

Haematological Health Profile of Female Players

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Abstract

The purpose of the study was to examine the **haematological health profile** (Haemoglobin, Red Blood Corpuscles, White Blood Corpuscles, Platelets & Serum Calcium) of female players during Luteal Phase, Menstrual Phase & Follicular Phase. Methodology: For the purpose of this study, 31 unmarried female players were selected. The subjects selected for this study were associated with different sports and were studying in Banaras Hindu University. The age of the subjects ranged between 20 to 25 years with having normal menstrual cycle of 28 ± 2 Subjects with irregular cycles, gynecological disorders, history of prolonged drug intake were excluded from the study. Blood sample (3-5ml) was taken on the following days by the help of reputed and registered Pathologist and their well trained technicians on 2nd day of Menstruation (Menstrual Phase), 11th day from Menstruation (Follicular Phase) & 22nd day from Menstruation (Luteal Phase). Results: Mean value of Haemoglobin during L.P.>F.P.>M.P.; mean value of Red Blood Corpuscles during F.P.>L.P.>M.P.; mean value of White Blood Corpuscles during L.P.>F.P.>M.P.; mean value of Platelets during L.P.>F.P.>M.P. and mean value of Serum Calcium during M.P.>L.P.>F.P. respectively. Conclusion: The mean value of Haemoglobin found greatest during Luteal Phase; Red Blood Corpuscles found greatest during Follicular phase; White Blood Corpuscles found greatest during Luteal Phase; Platelets found to be greatest during Luteal Phase & Serum Calcium found greatest during menstrual phase.

KEYWORDS: Haemoglobin, Red Blood Corpuscles, White Blood Corpuscles, Platelets, Calcium, Menstrual Phase, Follicular Phase & Luteal Phase.

Introduction

Menstruation/Menstrual Phase is the visible manifestation of cyclic physiologic uterine bleeding due to shedding of the endometrium following invisible interplay of hormones mainly through hypothalamus –pituitary –ovarian axis. For the menstruation to occur the axis must be responsive to the ovarian hormones (estrogen and progesterone) and the outflow tract must be patent. (D.C.Dutta, 2009).

The period extending from the beginning of a period (menses) to the beginning of the next one is called menstrual cycle. The first menstruation (menarche) occurs between 11-15 years with a mean of 13 years. It is more closely related to bone age than to chronological age. For the past couple of decades, the age of menarche is gradually declining with improvement of nutrition and environmental condition. Once the menstruation starts, it continues cyclically at intervals of 21-35 days with a mean of 28 days. Physiologically, it is kept in abeyance due to pregnancy and lactation. Ultimately, it

ceases between the ages 45-50 when menopause sets in. The duration of menstruation (menses) is about 2-7 days and the amount of blood loss is estimated to be 20 to 80 ml with in average of 35 ml. nearly 70 percent of total menstrual blood loss occurs in the first 2 days. The menstrual discharge consists mainly of dark altered blood, mucus, vaginal epithelial cells, fragments of endometrium, prostaglandins, enzymes and bacteria. The uterus is located inside the pelvis immediately dorsal (and usually somewhat rostral) to the urinary bladder and ventral to the rectum. The human uterus is pear-shaped and about 3 in. (7.6 cm) long. A female's uterus can be divided anatomically into four segments: The fundus, corpus, cervix and the internal orifice of the uterus. (D.C.Dutta.2009)

Blood has abundant functions in a healthy body. One of its primary tasks is to deliver oxygen and nutrients to the body's cells. The various components of blood each play an important role in human body. Blood cells are produced by stem cells in the bone marrow. Once these cells develop, they are released into the bloodstream. Red blood cells deliver hemoglobin, which is the iron-bearing protein that makes the transportation of oxygen possible. Also known as erythrocytes, red blood cells make up about 45 percent of blood. The liquid portion of the blood, plasma, makes up about 54 percent of blood's content. Although 90 percent water, plasma contains elements that are essential for sustaining health and life, including critical proteins. The remaining 1 percent of blood's composition is made up of white blood cells (leukocytes) and platelets (thrombocytes). White blood cells help protect the body from infections and disease by destroying the agents that cause illness. The tiny fragments called platelets are important in the formation of blood clots (coagulation). The average adult has about 5 quarts (4 to 5 litres) of blood coursing through his or her body. Serum Calcium is a mineral found mainly in the hard part of bones, where it is stored. Serum Calcium is added to bone by cells called osteoblasts and removed from bone by cells called osteoclasts. Several researches shows that Different phases of menstrual cycle puts some noticeable fluctuations in different blood components which are very important to take proper care of women health. (Kara Rogers, 2011).

