

# Menstrual Distress, Stress And Performance Of Female Basketball Players In Different Phases Of Menstrual Cycle

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## ABSTRACT

**Objective of the study:** The purpose of the study was to compare stress level, basketball performance and menstrual distress in during and post menstrual phases among the university level female basketball players. The relationship between stress level, basketball performance and menstrual distress was also ascertained.

**Method:** A total 80 girls were purposively selected as subjects from different colleges of Punjabi University, Patiala. All the subjects were assessed for stress, basketball performance and menstrual distress in during and post menstruation phases of menstrual cycle. The stress level of subjects was measured with the help of Perceived Stress Scale (PSS) developed by Sheldon Cohen (1988). Menstrual distress was assessed by using the Menstrual Distress Questionnaire (MDQ) developed by Rudolf. H. Moos (1969). Basketball performance was assessed with the help of Johnson Basketball Test Battery design by L. William Johnson (1934).

**Results:** Paired sample *t*-test revealed that the basketball players had significantly ( $p < 0.05$ ) higher mean value on perceived stress scale in during menstruation phase as compared to post menstruation phase. Menstrual distress, pain and concentration were found to have significantly higher mean values ( $p < 0.05$ ) in during menstruation phase among basketball players. Behaviour and arousal were significantly ( $p < 0.05$ ) associated with perceived stress and control significantly associated ( $p < 0.05$ ) with basketball performance in post menstrual phase.

**Conclusion:** The performance of basketball players was not affected during the menstrual phase. Behaviour and arousal showed significant association with stress level and control was observed to be significantly associated with basketball performance in the post menstrual phase.

**Key word:** - Basketball players, Menstrual distress, Stress, Menstrual cycle

## 1. INTRODUCTION

The menstruation has become less of a barrier to achieving sports goals for women recent times. In India as well menstruation has been deliberated as a taboo which made it difficult for women to discuss and voice out their concern, created a negated in understanding the vitality of menstruation for a healthy womanhood (Guterman et al., 2016). Impact of the physical exercise on the regulation of the menstruation cycle and the reproductive symptoms was considered in 1939. Gannon (1988) revealed that the potential of exercise in the alleviation of menstrual disorder and many more symptoms like premenstrual syndrome. Reneta and Constance (2000) described that the women femininity hormones influence excessive amount of the physiological and physical parameter that can influence the athletic performance. Although some studies described that due to the hormonal fluctuations in the organism during the menstrual cycle, there may occur change in the aerobic and anaerobic and muscle strength. Many studies reported that the menstrual phases do not influence the sports performance (Giacomoni et al., 2000 and Smekal et al., 2007). Menstrual disorders caused by excessive physical effort often take form of a secondary amenorrhea (absence of the menstruation) and in some cases women to give up their sport careers. They can also be caused by strong mental stress related with involved sport and can manifest with various mental, somatic, and emotional symptoms during this time, including premenstrual syndrome (PMS) and premenstrual dysphoric disorder (Gorden et al., 2017; Skrzypulec et al., 2017; Czajkowska et al., 2015 and Galecki et al., 2015). One of the most generally disorder at this time is menstruation signs (Flug et al., 1984 and Zegeye et al., 2009) i.e. irritability, breast tenderness, low back pain, abdominal pain, vomiting, nausea and general weakness, occurring premenstrual, during menstruation cycle and after the menstrual cycle (Yang et al., 2002). According to the WHO reports menstruation signs have a higher prevalence in Asian countries compared to the western countries. Most of the studies described that the effect of the menstruation on the performance defined that coordination is decreased during the premenstrual cycle and during the menstruation cycle and increased the sports performance after the menstruation cycle (Erdelyi, 1962 and Shangold, 1980). Although aerobic and anaerobic work capacity were not affected during the menstruation cycle (Stephenson et al., 1980), but the most common impact on the sports performance frequently results from variations in the balance between the oestrogen and progesterone hormones during the premenstrual and menstrual cycle.

