



# Relationship between Menstrual Stress Levels and Menstrual Cycle in Medical Students

Frisca Ronauli Batubara\*, Gelora Lisbet Aprina Sirait, Luana N. Achmad

Medical Faculty, Universitas Kristen Indonesia, Jakarta, Indonesia

## Article Info:

## Abstract



### Article History:

Received 23 June 2022  
Reviewed 10 August 2022  
Accepted 17 August 2022  
Published 25 August 2022

### Cite this article as:

Batubara FR, Sirait GLA, Achmad LN, Relationship between Menstrual Stress Levels and Menstrual Cycle in Medical Students, Journal of Drug Delivery and Therapeutics. 2022; 12(4-S):140-146

DOI: <http://dx.doi.org/10.22270/jddt.v12i4-s.5560>

### \*Address for Correspondence:

Frisca Ronauli Batubara, Medical Faculty, Universitas Kristen Indonesia, Jakarta, Indonesia

Menstruation is a physiological change in a woman's body that is affected by reproductive hormones that occur periodically. The menstrual cycle is the time from the first day of menstruation until the arrival of the next period of menstruation. The average menstrual cycle lasts for 21-35 days. Stress is a disorder of the body and mind caused by changes and life demands. Premenstrual Dysphoric Disorder (PMDD) is a condition accompanied by emotional and physical problems related to the menstrual cycle. This study aims to determine the correlation of stress levels during menstruation with the menstrual cycle in medical students. This study uses a type of cross-sectional research. The data was obtained using questionnaires. The study used 99 respondents who met inclusion criteria. The results showed that out of 99 respondents there were 79 respondents (79.8%) had a regular menstrual cycle, seven respondents (7.1%) had an abnormal menstrual cycle, there were 28 respondents (28.3%) had normal stress levels during menstruation. Twenty-one respondents (21.2%) had mild stress levels during menstruation, 21 respondents (21.2%) had moderate stress levels during menstruation, and 16 respondents (16.2%) had severe stress levels during menstruation, 13 respondents (13.1%) had stress levels are very heavy during menstruation. Based on the Spearman Rank test, there is a negative correlation with the moderate level of relationship between stress levels during menstruation and the length of the menstrual cycle.

**Keywords:** Menstruation, Menstrual Cycle, Stress, Stress Level.

## Introduction

Menstruation is the discharge of blood from the uterus, caused by the uterine lining detachment and the release of the endometrium. Menstruation is a physiological or normal condition starting from the age of puberty until menopause. The regular period in the menstrual cycle is between 21-35 days each menstrual period with a menstrual period of 3-5 days. The average menstrual cycle lasts 28 days. Menstrual cycles that are less than 21 days are called polymenorrhea, while menstrual cycles of more than 35 days are called oligomenorrhea <sup>1; 2; 3</sup>.

Premenstrual Syndrome (PMS) is a cyclonic process that begins in the luteal phase and ends about four days after menstruation with symptoms of physical, cognitive, emotional, and behavioral changes. PMS occurs in 75% of menstruating women and occurs in young women. Although the reason for PMS is unknown, it has been reported that the presence of particular psychiatric and chronic illnesses and hormonal, familial, and environmental factors influence the frequency and severity of PMS. So it is essential to determine the prevalence of STDs in society and the factors that influence it to describe the etiology of STDs <sup>4; 5</sup>.

A study by Ayla on Premenstrual syndrome prevalence and its relationship with depressive symptoms in first-year students found that the prevalence of PMS in university students was 58.1%. Premenstrual Syndrome was significantly higher in students with a risk of depression ( $p < 0.01$ ). A statistically significant relationship was determined between depression

risk and PMS total score and all PMS subscale scores except for changes in appetite ( $p < 0.01$ ) <sup>6</sup>.

Premenstrual Dysphoric Disorder (PMDD) is a condition accompanied by emotional and physical problems related to the menstrual cycle. The syndrome occurs regularly after the middle of the menstrual cycle and ends when menstruation starts slightly after a few days or during pregnancy. In a study conducted by Pooja et al. under the title Premenstrual Dysphoric Disorder (PMDD): Prevalence, Quality of Life and Disability Due to Disease Among Medical and Paramedical Students, it was found that 5.04% of respondents were carried out with the Premenstrual Symptoms Screening Tool (PSST) and the prevalence of PMDD was 4.43% was conducted using the Daily Record of Severity of Problems form (DRSP). The most frequent disturbances were found in work/school efficiency or productivity (70.33%), followed by social activities (36.23%). The quality of life of women with PMDD is lower than others, especially in social relations. In a study conducted in India, Kamat et al. in Anand, Gujarat, adolescent girls found the prevalence of PMDD as 4.6% <sup>7; 8</sup>.

