

Original research article

# VARIATION OF HEMOGLOBIN LEVEL DURING FOLLICULAR AND LUTEAL PHASES OF MENSTRUAL CYCLE IN STUDENTS OF I<sup>ST</sup> YEAR MBBS OF JMC JHALAWAR

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## ABSTRACT

**Introduction:** Menstruation is the monthly shedding of a women uterine lining. The four phases of the menstrual cycle are menstruation, the follicular phase, ovulation and the luteal phase. Common menstrual problems include heavy or painful periods, premenstrual syndrome (PMS) and menorrhagia.

**Objective:** To access and compare hemoglobin level before and after menstruation in rural and urban girls of Ist year MBBS of JMC, Jhalawar

**Methodology:** Hemoglobin level was tested using the Sahli's hemoglobinometer. premenstrual and post menstrual flow. Total 100 girls of first year MBBS of JMC, Jhalawar with a regular menstrual cycle participated in this study. T-test was used to compare the study.

**Results:** There is a significant difference found in hemoglobin level found in rural and urban students before and after menstruation. The hemoglobin level of the girls ranges between 8 and 12 grams per deciliter. The hemoglobin levels drops just upto 7 grams per deciliter in follicular phase and it rises upto 70 mg per deciliter in luteal phase. The psychological symptoms of PMS were more as compared to physical symptoms.

**Conclusion:** There is no significant drop in the hemoglobin levels in most of the girls but the mean of the student belongs to rural areas has low hemoglobin level in comparison to the urban areas. Premenstrual syndrome (PMS) was the most common menstrual problem faced by the students (85.24%), and mood swing being the commonest symptom noted in 89 participants.

**Keywords:** Menstruation, Follicular phase, Ovulation, Luteal phase and Hemoglobin

## 1. Introduction

Menstruation is the monthly shedding of a women uterine lining. The four phases of the menstrual cycle are menstruation, the follicular phase, ovulation and the luteal phase. Common menstrual problems include heavy or painful periods, premenstrual syndrome (PMS) and menorrhagia.<sup>1</sup> the creation and release of eggs as well as the release of oestrogen and progesterone in a cyclical manner. The uterine cycle oversees the maintenance and preparation of the uterine lining (womb) to receive an embryo.<sup>2</sup> These cycles are contemporaneous and coordinated, typically last between 21 and 35 days, with a mean duration of 28 days, and persist for around 30 to 45 years.<sup>4</sup>

The study on the women shows that the women faces of different age group faces several problems during their menstruation cycles.<sup>5,6,7</sup>

Various studies conducted on the haemoglobin levels during menstrual cycle are discussed below:

Lolade A. Odewumi, AMLSCN, Ikechukwu O. U. Isiguzoro,, Moses. D. Lugos, (2013)<sup>8</sup> , Hemoglobin and Serum Iron Concentrations in Menstruating Nulliparous Women in Jos, Nigeria has concluded that menstruation influences the haemoglobin and iron contents of childless women. Despite a substantial decrease in haemoglobin concentrations between the ovulatory and menstrual phases and between the ovulatory and follicular phases, there was no significant decrease in Hb levels between the menstrual and follicular phases.

Surbhi Kotwaney & Pushparaja Shetty (2014)<sup>9</sup> in his study on “Variation in Haemoglobin Levels During Menstrual Cycle”. The data collected throughout the two phases of the menstrual cycle were statistically examined using the Student t-test. This result aligns with the findings of our investigation. The during the luteal phase, haemoglobin concentrations were higher. phase. This may have been caused by menstrual blood loss. This could have affected the levels. Red blood cells are composed of haemoglobin. Menstrual blood loss has detrimental effects on the body. Iron deficiency anaemia and the risk of developing cardiovascular disease among women. According to additional study, post-menopausal women have higher haemoglobin levels. Premenopausal women during the luteal phase. This may be due to the elevated levels of progesterone during the ovulation phase in premenopausal women. In addition, it is believed that fluctuations in oestrogen levels and progesterone influence haematopoiesis during the menstrual cycle. Statistically significant fluctuations in haemoglobin concentrations were shown to occur during the menstrual cycle, as a result of this experiment.