Augmented participation of women in sports has led to greater awareness of the menstrual cycle alterations that repeatedly accompany exercise and training. This raised consciousness has inspired more scientists to examine the etiologic mechanisms responsible for such changes and has led many athletes to seek medical attention. As well, menstruation has become less of a road back in achieving sports goals for women. Numerous studies have been undertaken to scrutinize the effects of different phases of menstruation cycle on blood cells, but results have often been inconclusive and contradictory. The reason behind conducting this study was that, so many past studies pointed out that due to menses there are so many haematological fluctuations occurs in female body during different phases of menstruation cycle. The female regularly involved in physical activity as they are players, are too facing these kind of fluctuations in their blood. This study endeavored to reexamine these parameters measured by standard methods. In the present study the curiosity of the investigator has taken an initiative to find out the Haematological health profile of females players during menstrual phase, follicular phase and luteal phase of menstruation cycle with lots of effort.

Objectives of the study:

1. To examine the haematological health profile (Haemoglobin, Red Blood Corpuscles, White Blood Corpuscles, Platelets & Serum Calcium) of female players during Luteal Phase.
2. To investigate the haematological health profile (Haemoglobin, Red Blood Corpuscles, White Blood Corpuscles, Platelets & Serum Calcium) of female players during Menstrual Phase.
3. To discover the haematological health profile (Haemoglobin, Red Blood Corpuscles, White Blood Corpuscles, Platelets & Serum Calcium) of female players during Follicular Phase .

Significance of the study:

1. The study will be helpful for developing understanding in coaches and trainers to design a program and take a precaution during competition.
2. The present study will be helpful to understand the haematological health profile (Haemoglobin, Red Blood Corpuscles, White Blood Corpuscles, Platelets & Serum Calcium) view of sports women during different phases of menstrual cycle.
3. The study will be helpful to take the precautionary measures and also be helpful for preparing a suitable dietary pattern which can fulfill the need of better performance in sports which are affected by the Haematological fluctuations occurs in different phases of menstrual cycle.

Research Methodology

For the purpose of this study, 31 unmarried female players, associated with different sports and studying in Banaras Hindu University were voluntarily selected as subjects. The age of the subjects ranged between 20 to 25 years with having normal menstrual cycle of 28 ± 2 . Subjects with irregular cycles, gynecological disorders, history of prolonged drug intake were excluded from the study.

Selection of Variables

Keeping in the view about specific purpose of the study, the following Haematological variables were selected:

- (a) Haemoglobin
- (b) Red Blood Corpuscles
- (c) White Blood Corpuscles
- (d) Platelets
- (e) Serum Calcium

For the purpose of the present study Blood sample (3-5ml) was taken on the following days by the help of reputed and registered Pathologist and their well trained technicians on 2nd day of Menstruation (Menstrual Phase), 11th day from Menstruation (Follicular Phase) & 22nd day from Menstruation (Luteal Phase).

Design of the Study

Time series design was used. The time series design has only one group but attempts to show change that occurs when the test/ treatment is administered differs from the times when it is not.

Administration of Test

All the subjects received an explanation of nature and purpose of the study and gave their formal written consent to participate in the present study. Prior to obtain data, the subjects were asked to give completed self made questionnaire regarding their medical history, medications, current health conditions and menstrual cycle which was prepared with the help of expert. All subjects were asked to submit their report on regular menstrual cycles for last three cycles. Utmost care was also taken to obtain clinical based data regarding their health status to maintain research decorum. Subjects with irregular cycles, gynecological disorders, history of prolonged drug intake were excluded from the study. Research scholar also made a request to all volunteers for not taking any kind of medication during study without prior information to the scholar. 3-5ml venous blood samples were taken during different phases of menstrual cycle. The Haematological health profile data were taken under the following phases of menstruation cycle:

- (a) Menstrual phase (2nd day of menstruation)
- (b) Follicular phase (11th day from the menstruation starts)
- (d) Luteal phase (22nd Day from the menstruation starts)