PMDD is a somatophysical disease triggered by changes in steroid hormone levels that accompany changes in ovulation of the menstrual cycle. It occurs about a week before the menstrual cycle and is characterized by anger, emotional incapacity, headache, anxiety, and depression with somatic symptoms of edema, weight gain, breast tenderness, and paresthesias <sup>9</sup>.

In a study conducted by Aryal under the title Premenstrual Syndrome (PMS) and Premenstrual Dysphoric Disorder (PMDD) in Medical and Nursing Students at a Tertiary Care Teaching Hospital in Nepal, it was found that students with PMDD experienced a long menstrual cycle as many as 30 respondents and a long duration of 4 respondents. In comparison, female students without PMDD experienced a long menstrual cycle of 32 respondents<sup>10</sup>. Based on this background, the researchers wanted to know whether there is a relationship between stress levels during menstruation and the menstrual cycle in medical students. This research was conducted on students of the FK UKI Class of 2019.

## Literature Review

In women, the female genital tract is located in the pelvic and perineal cavities. The main components of the genital system consist of the ovaries, uterus, uterine tubes, cervix, and vagina. Menstruation is a physiological change in a woman's body that is influenced by reproductive hormones that occur periodically<sup>11</sup>. During menstruation, there is discharge in the form of blood, mucus, and cellular debris from the uterine mucosa. Menstruation occurs periodically and is accompanied by the shedding of the endometrium. The uterine wall will thicken, and if fertilization does not occur, it will shed so that it comes out as menstrual blood. Menstruation lasts about 14 days after ovulation occurs<sup>12</sup>.

Normal female reproduction is characterized by monthly rhythmic changes and physical changes in the ovaries and other sex organs. This rhythmic pattern is called the female monthly sexual cycle or menstrual cycle. The menstrual cycle lasts for 21-35 days, and the average duration of the menstrual cycle is 28 days. Usually, menstruation occurs for 4-6 days with a volume of 50-150 ml per day. The average menstrual cycle is divided into two parts, the ovarian cycle, and the uterine cycle. The ovarian cycle is divided into two, namely, the follicular phase and the luteal phase, and the uterine cycle is divided into two, namely the proliferative period and the secretory period<sup>13; 14</sup>.

The follicular phase lasts about 10-14 days. The GnRH hormone stimulates the pituitary to secrete FSH and LH, which will then trigger the ovaries to secrete estrogen resulting in endometrial proliferation. Every beginning of menstruation until two weeks afterward, reproductive hormone (FSH) works by the maturation of egg cells that come from several follicles. At mid-cycle, only one follicle will mature and be ready for ovulation. In this phase, the 1st to the sixth-day cycle occurs from the start of menstruation to the end. The hormones estrogen and progesterone begin to work at the lowest levels. Meanwhile, FSH levels increase to stimulate follicle maturation. The ovaries produce estrogen, and levels rise while progesterone levels remain low. From day 7 to day 13 of the cycle, the endometrium thickens to prepare for egg implantation<sup>13; 14; 15</sup>.

The ovulation phase occurs 14 days after menstruation. The final growth of the follicle and ovulation requires the hormone LH. Without the hormone LH, the follicle will not develop to the ovulation stage. Before ovulation, LH secretion by the anterior pituitary gland increases rapidly, and FSH increases approximately two to threefold simultaneously. LH causes the rapid secretion of follicular steroid hormones containing progesterone. Two events are required for ovulation: a) Theca externa releases proteolytic enzymes from lysosomes resulting in the dissolution of the follicular capsule wall due to weakening of the wall, causing swelling of the follicle and degeneration of the stigma; and b) There is the rapid growth of new blood vessels into the follicular wall. Progesterone is secreted into the follicular tissue. The combined follicle swelling and degeneration of the stigma results in rupture of

the follicle and release of the egg into the fallopian tube<sup>13; 14; 15</sup>.

The luteal phase occurs on days 15 to 28 of the cycle. The ruptured follicle develops into the corpus luteum, which produces progesterone. Progesterone and estrogen stimulate the lining of the blood vessels to prepare for the egg's implantation. If fertilization occurs, the fertilized egg attaches to the bed of blood vessels that supply nutrients to the growing placenta. The corpus luteum continues to produce estrogen and progesterone. If fertilization does not occur, the corpus luteum is damaged, and levels of estrogen and progesterone decrease. The lining of the blood vessels sheds, and menstruation begins<sup>13; 14; 15</sup>.