Menstrual cycle characteristics are also associated with a number of important factors predictive of future health outcomes, such as weight, smoking, alcohol intake, exercise, race/ethnicity and stress. (Cohen et al., 1983; Fenster et al., 1999; Harlow et al., 1997; Harlow and Campbell, 1994; Matteo, 1987; Rowland et al., 2002; Symons et al., 1997). A number of studies looked at the relationship between stress and menstrual cycle characteristics (Matteo, 1987; Harlow and Matanoski, 1991) and found that self-reported measures of stress correlated with longer menstrual cycles. However, women who reported that their jobs were characterized by high stress, but low control over their work environment had a higher risk of short cycles (Fenster et al., 1999). Stress and physical inactivity can lead to hormonal imbalance and can affect the menstrual pattern and cause symptoms during the menstrual phases. It has been observed that during menstruation phases there is evidence of better physiological response to stress as measured by increased heart rate, blood pressure, and adrenocortical activity (Hoyer et al., 2013). Various studies have proved that increased physical activity has a beneficial effect in reducing stress and common symptoms occurring during the luteal phase of menstrual cycle (Aganoff and Boyle, 1994; Biddle and Asare, 2011).

The present study was undertaken to examine the performance, menstrual distress, stress in menstrual phase and post menstrual phase of menstrual cycle among the female basketball players. The aim of the study was to ascertain the effect of menstruation on performance, menstrual distress and other psychological conditions such stress arising due to menstruation in the different phases of menstrual cycle among female basketball players.

## 2. METHODOLOGY

A cross-sectional survey type study was designed to examine the menstrual distress, basketball performance and stress during the menstruation phase and post menstruation phase of menstruation cycle of female basketball players. Purposive sampling technique was adopted for the selection of subjects. A total 80 female basketball players from different colleges affiliated to Punjabi University, Patiala were selected as subjects for the study. The age of the subjects were ranged between 18-25 years. All basketball players were assessed for basketball performance, menstrual distress and stress in the menstruation phase and post menstrual phase of menstruation cycle.

### *Basketball Performance*

The basketball performance of female players was measured with the help of Johnson basketball skill test. The Johnson Basketball Test Battery was developed by L. William Johnson (1934). This test battery measures the performance of players on various basketball skills. Johnson Basketball Test Battery composed of the three items as given following

- ❖ Field Goal Speed Test
- ❖ Basketball Throw for Accuracy
- ❖ Dribble Test.

### *Menstrual Distress Questionnaire (MDQ)*

This scale was developed by Moos (1969) and this questionnaire was used to analyse the behaviour and affective response of young girls. The MDQ requires subjects to rate their symptoms using a five-point likert type scale (0-4) ranging from “no experience of symptoms” to “very severe” over 47 statements. Each subject made these ratings separately for the menstrual (during, menstrual, remainder of cycle) phases of her most recent menstrual cycle. The eight scales of the MDQ are pain, water retention, autonomic reaction, negative affect, impaired concentration, behavioural change, arousal and control. Each scale (8 scales) scores were calculated separately, and then the total scores were calculated.

### *Perceived Stress Scale (PSS)*

The stress level of the female basketball players was assessed with the help of Perceived Stress Scale (PSS). This scale was developed by the Sheldon Cohen (1988), the most widely used self-scored standardized screening tool to measure the stress. Perceived Stress Scale had 10 items, four positive statements and six negative statements. The response set range from 0 (Never) and 4 (Very Often) and positive items are reverse coded. Higher the score, more will be perceived stress.

### *Statistical Analysis*

Statistical analyses were conducted using SPSS 16.0 (Statistical Package for Social Science Inc., Chicago, Illinois USA). The data was presented as descriptive statistics such as mean, standard deviation etc. The paired t-test was used to compare menstrual distress, stress and performance during and post menstrual phases among the female basketball players. The Karl Pearson Product Moment coefficient of correlation was used to identify the associations

among menstrual distress, stress and performance in during and post menstrual phases among the female basketball players. The significance level adopted was 0.05.

