

## Comparative Study of Balance Ability among Different Phases of Menstrual Cycle in National Level Female Players

Samiksha Nayak<sup>a</sup>, Deepak Mehta<sup>b</sup>

<sup>a</sup>Research Scholar, School of Physical Education, DAVV Indore, India

<sup>b</sup>Professor and Head, School of Physical Education, DAVV Indore, India

### Abstract

Menstruation is a very complicated process involving many different hormones, the woman's sex organs and the brain. **Objectives of the study:**1)To characterize the Balance ability during Menstrual Phase, follicular phase, ovulation phase, luteal Phase of Uterine changes during menstrual cycle in female players.2) To find out whether there were any significant difference among Menstrual Phase, follicular phase, ovulation phase, luteal Phase during menstrual cycle in relation to Balance. **Materials and Methods:** - Fifty (50) national levels female players were selected randomly who have regular menstrual cycle further they were selected from different sports i.e. Hockey, Badminton, Cricket, Football and Volleyball. Data were collected in different phases of menstrual cycle i.e. Menstrual Phase, Luteal phase, Ovulatory phase and Follicular phase. Age of female athletes ranged between 17 to 25 years. Balance ability was recorded with the help of stork stand test. Descriptive statistics, One Way Analysis of variance was employed to analyze data. **Results:** - Mean and SD value of Menstrual Phase, Follicular Phase, Ovulatory Phase and Luteal Phase were having  $23.93 \pm 14.48$ ,  $43.00 \pm 8.37$ ,  $47.33 \pm 4.06$ ,  $30.00 \pm 12.23$  respectively. Significant difference was found among Menstrual Phase, follicular phase, ovulation phase and luteal Phase of Uterine changes because calculated F value 42.49 was greater than the tabulated value and also P value found less than .05. **Conclusions: 1)** Significant difference was found among four phases i.e. Menstrual Phase, Luteal phase, Ovulatory phase and Follicular in relation to Balance ability.2) Balance ability of National female players in Ovulatory phase was greater than in comparison to Follicular phase, Luteal phase, Menstrual phase.

**KEYWORDS:** Balance ability, Follicular phase, Luteal phase, Menstrual phase, Ovulatory phase

### Introduction

Menstruation may be a difficult method involving many alternative hormones, the woman's sex organs and therefore the brain. A woman's internal sex organs carries with it 2 ovaries, the Fallopian tubes, the womb (womb) and therefore the epithelial duct. The ovaries contain the eggs with that, the girl is born and, throughout every amount, one egg can typically ripen and mature thanks to the action of hormones current within the blood. once the egg is mature it bursts from the ovary and drifts through the female internal reproductive organ down into the womb. The liner of the womb - the mucosa - has been thickened by the action of hormones and finished to receive the brute. If the egg is inseminated and therefore the girl becomes pregnant, it'll fasten itself onto the mucosa. If the egg is not fertilized, however, resultant hormonal changes cause the endometrium to slip away and menstruation begins [1]. ,

One study conducted in Italy indicates that female soccer players may be more at risk from injury before and during their menstrual periods. "It is unclear whether it was because of physiological or psychological factors or a combination of them [2]. The menstrual discharge consists mainly of dark altered blood, mucus, vaginal epithelial cells, and 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.2011)[3].

### Objectives of the study

- 1) To characterize the Balance ability during Menstrual Phase, follicular phase, ovulation phase, luteal Phase of Uterine changes during menstrual cycle in female players.
- 2) To find out whether there were any significant difference among Menstrual Phase, follicular phase, ovulation phase, luteal Phase during menstrual cycle in relation to Balance.

### Materials and Methods

For purpose of the study 50 national level female players were selected who have regular menstrual cycle they was selected from different sports that was hockey, badminton, cricket, football and volleyball. Data was collected in different phases of menstrual cycle .there age ranged between 17 to 25 years. Balance Ability was selected for the purpose of the study. To measure the balance ability Stork stand test was used.

### Analysis and Interpretation of Data

To compare Balance Ability among Different Phases of Menstrual Cycle analyzed by descriptive statistics [4] as well as ANOVA [5]. To find out the pair-wise comparisons, Post hoc Tukey test was applied .Descriptive statistics of data and Annova are presented in table-1

**Table No. 1**  
**Comparison of mean balance ability between the four phases – Menstrual, Follicular, Ovulatory and Luteal Phase**

Phase	No.	Balance Ability [Mean $\pm$ SD]	F value	P value
Menstrual Phase	40	23.93 $\pm$ 14.48	42.94	0.001*
Follicular Phase	40	43.00 $\pm$ 8.37		
Ovulatory Phase	40	47.33 $\pm$ 4.06		
Luteal Phase	40	30.00 $\pm$ 12.23		

**One-way ANOVA applied, P value = 0.001, Significant**

The above table shows the comparison of mean balance ability between the four phases – Menstrual Phase, Follicular Phase, Ovulatory Phase and Luteal Phase.

