of 2019.

Keywords : Hemoglobin Level, Premenstrual Syndrome (SPM)

INTRODUCTION

Hemoglobin is a protein particle found in red blood cells that functions to transport oxygen (O₂) from the lungs to all tissues of the body and carry carbon dioxide (CO₂) from tissues back to the lungs. The reduction in hemoglobin levels can impact various functions of hemoglobin in the body (Davis, 2014).

According to the World Health Organization (WHO), women aged 15 to 49 years suffering from anemia in six countries, namely Africa, America, Asia, Europe, the Eastern Mediterranean, and the Western Pacific, amount to 409–595 million individuals. In Asia, the prevalence of anemia in women aged 15–45 years reaches 191 million people. Indonesia ranks 8th out of 11 Asian countries, following Sri Lanka, with anemia prevalence of 7.5 million people aged 10–19 years. The prevalence of anemia in Indonesia, based on Riskesdas 2013, reached 37.1%, and it increased to 48.9% in the age group of 15–24 years in 2018 (Anis Fadhylah, and Heni Puji Wahyuningsih, 2020).

Premenstrual Syndrome (PMS) is a group of somatic disorders, emotional symptoms, and behaviors that occur in the luteal phase of the menstrual cycle and are experienced by women for one or two weeks before menstruation (Mizgier, 2019). The incidence rate of PMS in Indonesia is 85% among all women of reproductive age, with 60–75% experiencing moderate to severe premenstrual syndrome (Saryono, 2009, as cited in Afrilia & Musa, 2020).

Physical symptoms experienced during PMS include breast pain, bloating, fluid retention, abdominal pain, acne, fatigue, dizziness, and others. Meanwhile, psychological symptoms and emotional disturbances include rapid mood changes, sensitivity, difficulty concentrating, frequent forgetfulness, and even depression (Marjoribanks, 2013).

Premenstrual Syndrome (PMS) may be the most well-known health issue reported by women of reproductive age. The prevalence of PMS itself is 20% among women experiencing menstrual cycles. Epidemiological data indicates that 10% of women of childbearing age experience moderate to severe PMS, placing them at risk of developing Premenstrual Dysphoric Disorder (PMDD) at a rate of approximately 3% to 5% during pregnancy. Around 80% of women are aware of the developments during the premenstrual phase, 40% feel irritated by this condition, and 10% to 20% are powerless to cope with the syndrome (Moreno, 2015).

In women, especially adolescents, the nutritional and iron requirements continue to rise with the onset of menstruation. According to Rupali et al. (2015), whose research titled "The Relationship between Menstrual Patterns and Anemia in Indian Adolescents" revealed a prevalence of anemia of 90.83%. Based on this, adolescents with anemia exhibit irregular menstrual cycles and experience premenstrual syndrome and dysmenorrhea. Insufficient hemoglobin levels can affect body metabolism and nerve cell function, leading to abnormal functioning. Consequently, this results in a decrease in the acceleration of nerve impulses and disruption of the dopamine receptor system (Basith & Mappanyuki, 2016)

Inside red blood cells, hemoglobin plays a crucial role in binding oxygen and transporting it throughout the body. This oxygen supply to the entire body helps reduce the risk of ischemia, which can lead to menstrual pain. An individual with anemia who is less active during menstruation may experience more severe menstrual cramps. Additionally, individuals with anemia tend to produce a larger volume of menstrual blood (Sari et al., 2018)

Therefore, the researcher is interested in conducting a study titled "

Relationship between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students of the Faculty of Medicine at Wijaya Kusuma University, Surabaya, Class of 2019." The choice of this title is motivated by research findings (Baidya et al., 2019), concluding that individuals with anemia have higher PMS scores compared to those without anemia. PMS issues in women can disrupt physical health and social functioning, leading to disrupted activities and potential declines in academic performance. (Wijayanti et al., 2022)

RESEARCH METHOD

This study used an observational analytic research design. The population for this research comprised all students of the Faculty of Medicine, Wijaya Kusuma University Surabaya. The sample selected for this study consisted of students from the 2019 class of the Faculty of Medicine, Wijaya Kusuma University Surabaya, who met the inclusion and exclusion criteria. The researcher utilized a simple random sampling method to determine the sample. Subsequently, the selected sample was provided with informed consent. The collected data were then processed for statistical analysis using SPSS version 28 for Windows.