Statistical Technique for the Analysis of Data

The below mentioned statistical technique was used to fulfill the need of objectives of the study:

1. Descriptive Statistics

Results & Findings

Table- I: Descriptive Table of Haematological health profile of female players during Luteal Menstrual & Follicular phases of Menstruation Cycle

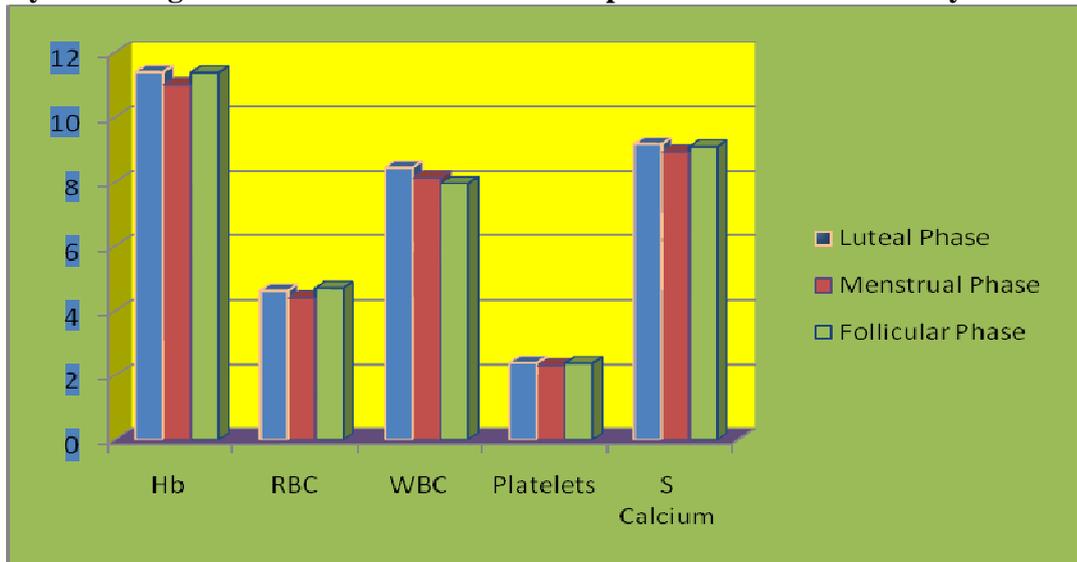
Parameters	Luteal Phase		Menstrual Phase		Follicular Phase	
	Mean Value	S.D.	Mean Value	S.D.	Mean Value	S.D.
Haemoglobin	11.4065	±1.45	11.0226	±1.18	11.3903	±1.38
Red Blood Corpuscles	4.6181	±0.51 7	4.4013	±0.469	4.6971	±0.513
White Blood Corpuscles	8.4419	±1.80	8.1387	±1.69	7.9613	±1.77
Platelets	2.3961	±0.60 5	2.3129	±0.541	2.3855	±0.494
Serum Calcium	9.1613	±0.56 7	8.9226	±0.580	9.0774	±0.535

As shown in Table No. I, it is clearly evident that:

- Mean value of Haemoglobin during Luteal Phase >Follicular phase> menstrual phase;
- Mean value of Red Blood Corpuscles during Follicular phase> luteal phase >menstrual phase;

- Mean value of White Blood Corpuscles during Luteal Phase > Follicular phase > Menstrual phase ;
- Mean value of Platelets during Luteal Phase > Follicular phase > menstrual phase.
- Mean value of Serum Calcium during Menstrual phase > Luteal Phase > Follicular phase respectively.