The mean balance ability in the menstrual phase was 23.93  $\pm$  14.48 seconds, in the follicular phase it was 43.00  $\pm$  8.37 seconds, in ovulatory phase it was 47.33  $\pm$  4.06

seconds and in the luteal phase it was  $30.00 \pm 12.23$  seconds. There was a statistically significant difference seen in the balance ability between the four groups ( $P < 0.05$ ). To find out the pair-wise comparisons, Post hoc Tukey test was applied.

**Post-hoc Tukey:**

Pairs	t value	P value	Interpretation
Follicular phase to Menstrual phase	8.08	0.000*	Significant
Ovulatory phase to Menstrual phase	9.91	0.000*	Significant
Luteal phase to Menstrual phase	2.57	0.053	Not significant
Ovulatory phase to Follicular phase	1.83	0.262	Not significant
Luteal phase to Follicular phase	-5.51	0.000*	Significant
Luteal Phase to Ovulatory phase	-7.34	0.000*	Significant

\* **Significant**

There was a statistically significant difference seen in the pair Follicular phase to Menstrual phase ( $P < 0.05$ ), showing a higher balance ability in the follicular phase in comparison to the menstrual phase.

There was a statistically significant difference seen in the pair Ovulatory phase to Menstrual phase ( $P < 0.05$ ), showing a higher balance ability in the ovulatory phase in comparison to the menstrual phase.

There was no statistically significant difference seen in the pair Luteal phase to Menstrual phase ( $P > 0.05$ ), showing a comparable balance ability in both the groups.

There was no statistically significant difference seen in the pair Ovulatory phase to Follicular phase ( $P > 0.05$ ), showing a comparable balance ability in both the groups.

There was a statistically significant difference seen in the pair Luteal phase to Follicular phase ( $P < 0.05$ ), showing a higher balance ability in the follicular phase in comparison to the luteal phase.

There was a statistically significant difference seen in the pair Luteal phase to Ovulatory phase ( $P < 0.05$ ), showing a higher balance ability in the ovulatory phase in comparison to the luteal phase.

Balance ability was seen during in the following manner:

Ovulatory phase > Follicular phase > Luteal phase > Menstrual phase

**Discussion of Findings**

On the basis of result it was concluded that there was significant difference among four groups namely menstrual phase, follicular phase, ovulatory phase, luteal phase in relation to balance ability and ovulatory phase has greater mean in comparisons to the mean value of follicular, luteal phase and menstrual phase. This might be due to estrogen which is main female hormone that is usually good during ovulatory phase. Balance is maintained by coactions of sensory (proprioceptive receptor, visual, vestibular organ) and nervous system also. Female sex hormones do not directly affect balance but they affect brain chemicals associate with the kinaesthetic perception. The receptors of female sex hormones are present everywhere in joints and nervous system. Estrogens also support the energy level, serotonin dopamine and alertness that can support to focus on position. **Byung Joon Lee PT and Ki Hun Cho, PT (2017)** conducted study on the effects of the menstrual cycle on the static

balance in healthy young women and concluded that the menstrual cycle affects the static balance of healthy subjects. During the menstrual cycle, intensity for balance exercises in females should be carefully controlled for injury prevention. The present study was supported by the study conducted by Byung Joon Lee PT and Ki Hun Cho, PT (2017) [6]. **Aline Tiemi Kami and Camila Borecki Vidigal (2017)** conducted study on Influence of menstrual cycle phases in functional performance of healthy and young women that the functional performance of healthy and young women was influenced by the different phases of the menstrual cycle, with worse results in the menstrual phase for the tests SHT and FH8, and the consequent impairment of coordination and speed to achieve them. However, the dynamic balance, assessed through the m SEBT, pointed no changes regarding the menstrual cycle phases. The present study was contrary to the study conducted by **Aline Tiemi Kami and Camila Borecki Vidigal (2017)** [7].

#### Conclusions:

- Significant difference was found among four phases i.e. Menstrual Phase, Luteal phase, Ovulatory phase and Follicular in relation to Balance ability.
- Balance ability of National female players in Ovulatory phase was greater than in comparison to Follicular phase, Luteal phase, Menstrual phase.

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