RESEARCH RESULTS

A. General Overview of the Research Location

This research, conducted at the Faculty of Medicine, Wijaya Kusuma University Surabaya, explores the relationship between anemia and the severity of premenstrual syndrome. The methodology involved administering questionnaires and conducting hemoglobin level assessments among students from the 2019 class.

B. Research Results Description

The results of the questionnaire distribution are presented in the table below.

Table 1 Age of Students at the Faculty of Medicine, WKUS, Class of 2019

Age	Frequency	Percentage (%)
20 years	5	12,8
21 years	28	71,8
22 years	5	12,8
23 years	1	2,6
Total	39	100

Source: Research Results 2022

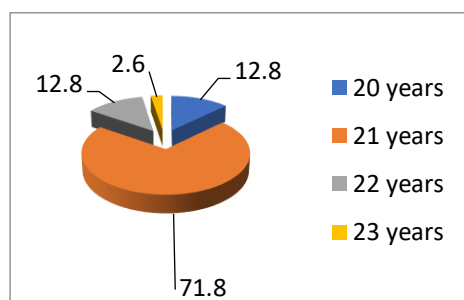


Figure 1 Distribution of Age among Students at the Faculty of Medicine, WKUS, Class of 2019

Table 1 and Figure 1 indicate that the majority of students from the Class of 2019 at the Faculty of Medicine, Wijaya Kusuma University Surabaya, who participated as respondents in this study, were 21 years old, with a total of 28 individuals (71.8%). The youngest age group was 20 years old, comprising five individuals (12.8%), while the oldest age group was 23 years old, represented by one individual (2.6%).

Table 2 Hemoglobin Levels of Students at the Faculty of Medicine, WKU, Class of 2019

Hemoglobin Level	Frequency	Percentage (%)
Normal	25	64,1
Anemia	14	35,9
Total	39	100.0

Source: Research Results 2022

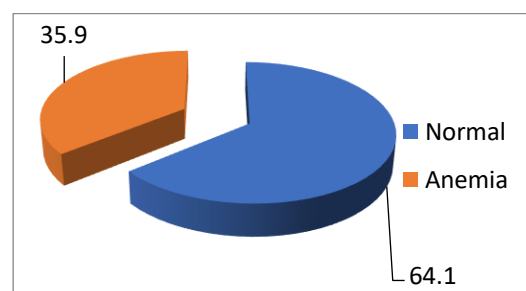


Figure 2 Distribution of Hemoglobin Levels among Students at the Faculty of Medicine, WKUS, Class of 2019

Table 2 and Figure 2 indicate that the majority of students from the Class of 2019 at the Faculty of Medicine, Wijaya Kusuma University, who participated as respondents in this study, have normal hemoglobin levels, with a total of 25 individuals (64.1%). Additionally, 14 respondents (35.9%) have hemoglobin levels categorized as anemia.

Table 3 Premenstrual Syndrome (PMS) in Students at the Faculty of Medicine, WKUS, Class of 2019

PMS	Frequency	Percentage (%)
Mild	6	15,3
Moderate	32	82,1
Severe	1	2,6
Total	39	100.0

Source: Research Results 2022

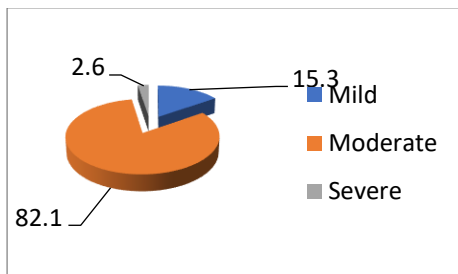


Figure 3 Distribution of Premenstrual Syndrome (PMS) in Students at the Faculty of Medicine, WKUS, Class of 2019

Table 3 and Figure 3 indicate that the majority of students from the Class of 2019 at the Faculty of Medicine, Wijaya Kusuma University, who participated as respondents in this study, experienced moderate premenstrual syndrome, with a total of 32 individuals (82.1%). Additionally, six individuals (15.3%) experienced mild premenstrual syndrome, and one individual (2.6%) among the respondents experienced severe premenstrual syndrome.