### 3. RESULTS

Table: 1 Comparison of stress, performance and menstrual distress among basketball players in different phases of menstrual cycle

| Variables              | During Menstruation |       | Post Menstruation |       | t-value | p-value |
|------------------------|---------------------|-------|-------------------|-------|---------|---------|
|                        | Mean (N=80)         | SD    | Mean (N=80)       | SD    |         |         |
| Stress                 | 22.95               | 5.99  | 19.22             | 6.31  | 4.098   | 0.008*  |
| Basketball Performance | 51.83               | 6.33  | 52.03             | 8.19  | -0.199  | 0.843   |
| Menstrual Distress     | 83.68               | 18.53 | 77.33             | 15.63 | 2.338   | 0.022*  |
| -pain                  | 11.23               | 5.53  | 9.41              | 4.17  | 2.252   | 0.027*  |
| -concentration         | 13.76               | 8.44  | 10.95             | 6.06  | 2.292   | 0.025*  |
| -behaviour             | 8.20                | 4.24  | 8.18              | 4.57  | 0.017   | 0.987   |
| -automatic reaction    | 9.16                | 4.86  | 8.17              | 4.60  | 1.302   | 0.171   |
| -water retention       | 8.42                | 4.20  | 9.32              | 6.52  | -1.095  | 0.277   |
| -negative effects      | 12.11               | 6.65  | 12.06             | 7.06  | 0.046   | 0.963   |
| -arousal               | 9.85                | 5.17  | 10.28             | 6.03  | -0.483  | 0.631   |
| -control               | 10.31               | 6.32  | 9.35              | 4.80  | 1.143   | 0.256   |

\*Indicate  $p < 0.05$ .

The comparison of stress, performance and menstrual distress and its sub-variables such as pain, concentration, behaviour, automatic reaction, water retention, negative effect, arousal and control among basketball players in different phases of menstrual cycle is presented in table 1. The paired samples t-test revealed that basketball players showed significantly higher mean value on perceived stress scale ( $t=4.098$ ,  $p=0.008$ ) in the menstruation phase as compared to the post menstruation phase of menstrual cycle. However, no significant difference was reported in the performance between during and post menstrual phases among the basketball players. Further, the results revealed that the menstrual distress ( $t=2.338$ ,  $p=0.022$ ) was significantly higher in the menstruation phase as compared to post menstruation phase among basketball players. Similarly it was noticed that the pain ( $t=2.252$ ,  $p=0.027$ ) and concentration ( $t=2.292$ ,  $p=0.025$ ) sub-variables of menstrual distress reported significantly higher mean values in the menstruation phase as compared to post menstruation phase among basketball players.

Table: 2 Associations of stress and performance with menstrual distress among basketball players in different phases of menstrual cycle

| Variables           | Stress                      |         | Basketball Performance      |         |
|---------------------|-----------------------------|---------|-----------------------------|---------|
|                     | Correlation Coefficient (r) | p-value | Correlation Coefficient (r) | p-value |
| During Menstruation |                             |         |                             |         |
| Menstrual Distress  | 0.185                       | 0.101   | 0.138                       | 0.221   |
| -pain               | 0.187                       | 0.097   | -0.066                      | 0.563   |
| -concentration      | 0.202                       | 0.073   | 0.135                       | 0.232   |
| -behaviour          | -0.031                      | 0.785   | 0.111                       | 0.325   |
| -automatic reaction | 0.056                       | 0.620   | -0.057                      | 0.613   |
| -water retention    | -0.044                      | 0.696   | 0.039                       | 0.730   |

|                          |        |        |        |        |
|--------------------------|--------|--------|--------|--------|
| -negative effect         | 0.004  | 0.970  | 0.084  | 0.463  |
| -arousal                 | 0.036  | 0.751  | -0.101 | 0.374  |
| -control                 | 0.128  | 0.259  | 0.211  | 0.060  |
| <b>Post Menstruation</b> |        |        |        |        |
| Menstrual Distress       | 0.049  | 0.663  | 0.070  | 0.535  |
| -pain                    | 0.035  | 0.759  | -0.012 | 0.914  |
| -concentration           | 0.134  | 0.237  | 0.032  | 0.780  |
| -behaviour               | -0.270 | 0.015* | 0.005  | 0.968  |
| -automatic reaction      | -0.210 | 0.061  | -0.076 | 0.505  |
| -water retention         | -0.054 | 0.632  | 0.185  | 0.101  |
| -negative effect         | 0.176  | 0.119  | -0.209 | 0.063  |
| -arousal                 | 0.226  | 0.044* | 0.054  | 0.634  |
| -control                 | -0.075 | 0.507  | 0.227  | 0.043* |

\*Indicate  $p < 0.05$ .