The proliferative phase begins at the same time as the last part of the ovarian follicular phase, when the endometrium begins to repair itself and proliferate under the influence of estrogen from the newly developing follicle. What remains when menstrual bleeding stops is a thin and reduced endometrial layer. Estrogen stimulates the proliferation of epithelial cells, glands, and blood vessels in the endometrium so that the thickness of the lining increases. This phase is dominated by estrogen and lasts from the end of menstruation until ovulation. Peak estrogen levels trigger an ovulation-inducing LH surge<sup>15; 16; 17</sup>.

The secretory phase has a duration of 12-14 days. The gland appears to be more tortuous, and excess secretory substance accumulates in the gland's epithelial cells. The cytoplasm of the stromal cells is increased, the storage of lipids and glycogen is significantly increased in the stromal cells, and the blood supply to the endometrium is increased compared with the development of the secretory activity, resulting in highly tortuous blood vessels. Peak secretion occurs seven days after the gonadotropin surge coincides with blastocyst implantation if pregnancy occurs. In this phase, the gland actively secretes glycoproteins and peptides into the uterine cavity. Immunoglobulins in the blood circulation can enter the uterine cavity in a protein-bound state and are produced by epithelial cells<sup>15; 17; 18</sup>.

The average menstrual cycle occurs for 21-35 days each menstrual period. The average woman experiences a menstrual cycle of 28 days. Although the average menstrual cycle is 21-35 days, a person with a concise menstrual cycle, 21 days or a very long period, for example, 35 days, can still be considered normal if the cycle continues throughout the menstrual period. Menstrual cycles shorter than 21 days or longer than 35 days are considered abnormal. Menstruation duration is 4-6 days and an average of 6 days. Blood fluid that comes out during menstruation consists of blood, mucus, and mucus from the cervix and vagina<sup>19</sup>.

During menstruation, the average blood loss in ordinary women during one menstrual period is 25-60 ml with dark red blood color. During menstruation, blood loss occurs. It can be said to be expected if it does not exceed 80 ml. On average, change pads 2-3 times a day. If there is a disturbance in the cycle, the length and volume of menstrual blood will affect the amount of blood that comes out. The menstrual cycle is disturbed, where the cycle becomes shorter, the blood that comes out will be more, and the iron that comes out with the blood will be more. It causes anemia, and the color of the blood becomes bright red. Disorders of menstruation and its cycle are classified into abnormalities in the amount of blood and duration of bleeding, cycle disorders, bleeding outside of menstruation, and other disorders related to menstruation. Stress is a significant contributor to physical and mental health. Research has shown that exposure to stressors, life events, or physiological stress symptoms, such as elevated cortisol levels, do not always result in subjective stress. Stress

hurts mental health. Among other things, helplessness appears to be an essential component of psychopathological symptoms<sup>20</sup>.

Any effect of changes in the surrounding environment on living things that disrupt homeostasis (internal balance) of living things is called stress<sup>21</sup>. Stress conditions encourage decreased interest and effectiveness, decreased energy so that it feels tired, and feelings of anger, frustration, confusion, and hopelessness. Anxiety is a tense state associated with fear, worry, and feelings of guilt. Frustration occurs when the desired goal is hampered or delayed by external and internal obstacles. Aggression is a form of response to frustration. A frustrated person usually looks restless, unhappy, angry, and even hits and destroys him<sup>22</sup>. There are many causes of stress. Some examples of stress stimuli are psychological, developmental, and environmental.

Stress does not always have a negative impact, but stress can also have a positive impact on humans. The positive impact is called Eustress, and the negative impact is called Distress<sup>23</sup>. Stress is divided into five levels: normal stress, mild stress, moderate stress, severe stress, and very heavy stress. There are several factors that cause stress, including environmental factors, Educational factors, social support factor, individual factors, and personality factors<sup>24</sup>. Premenstrual Dysphoric Disorder (PMDD) is a condition accompanied by emotional and physical problems related to the menstrual cycle. Premenstrual Dysphoric Disorder consists of psychiatric or somatic symptoms that occur in the luteal phase of the menstrual cycle. According to the American Congress of Obstetricians and Gynecologists (ACOG), menstruating women experience at least 1 of the PMS symptoms in their menstrual cycle each month, as much as 85%. Premenstrual Dysphoric Disorder is a more severe symptom of premenstrual syndrome. PMDD prevalence is 3% to 9%<sup>25</sup>.

The relationship between PMDD as a psychiatric disorder and other psychiatric illnesses remains unclear. It is not known whether PMDD is strongly associated with psychiatric illness or has etiological factors associated with hormonal changes in a woman's menstrual cycle. PMDD is characterized by various affective symptoms, including anger, mood swings, depression, and anxiety, as well as somatic symptoms leading to severe social dysfunction<sup>26</sup>.