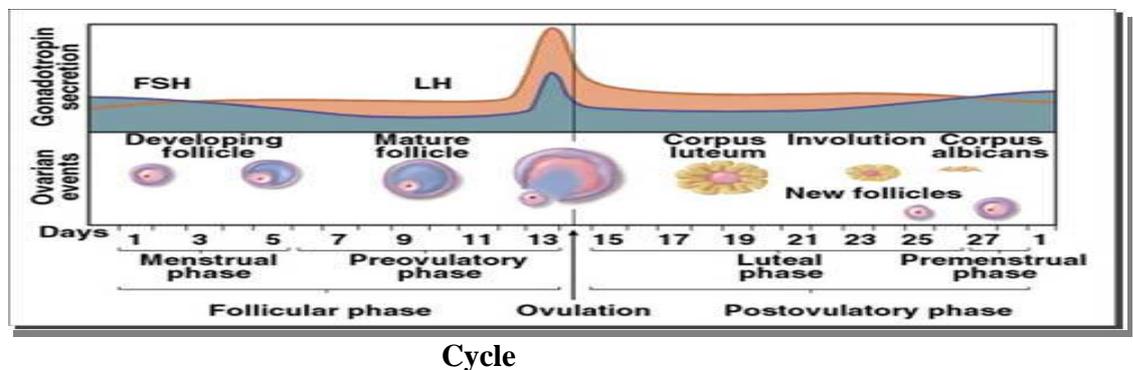
Figure- I: Graphical representation of Haematological health profile of female players during Luteal Menstrual & Follicular phases of Menstruation Cycle



Discussions of Findings

With the abovementioned statistical findings Haemoglobin ,Red Blood Corpuscles Platelets & Serum Calcium were found lowest mean value in Menstruation Phase, only White blood Corpuscles was found lowest mean value during Follicular Phase. The result of this study has not revealed any significant difference in the change of blood characteristics among different phases of the menstrual cycle only shows some numerical rise within all the three phases of Menstruation Cycle.

Figure-II: Hormonal Changes during Different Phases of Menstruation



But there are many studies which have shown that during the menstrual phase women experienced many changes beside all the hormonal and chemical changes in the blood. Many researches shows that Haemoglobin level decrease during menstruation, platelets counts decrease just before menstruation. But in the present study numerical value shows fluctuations in different phases in menstruation cycle. In almost similar kind of study conducted by Malini K. Sharma (2006) entitled "Haematological Profile in different phases of Menstrual Cycle" also analyses Haemoglobin, Red Blood cells, WBC, & Platelets count and not found any significant changes in different Phases of Menstrual Cycle.

Estrogen lowers serum calcium, and in its absence as seen at menopause, serum calcium concentrations rise (Young M.N., Nordin B.E.C., 1967). Estrogen is believed to lower serum calcium through an inhibition of bone resorption by suppressing the mesenchymal process involved in bone remodeling and promoting bone mineralization (Stice S.L., Ford S.P., Rosazza J.P., Van-Orden D.E., 1987). Parathyroid hormone appears to act in an exactly opposite manner. Recent evidence suggests that estrogen has calcium antagonistic properties, inhibiting calcium currents and decreasing calcium entry into vascular smooth muscle (Stice S.L., Ford S.P., Rosazza J.P., Van-Orden D.E., 1987). During the menstrual cycle, estradiol has two peaks, one immediately before the LH surge and ovulation, and the second during the luteal phase. Increasing estrogen levels would result in falling calcium concentrations with compensatory rises in parathyroid hormone preventing marked degrees of hypocalcemia. Therefore, women with an already underlying calcium disturbance would be subjected to further decrements in calcium concentrations on exposure to increasing estrogen levels during the luteal phase of the menstrual cycle. During this particular phase of the menstrual cycle, progesterone which is the predominant ovarian steroid hormone and is an anti estrogen, may modify the actions of estrogen at the cellular level resulting in enhanced neuromuscular irritability and vascular reactivity. These changes are associated with not only to physiological characteristics but also biochemical and psychological as well. Irritation, anger, excitation or change in thinking process may also get associated with the onset of menses. The result of the present studies may be associated to the fact that the subject of this study were female players who were actively involved to sports at higher level which might have nullified the negative effect in their haematological status that could have been otherwise affected the normal female during different phases of the menstrual cycle. The subjects of the present study were sportsmen and following a systematic dietary pattern with regular exercise. Due to this reason hormonal balance maintains and obstructs the intensity of severe fluctuations during different phases of menstruation cycle in female players.

Conclusions: The following conclusion may be drawn after findings:-

The mean value of **Haemoglobin** found greatest during Luteal Phase; **Red Blood Corpuscles** found greatest during Follicular phase; **White Blood Corpuscles** found greatest during Luteal Phase; **Platelets** found to be greatest during Luteal Phase & **Serum Calcium** found greatest during menstrual phase.

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