Table 2 presents correlation analyses of stress and performance with menstrual distress among basketball players in different phases of menstrual cycle. The results showed that there were no significant relationship of stress and performance with the menstrual distress and its sub-variables in menstruation phase of menstrual cycle among basketball players. In post menstruation phase, behaviour ( $r = -0.270$ ,  $p = 0.015$ ) and arousal ( $r = 0.226$ ,  $p = 0.044$ ) sub-variables of menstrual distress reported significant associations with stress among basketball players. Similarly, control ( $r = 0.227$ ,  $p = 0.043$ ) sub-variable of menstrual distress showed significant association with performance of basketball players. Table 3 showed the correlation analysis of stress with performance among basketball players in different phases of menstrual cycle. Results showed that there was no significant relationship between stress and performance of basketball players in the both during menstruation and post menstruation phases of menstrual cycle.

Table: 3 Association between stress and performance among basketball players in different phases of menstrual cycle

| Stress              | Basketball Performance |         |
|---------------------|------------------------|---------|
|                     | r-value                | p-value |
| During Menstruation | 0.201                  | 0.074   |
| Post Menstruation   | 0.033                  | 0.774   |

#### 4. DISCUSSION

Menstruation is generally a common existence during the reproductive woman's life, up to 90% women experience one or more signs during the days previous to menstruation, and almost all components of women's usual functioning can be negatively or positively affected by changes in the menstrual cycle process (Partoazam, 2009). The findings of the present study reported no significant differences in performance among basketball players between during menstruation and post menstruation phases. However, when the effect of menstruation on performance was studied, some investigator found its negative effects on performance (Wilson et al., 1991) while others did not find negative effect on the performance (Quadagno et al., 1991). Female athletes reporting poorer performance during menstruation, a large percentage were endurance athletes i.e. tennis players and rowers. Performances of volleyball and basketball players and swimmers and gymnasts were better than the endurance athletes, but were still below normal. Performances by track and field athletes, especially sprinters were not affected nearly so much by menstruation as were the performances by other athletes.

Gold-medal performances have been reported in swimming and track and field during menstruation (Fox et al., 1988). Some studies reported that the best performance is performed after the menstrual period and 15th day of the menstrual cycle (Eston, 1984 and Fraccaroli, 1980). Nockers (1980) have documented evidence to suggest that the pre-menstrual phase is often associated with decreased performance. However, Olympic medal-winning performances have taken place during all portions of the menstrual cycle (Fox et al., 1988; Fleck et al., 1990). 37% of the athletes who participated in the 1964 Olympic Games said that they thought their performances were not negatively affected by their menstrual cycle (Kin et al., 2000). The basketball players were experienced significantly higher levels of stress in the menstruation phase as compared to post menstruation phase. This might be due to the menstruation related complications and psychological imbalances. The performance of basketball players did not show any association with menstrual distress and stress in both during menstruation and post menstruation phases. However, several studies described that the effect of the menstruation on the performance defined that coordination is decreased during the premenstrual cycle and during the menstruation cycle and increased the sports performance after the menstruation cycle (Erdelyi, 1962 and Shangold, 1980). On the other hand, it was concluded from the findings of the study that performance of basketball players did not effected by during menstrual phase and post menstrual phase.

## 5. CONCLUSION

In conclusion, it was observed from the findings of the study that performance of basketball players was not differ significantly between during menstrual phase and post menstrual phase. Stress and menstrual distress were significantly higher during menstruation phase as compared to post menstruation phase among basketball players. The stress and menstrual distress did not showed any association with the performance during menstrual phase and post menstrual phase among the female basketball players.

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