## Research Method

This type of research is analytical survey research. This study aimed to analyze the relationship between stress levels during menstruation and the menstrual cycle in medical students. This study uses a research method that is analytic with a cross-sectional approach. The time of study was carried out on March 18, 2021. This research was carried out at the Faculty of Medicine, Indonesian Christian University, Cawang. The population is the entire object of research. The population in this study were all students of the 2019 UKI Medical Faculty, which amounted to 99 people. The instrument used in the study was a questionnaire. Researchers distributed questionnaires to respondents and gave informed consent to respondents as an agreement to participate as respondents. Then the respondents filled out the questionnaires that had been distributed. The data that has been collected is processed using the SPSS program and presented in tabular form. Data was obtained through editing, coding, scoring, and tabulating procedures. Then the analysis was carried out in two ways: univariate analysis and bivariate analysis.

## Result and Discussion

The study's results on the relationship between stress levels during menstruation and menstrual cycles in medical students obtained data for 99 respondents. They have been grouped

into two parts: the menstrual cycle and stress levels during menstruation. The results of this study are presented in the form of distribution tables and narratives with the following results.

**Table 1: Description of Respondents Based on Blood Color during Menstruation**

No	Blood Color	<i>f</i>	%
1.	Brown/Dark Red	51	51.5
2.	Bright red	45	45.5
3.	Pink	3	3.0
<b>Total</b>		99	100.0

From table 1 above, the majority of respondents with brown/dark red blood color during menstruation were 51 respondents (51.5%), bright red blood color was 45 respondents (45.5%), and pink blood color was three respondents (3.0%).

**Table 2: Description of Respondents Based on the Pads Used During Menstruation**

No	Spent pads	<i>f</i>	%
1.	1-3 times	63	63.6
2.	4-6 times	36	36.4
<b>Total</b>		99	100.0

From table 2 above, it was found that 63 respondents (63.6%) spent 1-3 times on sanitary napkins and 36 respondents (36.4%) spent 4-6 times on sanitary napkins.

**Table 3: Description of Respondents Based on Menstrual Cycle Length**

No	Cycle Length	<i>f</i>	%
1.	<21 days	13	13.1
2.	21-35 days	79	79.8
3.	>35 days	7	7.1
<b>Total</b>		99	100.0

From table 3 above, 79 respondents (79.8%) have a cycle length of 21-35 days, a cycle length of <21 days is 13 respondents (13.1%) and a cycle length of >35 days is 7 respondents (7.1%).

**Table 4: Description of Respondents Based on the Duration of the Menstrual Cycle**

No	Duration	<i>f</i>	%
1.	3-4 days	33	33.3
2.	4-6 days	63	63.6
3.	>6 days	3	3.0
<b>Total</b>		99	100.0

From table 4 above, there are 63 respondents (63.6%), the duration of 3-4 days during menstruation were 33 respondents (33.3%), and the duration of >6 days during menstruation as many as three respondents (3.0%).

**Table 5: Description of Respondents Based on Pain during Menstruation**

No	Pain	<i>f</i>	%
1.	Yes	86	86.9
2.	No	13	13.1
<b>Total</b>		99	100.0

Table 5 above shows that most of them feel pain during menstruation, with 86 respondents (86.9%) and 13 respondents (13.1%) not feeling pain during menstruation.

**Table 6: Description of Respondents Based on Location of Pain during Menstruation**

No	Pain location	<i>f</i>	%
1.	Lower Abdomen	54	54.5
2.	Hips	9	9.1
3.	A, B is right	36	36.4
<b>Total</b>		99	100.0

From table 6 above, the location of the most pain during menstruation is in the lower abdomen with a total of 54 respondents (54.5%), then in the lower abdomen and hips (A, B correct) as many as 36 respondents (36.4%) and nine respondents (9.1%) felt pain only in the hip.

**Table 7: Description of Respondents Based on Menstruation 2x in a Month**

No	Menstruation 2x in a month	<i>f</i>	%
1.	Yes	1	1.0
2.	No	98	99.0
<b>Total</b>		99	100.0

From table 7 above, almost all of them did not experience menstruation 2x in a month were 98 respondents (99.0%) and the remaining one respondent (1.0%) experienced menstruation 2x in a month.

**Table 8: Description of Respondents by Type of Food during Menstruation**

No	Types of food during menstruation	<i>f</i>	%
1.	Junk Food	40	40.4
2.	(hamburgers, pizza, fried chicken)	59	59.6
<b>Total</b>		99	100.0

From table 8 above, it is found that 59 respondents (59.6%) consume healthy food such as vegetables, fish, and fruit, and as many as 40 respondents (40.4%) consume junk food such as hamburgers, and pizza, fried chicken, etc.