Keller, M.F. and Lalande, S. (2019)<sup>11</sup>, The Effect of the Menstrual Cycle on Hemoglobin Mass. Uncertain is the effect of the menstrual cycle on oxygen-carrying capacity. Comparing the follicular phase to the luteal phase of the menstrual cycle, previous investigations have indicated either decreases or no significant changes in haemoglobin concentration. Changes in plasma volume resulting from variable oestrogen and progesterone levels likely contribute to the fluctuations in menstrual cycle haemoglobin concentration.

Lugos MD, Vwamdem NI, Polit UY, Ofojekwu MJN, Damen JG (2019)<sup>12</sup> in their study on Screening for Anaemia at Different Phases of the Menstrual Cycle among Female Students in a Nigerian University. Blood loss during menstruation has been speculated to deplete women's iron stores, hence raising their risk of developing iron-deficiency anaemia. This study was conducted to investigate the prevalence of anaemia in women of reproductive age at various periods of the menstrual cycle. After receiving ethical approval from the Jos University Teaching Hospital's Ethics Committee, we received informed consent from potential study participants. We recruited 51 women between the ages of 19 and 30 and examined their menstrual cycle haematocrit values. These individuals experienced regular menstrual periods. The majority of female participants were 23 years old. The majority of individuals had menstrual cycles lasting between 25 and 30 days. The duration of menstrual flow for the majority of study participants was between 3 and 5 days, with 5 days occurring 29 times with the highest frequency. The menstrual bleeding phase of each subject's recorded menstrual history revealed no aberrant trends. The majority of women with menarcheal ages of 12 or older were noted in the age of menarche data. Kulkarni et al. observed in earlier investigations that there is no correlation between menarche status, menarcheal age, and

anaemia. These findings are confirmed by the fact that, regardless of their age at menarche, the participants in this study exhibited comparable menstrual patterns.

Verma Indu. Joshi Gaurika. Sood Dinesh. Soni RK (2020)<sup>10</sup> Menstrual Problems in Undergraduate Medical Students: A Cross-sectional Study in a Medical College of North India Journal of South Asian Federation of Obstetrics and Gynaecology Menstrual issues are widespread among medical students, negatively impacting their mental and physical health and contributing to class absences. Premenstrual syndrome, dysmenorrhea, and abnormal uterine bleeding were the most common menstrual problems found in this study.

## 2. Aims & Objectives

The primary aim of this study is to assess the variation of hemoglobin level during follicular and luteal phase of menstrual cycle in students of I<sup>st</sup> year MBBS of JMC, Jhalawar. The hypothesis was formulated and tested from the data collected.

## 3. Material and Methods

Hemoglobin level was tested using the Sahli's hemoglobinometer. premenstrual and post menstrual flow. Total 100 girls of first year MBBS of JMC, Jhalawar with a regular menstrual cycle participated in this study. T-test was used to compare the study. Sample was taken during follicular phase and luteal phase. Parameters like height, weight and menstrual flow was taken.