C. Statistical Analysis

After determining the characteristics of each variable (univariate), the study proceeded with bivariate analysis to explore the relationships between variables. The following presents the results of the examination using the Spearman correlation test.

Table 4 Relationship Between Hemoglobin Levels and Severity of Premenstrual Syndrome (PMS) in Students Kusuma Surabaya, Class of 2019

Hemoglobin Level	PMS			Total	p-value	r
	Mild	Moderate	Severe			
Normal	6	19	0	25	0,022*	0,367
	24%	76%	0%	100%		
Anemia	0	13	1	14		
	0%	92,9%	6,1%	100%		
Total	6	32	1	39		
	15,4%	82,1%	2,6%	100%		

* statistically significant

r : correlation coefficient

Source: Processed Questionnaire Results

The results of the Spearman correlation test indicate a relationship between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students at the Faculty of Medicine, Wijaya Kusuma University Surabaya, Class of 2019. This is supported by a significance value (sig) of 0.022 (< 0.05) in the Spearman Correlation test, Specifically:

- Out of 100% of respondents with normal hemoglobin levels, it was found that 24% experienced mild premenstrual syndrome, while the remaining 76% experienced moderate premenstrual syndrome.
- Out of 100% of respondents with anemia, 92.9% experienced moderate premenstrual syndrome, and the remaining 7.1% experienced severe premenstrual syndrome.

DISCUSSION

A. Discussion

The research findings reveal that a majority of the students from the Faculty of Medicine at Wijaya Kusuma University Surabaya, Class of 2019, who participated as respondents in this study, have hemoglobin levels categorized as normal, comprising 25 individuals (64.1%). Additionally, 14 respondents (35.9%) were found to have hemoglobin levels categorized as anemic. This result is higher than the findings of Sholikhah, who reported a prevalence of anemia among female students in Surabaya at approximately 26.1%, with an average Hb level of 10.85 g/dl, attributed to iron deficiency in diet and menstrual cycles (Sholikhah et al., 2021). Furthermore, the prevalence of anemia in Indonesia, according to Riskesdas in 2013, was 23.9% among women due to insufficient iron intake in their dietary patterns (Riskesdas, 2013).

Women experience varying menstrual cycles depending on individual conditions. However, an extended menstrual period is associated with a lower hemoglobin level due to significant blood loss, making anemia more likely to occur (Hadijah et al., 2019). Hemoglobin plays a crucial role in binding oxygen within blood cells, and it is carried by red blood cells. A reduction in hemoglobin levels in the body can lead to decreased oxygen flow in the blood (Sari et al., 2018).

The research results indicate that the majority of students from the Faculty of Medicine at Wijaya Kusuma University Surabaya, Class of 2019, who served as respondents in this study, experienced moderate premenstrual syndrome (PMS), totaling 32 individuals (82.1%). Additionally, six respondents (15.3%) experienced mild premenstrual syndrome, while one respondent (2.6%) fell into the category of severe premenstrual syndrome. This aligns with the findings of a study conducted by Lestari, revealing that the majority of respondents experienced moderate premenstrual syndrome, with 31 individuals (56.4%), and the fewest students experienced mild premenstrual syndrome, totaling ten individuals (18.2%). The causes cited include hormonal imbalances, stress or anxiety, and nutritional deficiencies (Lestari, 2015). Furthermore, Parahats' research reported that the majority of respondents experienced moderate premenstrual syndrome (44.4%), with 32 individuals and 25 individuals

(34.7%) experiencing mild premenstrual syndrome due to hormonal imbalances and nutritional deficiencies (Parahats, 2019).

Premenstrual syndrome is a condition that occurs in women 2-14 days before menstruation. It is a common disorder among women, encompassing physical, psychological, and emotional symptoms. Common complaints include anxiety, fatigue, difficulty concentrating, insomnia, loss of energy, headaches, abdominal pain, and breast pain. Premenstrual syndrome is associated with a high level of discomfort. Although it does not pose a life-threatening risk, it can impact the productivity and mental well-being of women. Approximately 75% of women report premenstrual syndrome symptoms, with 30% requiring treatment. In the younger age group, premenstrual syndrome is highly prevalent, indicating a significant health concern (Safitri et al., 2016).