**Table 9: Description of Respondents Based on Sports**

No	Olahraga	<i>f</i>	%
1.	Ya	44	44.4
2.	No	55	55.6
<b>Total</b>		99	100.0

Table 9 above shows that most of the respondents do not do sports, with a total of 55 respondents (55.6%) and as many as 44 respondents (44.4%) doing sports.

**Table 10: Description of Respondents by Type of Sports**

No	Jenis olahraga	<i>f</i>	%
1.	Sepeda	17	17.2
2.	Bulutangkis	3	3.0
3.	Lainnya	79	79.8
<b>Total</b>		99	100.0

From table 10 above, it was found that 79 respondents (79.8%) did other types of sports such as running, jogging, and not exercising, as many as 17 respondents (17.2%) doing bicycle sports and the rest doing badminton, as many as three respondents (3.0%).

**Table 11: Description of Respondents Based on Stress Levels during Menstruation**

No	Stress level	<i>f</i>	%
1.	Normal	28	28.3
2.	Abnormal	71	71.7
	- Light	21	21.2
	- Currently	21	21.2
	- Heavy	16	16.2
	- Very heavy	13	13.1
<b>Total</b>		99	100.0

From table 11 above, it was found that those who experienced everyday stress during menstruation were 28 respondents (28.3%). Those who experienced abnormal stress during menstruation were a total of 71 respondents (71.7%) consisting of mild stress during menstruation, 21 respondents (21.2%), moderate stress during menstruation, 21 respondents (21.2%), severe stress during menstruation, 16 respondents (16.2%), and very heavy stress 13 respondents (13.1%).



**Table 12: Description of Respondents Based on the Relationship between Stress Levels during Menstruation and Menstrual Cycle**

No	Stress Level	Menstrual Cycle Length						Total	
		<21 days		21-35 days		>35 days		Σ	%
		f	%	f	%	f	%		
1.	Normal	2	2.0%	25	25.3%	1	1.0%	28	28.3%
2.	Abnormal	11	11.1%	54	54.5%	6	6.1%	71	71.7%
	- Light	5	5.1%	14	14.1%	2	2.0%	21	21.2%
	- Currently	2	2.0%	16	16.2%	3	3.0%	21	21.2%
	- Heavy	0	0.0%	15	15.2%	1	1.0%	16	16.2%
	- Very heavy	4	4.0%	9	9.1%	0	0.0%	13	13.1%
<b>Total</b>		13	13.1%	79	79.8%	7	7.1%	99	100.0%

From table 12 above, it is obtained that normal stress levels during menstruation with menstrual cycles <21 days are two respondents (2.0%), normal stress levels during menstruation with menstrual cycles 21-35 days are 25 respondents (25.3%), normal stress level during menstruation with menstrual cycle >35 days as many as one respondent (1.0%). Abnormal stress levels during menstruation with menstrual cycle <21 days as many as 11 respondents (11.1%) consisting of mild stress 5 respondents (5.1%), moderate stress 2 respondents (2.0%), severe stress 0 respondents (0.0%), very heavy stress 4 respondents (4.0%). Abnormal stress levels during menstruation with a menstrual cycle of 21-35 days as many as 54 respondents (54.5%) consisting of light stress 14 respondents (14.1%), moderate stress 16 respondents (16.2%), severe stress 15 respondents (15.2%), very heavy stress nine respondents (9.1%). Abnormal stress levels during menstruation with menstrual cycle >35 days as many as 6 respondents (6.1%) consisting of mild stress 2 respondents (2.0%), moderate stress 3 respondents (3.0%), severe stress 1 respondent (1.0%), very heavy stress 0 respondents (0.0%). The discussion follows based on the research results on the Relationship between Stress Levels During Menstruation and Menstrual Cycles in Medical Students.

The results showed that from 99 respondents, there were normal stress levels during menstruation, as many as 28 respondents (28.3%), 21 respondents (21.2%) experienced mild stress during menstruation, 21 respondents (21.2%) experienced moderate stress during menstruation, 16 respondents (16.2%) experienced severe stress during menstruation, and 13 respondents (13.1%) experienced very heavy stress during menstruation. It shows that most 2019 UKI Faculty of Medicine students experience normal stress levels during menstruation. Stress is a physical and psychological reaction, so each individual to stress varies greatly depending on the stressor, individual situation, and strategies to deal with it <sup>27</sup>.