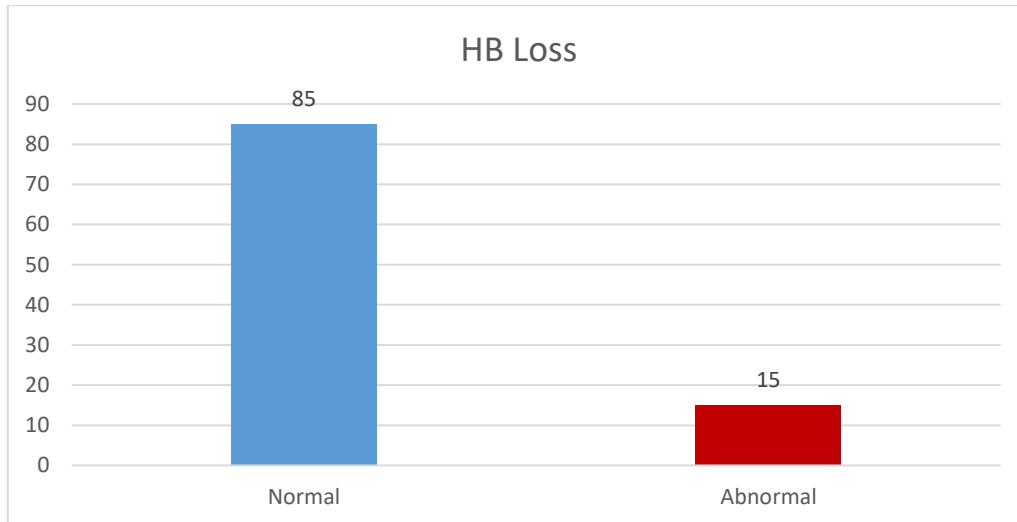
Statistical Method Descriptive statistics in the form of percentages were used in this study. The MS Excel and Statistical Package for the Social Sciences was used to analyse the data. Data was converted into percentages and ratios for easier interpretation.

Materials and Methods consists of this investigation involved 100 student of MBBS. Their written approval was acquired. All selected girls were nonsmokers, abstainers, and infection-free. Through surveys, the average duration of their period and their menstrual cycle, stress, age, BMI and their food was obtained. For estimate of haemoglobin, full blood samples were obtained about 9 a.m. on the fourth day of the menstrual cycle and four days before to menstruation. The study was carried over 3 months. Each average of three readings for each phase for a person was taken. Haemoglobin measurement was conducted by using Sahils technique. Using the Student t-test, the data gathered throughout the two periods of the menstrual cycle were statistically analysed.

## 4. Results

**Table No.1 Haemoglobin Change in Girls in their follicular and luteal phase**

Haemoglobin change	No. of Students	Percentage
Normal	85	85
Abnormal	15	15
Total	100	100

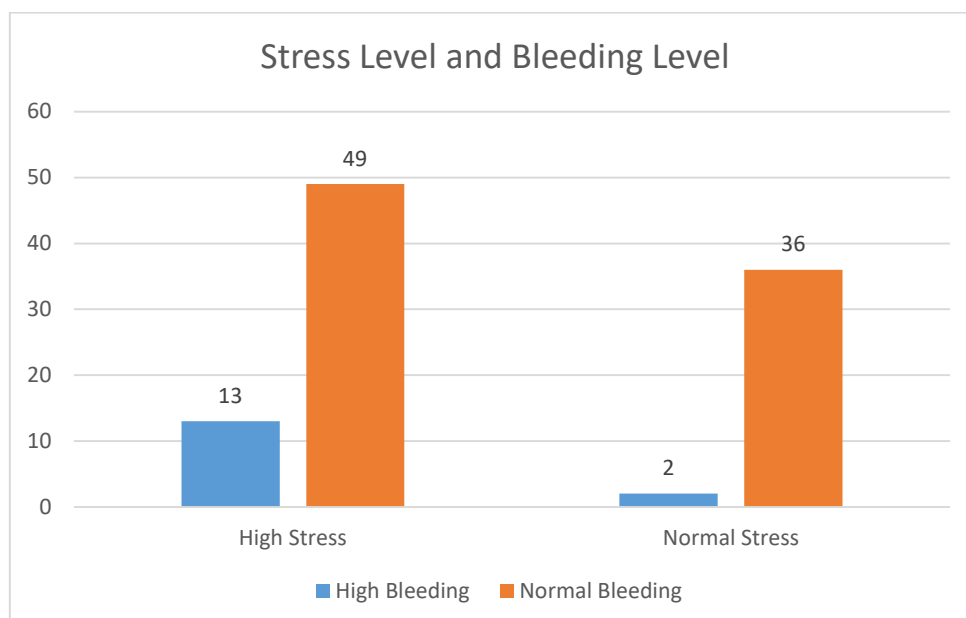


**Figure: No.1: Haemoglobin Change in Girls in follicular and leutal phase**

As shown in the above figure that out of the total 85 students of JMC are having normal haemoglobin change between 0-1 and 15 of students are having high haemoglobin change more than 1. Therefore, that most of girls are having normal haemoglobin change between the leutal and follicular phase.