The research results demonstrate a significant correlation between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students from the Faculty of Medicine at Wijaya Kusuma University Surabaya, Class of 2019. This is evident from the p-value obtained during the Spearman Correlation test, which is 0.022 (< 0.05).

The study revealed that when students have hemoglobin levels categorized as anemic, there is an increased likelihood of experiencing more severe degrees of premenstrual syndrome (PMS). Specifically, one individual (7.1%) was found to experience PMS with a severe degree, while the majority, comprising 13 individuals (92.9%), experienced PMS with a moderate degree. No individuals with anemic hemoglobin levels were found to experience PMS with a mild degree. On the other hand, individuals with normal hemoglobin levels showed a different pattern, with no instances (0%) of severe PMS, the highest number (76%) experiencing moderate PMS, and 24% experiencing mild PMS. These findings align with a study conducted by Baidya, which reported that 21% of individuals experienced mild premenstrual syndrome, the majority (78%) experienced moderate premenstrual syndrome, and no cases of severe premenstrual syndrome were observed. This is attributed to hormonal changes and lifestyle factors such as diet (Baidya et al., 2019).

General therapy for managing premenstrual syndrome (PMS) typically

involves the administration of analgesics, vitamins, and psychotherapy, such as relaxation therapy and cognitive-behavioral therapy aimed at reducing tension, anxiety, and emotional disturbances during PMS. Preventive measures to alleviate PMS symptoms include lifestyle modifications such as regular aerobic exercise, dietary adjustments, stress management, and sleep pattern adjustments, especially during the premenstrual period (Ryu and Kim, 2015). These efforts represent the most effective approach to PMS therapy and are supported by the American College of Obstetricians and Gynecologists (ACOG) (Appleton, 2018).

Recommended dietary modifications involve increasing the consumption of complex carbohydrates or protein to enhance tryptophan, a serotonin precursor, resulting in increased serotonin levels. Stress management techniques include relaxation exercises, meditation, yoga, and breathing techniques (Ryu and Kim, 2015).

For individuals experiencing anemia, therapy involves the administration of iron supplements and increasing the intake of iron-rich foods such as red meat, poultry, fish, eggs, and dairy products regularly. This dietary approach aims to boost hemoglobin levels (Prameswari et al., 2016).

CONCLUSION AND RECOMMENDATION

A. Conclusion

Based on the analysis and discussion in the preceding chapters, the following conclusions can be drawn:

1. The results of the analysis indicate a significant relationship between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students of the Faculty of Medicine, Wijaya Kusuma University Surabaya, Class of 2019. This is evidenced by a sig value of 0.022 (< 0.05) during the Spearman Correlation test. This signifies a correlation between hemoglobin levels and the severity of premenstrual syndrome (PMS) among students of the Faculty of Medicine, Wijaya Kusuma University Surabaya, Class of 2019.
2. The research findings suggest that students with anemia-level hemoglobin are more likely to experience a higher severity of premenstrual syndrome (PMS). Conversely, those with normal

hemoglobin levels have a lower likelihood of experiencing Premenstrual Syndrome.

B. Recommendation

Based on the conclusions above, several recommendations can be suggested:

1. For first-semester students in the Medical Education Program at the Faculty of Medicine, Wijaya Kusuma University, it is recommended to take various measures to increase hemoglobin levels. This can be achieved through improving the intake of iron-rich foods, recognizing symptoms of anemia, monitoring menstrual patterns, taking iron supplements, and regularly educating students about anemia.
2. Future researchers are advised to broaden the variables that influence the severity of premenstrual syndrome in medical students.
3. Subsequent researchers are encouraged to include the severity of pain using the Visual Analog Scale (VAS) in the questionnaire to provide more accurate research data.
4. Institutions are encouraged to use this research as a basis for understanding factors that can affect the health of students. It can also be considered in formulating policies related to the educational process at the Faculty of Medicine. Furthermore, the study's findings can be used to educate and raise awareness among students regarding hemoglobin levels and the severity of premenstrual syndrome.

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