Menstruating women (80–95%) experience physiological changes in the premenstrual period, but the number of women who meet the criteria for PMDD is much smaller. However, prevalence estimates from various studies in communities around the world generally fall between 1.2% and 7%, depending on the study. PMDD symptoms can be a major depressive disorder (MDD). Up to 20% of women experience severe premenstrual mood disorder and physical symptoms [28]. In a study conducted by Jumana under the title Prevalence and association of premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD) with academic performance among university students, the prevalence of

PMS was 92.3%, and PMDD was 7.7%. There was a significant difference in the degree of determination between students with PMS and those with PMDD <sup>29</sup>.

Research conducted at the University of Wollo, Ethiopia, found that the prevalence of premenstrual dysphoric disorder (PMDD) was 66.9%. Among those who had PMDD, as many as 206 respondents (81.1%) reported the onset of symptoms before joining the university. In comparison, 23 respondents (9.1%) started experiencing symptoms after they joined the university. Two hundred seventeen respondents (85.4%) had PMDD and felt it negatively impacted their academic performance. Most of them agree on the negative impact of premenstrual syndrome on academic performance. Six respondents (2.7%) of those who reported PMDD had withdrawals from school because of the symptoms they were experiencing <sup>30</sup>.

The results showed that from 99 respondents, as many as 79 respondents (79.8%) experienced a long menstrual cycle of 21-35 days, then as many as 13 respondents (13.1%) experienced a menstrual cycle length of <21 days, and as many as seven respondents (7.1 %) experienced menstrual cycle length >35 days. Most 2019 UKI Faculty of Medicine students experience average menstrual cycle lengths (21-35 days).

The menstrual cycle lasts for 28 days. The normal cycle lasts for 21-35 days. The menstrual cycle length can vary in one woman, even from month to month. A menstrual cycle that extends more than 35 days is called oligomenorrhea. The menstrual cycle that is less than 21 days is called polymenorrhea. The average length of menstruation is 4-6 days. Hypomenorrhea is a menstrual period of fewer than four days, and hypermenorrhea if it is more than six days <sup>23</sup>.

The results of research conducted by Atma in 2020 entitled The Relationship between Stress Levels and Menstrual Cycles in SMAN 1 Rambutan students with 143 respondents found that 139 respondents (97.2%) experienced regular menstrual cycles <sup>31</sup>. In addition, growth factors also affect menstruation in a person. If a child experiences delays during the growth period, it is estimated that the maturation of the female reproductive system will also experience delays. It is also strongly influenced by nutrition during growth <sup>32</sup>.

It is in line with the theory according to Kusmiran in 2014, which said that body weight affects menstrual function. Weight loss causes disturbances in ovarian function and depends on the pressure in the ovaries. Pathological conditions such as underweight and anorexia nervosa cause weight loss, leading to amenorrhea <sup>5</sup>.

The results showed that of 99 respondents, almost half experienced abnormal stress levels during menstruation with a normal menstrual cycle, as many as 54 respondents (54.5%). The results of the study using the Spearman rho statistical test obtained a  $p$ -value = 0.700 ( $p > 0.05$ ), and the value of  $r = -0.39$  indicates a negative correlation with a moderate level of relationship. So that  $H_0$  is accepted and  $H_1$  is rejected, meaning there is no relationship between stress levels during menstruation and the menstrual cycle in medical students.

PMDD is a somatophysical disease triggered by changes in steroid hormone levels that accompany changes in ovulation of the menstrual cycle. It occurs about a week before the menstrual cycle and is characterized by anger, emotional incapacity, headache, anxiety, and depression with somatic symptoms of edema, weight gain, breast tenderness, and paresthesias<sup>9</sup>.

Soo-Ho, conducted with the title Premenstrual Syndrome (PMS), and Premenstrual Dysphoric Disorder (PMDD) in perimenopausal women, found that women with PMDD experienced regular menstruation were 21 respondents, and those who experienced irregular menstruation were two respondents. Meanwhile, among women without PMDD who experienced regular menstruation, 71 respondents and six respondents who experienced irregular menstruation were<sup>33</sup>.

## Conclusion

Based on the results of research on "The Relationship between Stress Levels During Menstruation and Menstrual Cycles in FK UKI," it can be concluded as follows: a) There are 79 respondents (79.8%) experiencing normal menstrual cycles and seven respondents (7.1%) experiencing abnormal menstrual cycles; b) There are 28 respondents (28.3%) with everyday stress levels, 21 respondents (21.2%) with mild stress levels, 21 respondents (21.2%) with moderate stress levels, 16 respondents (16.2%) with severe stress levels, 13 respondents (13.1%) with very heavy stress levels during menstruation; c) There is a negative correlation with a moderate level of relationship ( $r = -0.039$ ) between the stress level during menstruation and the menstrual cycle, and there is no relationship between the stress level during menstruation and the menstrual cycle ( $p > 0.05$ ).