**Table No.2 Level of Stress and the Bleeding.**

High Stress	High Bleeding	Normal Bleeding	Total
High Stress	13	49	62
Normal Stress	2	36	38
Total	15	85	100

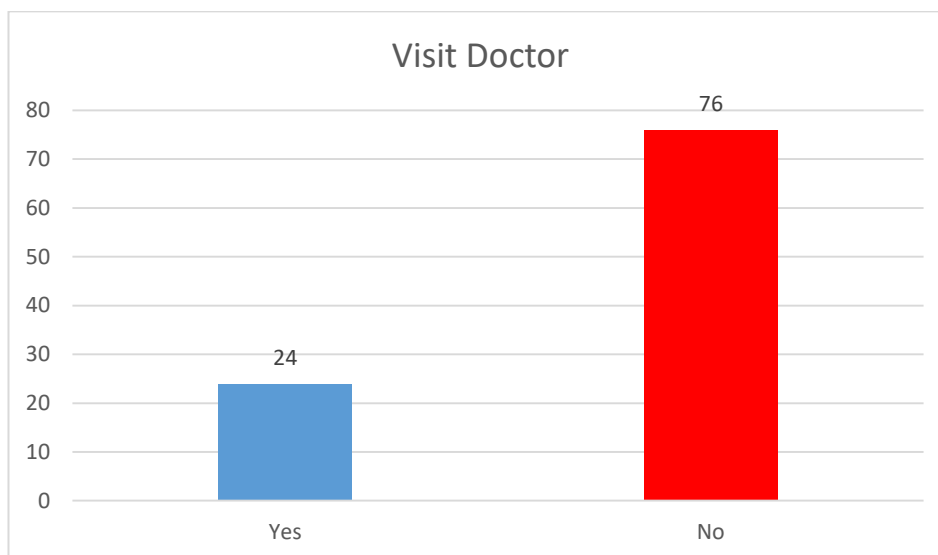


**Figure No.2: Level of Stress and the Bleeding.**

As shown in the above figure that out of the total 100 students 15 students of JMC are having high bleeding and 13 of them having high stress level. Therefore, that most of girls are having high stress level are experiencing high bleeding during their periods.

**Table No 3: Visiting Doctor Regularly**

Visit Doctor	No of Girls	Percentage
Yes	24	24
No	76	76
Total	100	100

**Figure No 3: Visiting Doctor Regularly**

As shown in the above figure that out of the total 100 students 24 do visit to doctor to maintain their good health and rest 76 girls do not regularly visit to their problems they face in menstruation cycle. Therefore, the girls should visit to doctor for consulting their health during their menstruation cycle problems.

The following hypothesis is formulate and tested to study the hemoglobin level during follicular and luteal phase of menstrual cycle in students of I<sup>st</sup> year MBBS of JMC, Jhalawar.  
 Null Hypothesis: There is no significant difference between hemoglobin level during follicular and luteal phase of menstrual cycle in students of I<sup>st</sup> year MBBS of JMC, Jhalawar.  
 Alternate Hypothesis: There is significant difference between hemoglobin level during follicular and luteal phase of menstrual cycle in students of I<sup>st</sup> year MBBS of JMC, Jhalawar.