## References

- [1] Anwar, Mochamad. "Ilmu kandungan." 2011.
- [2] Wulandari, Fitria Ika, and Luth Pita Putri Larasati. "Hubungan Tingkat Stres dengan Siklus Menstruasi pada Guru dan Karyawan SMP Negeri 18 Surakarta." *Jurnal Maternity* 2016; 3(1).
- [3] Mustofa, Dwi Hanif, Sulistyani Sulistyani, Retno Sintowati, and Erna Herawati. "Hubungan Antara Tingkat Stres Dan Indeks Massa Tubuh Dengan Siklus Menstruasi Pada Mahasiswa Fakultas Kedokteran Universitas Muhammadiyah Surakarta." *Proceeding Book National Symposium and Workshop Continuing Medical Education XIV*, 2021.
- [4] Hantsoo, Liisa, and C. Neill Epperson. "Premenstrual dysphoric disorder: epidemiology and treatment." *Current psychiatry reports* 2015; 17(11): 1-9. <https://doi.org/10.1007/s11920-015-0628-3>
- [5] Epperson, C. Neill, Meir Steiner, S. Ann Hartlage, Elias Eriksson, Peter J. Schmidt, Ian Jones, and Kimberly A. Yonkers. "Premenstrual dysphoric disorder: evidence for a new category for DSM-5." *American Journal of Psychiatry* 2012; 169(5):465-475. <https://doi.org/10.1176/appi.ajp.2012.11081302>
- [6] Acikgoz, Ayla, Ayfer Dayi, and Tolga Binbay. "Prevalence of premenstrual syndrome and its relationship to depressive symptoms in first-year university students." *Saudi medical journal* 2017; 38(11):1125. <https://doi.org/10.15537/smj.2017.11.20526>
- [7] Thakrar, Pooja, Kalyani Bhukar, and Rajat Oswal. "Premenstrual dysphoric disorder: Prevalence, quality of life and disability due to illness among medical and paramedical students." *Journal of Affective Disorders Reports* 2021 ; (4):100112. <https://doi.org/10.1016/j.jadr.2021.100112>
- [8] Kamat, Shruti V., Archana Nimbalkar, Ajay G. Phatak, and Somashekhar M. Nimbalkar. "Premenstrual syndrome in Anand District, Gujarat: A cross-sectional survey." *Journal of Family Medicine and Primary Care* 2019;18(2):640.
- [9] American Psychiatric Association. "Diagnostic and statistical manual of mental disorders, text revision (DSM-IV-TR®)." (2010).
- [10] Aryal, Shreyashi, Babita Thapa, and Sagun Ballav Pant. "Premenstrual syndrome and premenstrual dysphoric disorder in medical and nursing students of a tertiary care teaching hospital in Nepal." *Nepal Journal of Obstetrics and Gynaecology* 2017; 12(1):12-16. <https://doi.org/10.3126/njog.v12i1.18975>
- [11] Stevenson, John C. "A woman's journey through the reproductive, transitional and postmenopausal periods of life: impact on cardiovascular and musculo-skeletal risk and the role of estrogen replacement." *Maturitas* 2011; 70(2):197-205. <https://doi.org/10.1016/j.maturitas.2011.05.017>
- [12] Felicia, Felicia, Esther Hutagaol, and Rina Kundre. "Hubungan status gizi dengan siklus menstruasi pada remaja putri di PSIK FK UNSRAT Manado." *Jurnal Keperawatan* 2015; 3(1).
- [13] Omorogiwa, A., and E. E. Egbeluya. "A comparative study of the hematological values in the Ovulation and Luteal phases of the menstrual cycle." *International Journal of Biological and Chemical Sciences* 2014; 8(4):1853-1858. <https://doi.org/10.4314/ijbcs.v8i4.43>
- [14] Roomruangwong, Chutima, André F. Carvalho, Frank Comhaire, and Michael Maes. "Lowered plasma steady-state levels of progesterone combined with declining progesterone levels during the luteal phase predict peri-menstrual syndrome and its major subdomains." *Frontiers in psychology* 2019; 10:2446. <https://doi.org/10.3389/fpsyg.2019.02446>
- [15] Critchley, Hilary OD, Jacqueline A. Maybin, Gregory M. Armstrong, and Alistair RW Williams. "Physiology of the endometrium and regulation of menstruation." *Physiological reviews* 2020. <https://doi.org/10.1152/physrev.00031.2019>
- [16] Barrett, Kim E. "Ganong's review of medical physiology." 2019: 1-1.
- [17] Sherwood, Lauralee. "Fisiologi Manusia dari Sel ke Sistem (Human physiology: from cells to systems)." Jakarta, EGC 2011: 766-767.
- [18] Bernard, O. L. I. V. I. E. R., M. A. Ripoche, and Dorothea Bennett. "Distribution of maternal immunoglobulins in the mouse uterus and embryo in the days after implantation." *The Journal of experimental medicine* 1977; 145(1):58-75. <https://doi.org/10.1084/jem.145.1.58>
- [19] Miraj, Sepide, and Sara Kiani. "Menstrual diseases as stated in canon fil-Tibb." *Der Pharmacia Lettre* 2016; 8(6):261-268.
- [20] Cohen, Sheldon, Michael LM Murphy, and Aric A. Prather. "Ten surprising facts about stressful life events and disease risk." *Annual review of psychology* 2019; 70:577. <https://doi.org/10.1146/annurev-psych-010418-102857>
- [21] Shahsavarani, Amir Mohammad, Hassan Ashayeri, Morvarid Lotfian, and Kolsoum Sattari. "The effects of stress on visual selective attention: The moderating role of personality factors." *Journal of American Science* 2013; 9(6):1-16.
- [22] Romauli, Romauli, Regina Marintan, and Nurul Utami. "PENGARUH STRESOR PSIKOLOGIS DAN STRESOR SOSIAL TERHADAP SIKLUS MENSTRUASI." *SEAJO: The Southeast Asia Journal of Midwifery* 2017; 3(2):7-11. <https://doi.org/10.36749/seajom.v3i2.8>
- [23] Kupriyanov, Roman, and Renad Zhdanov. "The eustress concept: problems and outlooks." *World Journal of Medical Sciences* 2014; 11(2):179-185.
- [24] Uchino, Bert N. *Social support and physical health: Understanding the health consequences of relationships*. Yale university press, 2004. <https://doi.org/10.12987/yale/9780300102185.001.0001>

- [25] Lee, Young-Jae, Sang-Wook Yi, Da-Hye Ju, Sang-Soo Lee, Woo-Seok Sohn, and In-Ju Kim. "Correlation between postpartum depression and premenstrual dysphoric disorder: Single center study." *Obstetrics & gynecology science* 2015; 58(5):353-358. <https://doi.org/10.5468/ogs.2015.58.5.353>
- [26] Biggs, Wendy S., and Robin H. Demuth. "Premenstrual syndrome and premenstrual dysphoric disorder." *American family physician* 2011; 84(8):918-924.
- [27] Al-Batanony, Manal Ahmad, and Sultan Fahad AL-Nohair. "Prevalence of premenstrual syndrome and its impact on quality of life among University Medical Students, Al Qassim University, KSA." *Public Health Research* 2014; 4(1):1-6.
- [28] Halbreich, Uriel, Torbjorn Backstrom, Elias Eriksson, Shawn O'brien, Helena Calil, Eva Ceskova, Lorraine Dennerstein et al. "Clinical diagnostic criteria for premenstrual syndrome and guidelines for their quantification for research studies." *Gynecological Endocrinology* 2007; 23(3):123-130. <https://doi.org/10.1080/09513590601167969>
- [29] Shehadeh, J. Hussein, and Ayman M. Hamdan-Mansour. "Prevalence and association of premenstrual syndrome and premenstrual dysphoric disorder with academic performance among female university students." *Perspect Psychiatr Care* 2018; 54(2):176-184. <https://doi.org/10.1111/ppc.12219>
- [30] Tsegaye, Delelegn, and Yemiamrew Getachew. "Premenstrual dysphoric disorder and associated factors among female health science students in Wollo University, Ethiopia, 2017/18." *Maternal health, neonatology and perinatology* 2019; 5(1):1-8. <https://doi.org/10.1186/s40748-019-0102-z>
- [31] Nathalia, Vetri. "Hubungan Tingkat Stres Dengan Siklus Menstruasi Pada Mahasiswi STIT Diniyyah Puteri Kota Padang Panjang." *Menara Ilmu* 2019; 13(5). <https://doi.org/10.36729/jam.v5i2.390>
- [32] Deviliawati, Atma. "Hubungan Tingkat Stres Dengan Siklus Menstruasi." *Jurnal'Aisyiyah Medika* 2020; 5(2). <https://doi.org/10.36729/jam.v5i2.390>
- [33] Chung, Soo-Ho, Tae-Hee Kim, Hae-Hyeog Lee, Arum Lee, Dong-Su Jeon, Junsik Park, and Yesol Kim. "Premenstrual syndrome and premenstrual dysphoric disorder in perimenopausal women." *Journal of Menopausal Medicine* 2014; 20(2):69-74. <https://doi.org/10.6118/jmm.2014.20.2.69>