**Table No. 4 T-test results of HB level among the students**

MC	Mean	Variance	Observations	df	t-test	P(T<=t) two-tail	t Critical two-tail
HB Follicular	9.79	1.633	100	198	-11.9	5.40041E-25	1.972
HB Luteal Phase	10.95	1.644	100				

Haemoglobin measurement was conducted by using Sahils technique. Using the Student t-test, the data gathered throughout the two periods of the menstrual cycle were statistically analysed. P-value is less than .05 this shows that null hypothesis is rejected. This shows that there is significant difference between the hemoglobin levels. Therefore, there is significant

difference between hemoglobin level during follicular and luteal phases of menstrual cycle in students of Ist year MBBS of JMC, Jhalawar.

During the follicular phase, the mean haemoglobin concentration is 9.7 g/dl, while during the luteal phase, it is 11 g/dl. The p-value found was less than .05, which shows that there is considerable change ( $p < 0.05$ ) in the levels of haemoglobin during menstrual cycle.

Due to the amount of blood that is lost, heavy periods might result in iron deficiency anaemia. In the majority of cases, this form of anaemia can be managed by addressing the underlying reason of heavy periods, supplementing with iron, or using hormonal contraception.

### **Conclusion**

This study analyses the variation of haemoglobin level in luteal and follicular phase of menstrual cycle of the MBBS girls studying in JMC, Jhalawar. The menstrual cycle is a cyclical process that happens between menarche and menopause in women of childbearing age. During this cycle, the steroid hormones oestrogen and progesterone are secreted. The usual duration of a menstrual cycle is 28 days, however variations between 21 and 40 days are normal. Pre-ovulatory or follicular phase and post-ovulatory or luteal phase are the phases of the menstrual cycle. During the follicular phase, oestrogen levels are higher, whereas progesterone levels spike during the luteal phase. Red blood cells contain the iron-containing metalloprotein haemoglobin. It is responsible for transporting oxygen to tissues and carbon dioxide away from them. Blood loss during menstruation ranges from 30 to 80 ml. This causes iron loss throughout the body. This may indirectly alter red blood cell haemoglobin levels. The purpose of the study was to determine how haemoglobin levels fluctuate throughout the menstrual cycle.

Due to the amount of blood that is lost, heavy periods might result in iron deficiency anaemia. In the majority of cases, this form of anaemia can be managed by addressing the underlying reason of heavy periods, supplementing with iron, or using hormonal contraception. The haemoglobin levels obtained were greater during the luteal phase. This could be the result of blood loss during menstruation. This would have possibly impacted the levels of haemoglobin in red blood cells. Blood loss during menstruation results in a negative iron load and increases the risk of iron-deficiency anaemia in women. In addition, it is found that variation during the menstrual cycle, haemoglobin levels exhibit statistically significant change, according to the present study. Statistically significant variation occurs in the levels of hemoglobin between the follicular and luteal phases of menstrual cycle. Premenstrual syndrome (PMS) was the most common menstrual problem faced by the students (85.24%), and mood swing being the commonest symptom noted in 89 participants. In this study of the menstrual cycle of the 100 students, it was found that very few girls experience longer period lasting more than 7 days. The health care is being taken by themselves and they do not visit doctor regularly. The high stress is a problem among the student of MBBS and due to which they have abnormal menstrual cycle and heavy bleeding problem. The stress level are associated with the menstrual cycle. The higher the stress the more blood loss has been found but the values are not so significant. Out of total 100 girls 15 girls students takes high stress which is having bad effects on their menstrual cycles. In some cases the high blood loss during the luteal and follicular phase has been found. Most of the girls are not regularly visiting the doctor in case of minor problems, so it is suggested that the girls should visit the doctor even in case of minor abnormal menstrual periods. The blood loss ranging between 0-1 unit and in few cases it is more than 1. Therefore this study

concluded that only some students have high blood loss during menstrual periods and the various factors such as stress, anxiety and self-care are the contributing factor to it.

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**Conflict of Interest:** No conflict of interest.

**Source of Funding:** Self-funded study

**Ethical Clearance:** Approval of the Institutional ethical Committee was taken to conduct the study.

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