CHAPTER IV

RESULTS AND DISCUSSIONS

The data collected on selected criterion variables has been analyzed and presented in this chapter. The purpose of the study was to explore the influence of menstrual cycle phases on selected motor ability components and physiological variables between high and low performers of kho – kho players. For the purpose of the study, one hundred women Kho-Kho players from Salem District, Tamil Nadu, India during the year 2015-2016 were selected as subjects on random basis. (thirty high performers and thirty low performers were selected). The playing ability of the women Kho-Kho players were assessed by adapting subjective rating by three experts in the game of Kho-Kho. The age of the subjects were ranged between 19 to 25 years.

The following motor ability components and physiological variables such as speed, muscular endurance, explosive power, agility, flexibility, resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate were only selected as criterion variables.

The different levels of performance such as high and low performers were selected as independent variables. All the subjects were tested on selected criterion variables at the mid-day of all three phases namely menstrual phase, proliferative phase and secretory phase and collected data were statistically analyzed by using 2×3 factorial ANOVA with last factor repeated measures to find out the significant differences between rows (levels of performance) and columns (different phases of

menstrual cycle). Whenever the obtained "F" ratio for interaction effect was found to be significant, the simple effect test was used as a follow up test.

According to Jerry R. Thomas and Jack K. Nelson, whenever the main purpose is usually lies in the interaction, it is sufficient to discuss the interaction effect only, unless some special circumstances exists, interest in testing the main effects is usually limited. Hence, whenever, the obtained "F" ratio for interaction effect was found to be significant, the simple effect test was used as a follow up test. Since, two groups and three different phases of menstrual cycle were compared, whenever the obtained "F" ratio value in the simple effect was significant, the Scheffe'S test was applied as post hoc test to determine the paired mean differences, if any.

4.1 ANALYSIS OF THE DATA

The influence of independent variables on each criterion variables were analysed and presented below.

4.1.1 ANALYSIS OF SPEED

The mean and standard deviation values on speed of Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table III.

TABLE III

THE MEAN AND STANDARD DEVIATION VALUES ON SPEED OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	7.46	7.68	8.09
	S.D	0.26	0.27	0.36
Low Performers	Mean	7.81	7.95	8.18
	S.D	0.30	0.22	0.33

The Table III shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on speed are 7.46, 7.68 and 8.09 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on speed are 7.81, 7.95 and 8.18 respectively.

The two way analysis of variance values on speed of two levels of performance at their three phases of menstrual cycle have been presented in Table III-A.

TABLE III-A

THE TWO WAY ANALYSIS OF VARIANCE ON SPEED FOR WOMEN

KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE

DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	2.47	1	2.47	29.14*
B Factor (Phases of Menstrual Cycle)	7.70	2	3.85	45.33*
AB Factor (Interaction) (Level of Performance x Phases of Menstrual Cycle)	0.53	2	0.26	3.10*
Error	14.77	174	0.09	

*Significant at .05 level of confidence.
The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table III-A shows that the obtained 'F' ratio value on speed 29.14 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The result of the study indicates that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on speed.

The obtained 'F' ratio value on speed 45.33 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of

their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that significant difference exists among different phases of menstrual cycle irrespective of their levels of performance on speed.

The obtained 'F' ratio value on speed 3.10 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was a significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on speed.

Since, the obtained 'F' ratio for the interaction was found significant, the simple effect test was applied as follow up test and it is presented in Table III-B.

TABLE III-B

THE SIMPLE EFFECT TEST FOR LEVEL OF PERFORMANCE AND

DIFFERENT PHASES OF MENSTRUAL CYCLE ON SPEED

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
Level of Performance and Menstrual Phase	1.84	1	1.84	21.65*
Level of Performance and Proliferative Phase	1.04	1	1.04	10.32*
Level of Performance and Secretory Phase	0.12	1	0.12	1.43
Phases of Menstrual Cycle and High Performers	6.12	2	3.06	36.06*
Phases of Menstrual Cycle and Low Performers	2.10	2	1.05	12.37*
Error	14.77	174	0.09	

*Significant at .05 level of confidence.
The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table III-B shows that the obtained 'F' ratio values on speed 21.65 and 10.32 for level of performance and menstrual phase and level of performance and proliferative phase are greater than the table value of 3.893 with df 2 and 174 required for significant at .05 level of confidence. And the obtained 'F' ratio value on speed 1.43 for level of performance and secretory phase is lesser than the table value of 3.893 with df 2 and 174 required for significant at .05 level of confidence

The result of the study indicates that there was a significant difference exists between level of performance and menstrual phase and level of performance and proliferative phase on speed. And no significant difference exist between level of performance and secretory phase on speed

Table III -B also reveals that the obtained 'F' ratio value on speed 36.06 and 12.37 for phases of menstrual cycle and high performers and phases of menstrual cycle and low performers are greater than the table value 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that there was a significant difference between the phases of menstrual cycle and high performers and phases of menstrual cycle and low performers on speed.

Since, three different phases of menstrual cycle were compared, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any and the results of high and low performers are given in Tables III – C and III – D respectively.

TABLE III-C

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON SPEED OF HIGH PERFORMERS

Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
7.46	7.68	-	0.22*	0.186
7.46	-	8.09	0.63*	0.186
-	7.68	8.09	0.41*	0.186

* Significant at .05 level of confidence.

The table III-C shows that the mean difference between the high performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 0.22, 0.63 and 0.41 respectively on speed are greater than the confidence interval value 0.186 at .05 level of confidence.

The results of the study shows that all the paired means of high performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on speed.

TABLE III-D

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON SPEED OF LOW PERFORMERS

Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence ,Interval
7.81	7.95	-	0.14	0.186
7.81	-	8.18	0.37*	0.186
-	7.95	8.18	0.23*	0.186

* Significant at .05 level of confidence.

The table III-D shows that the mean difference between the low performers at their menstrual and proliferative phases is 0.14 on speed is lesser than the confidence interval value 0.186 at .05 level of confidence.

The table III-D also shows that the mean difference between the low performers at their menstrual and secretory phases and proliferative and secretory

phases are 0.37 and 0.23 respectively on speed are greater than the confidence interval value 0.186 at .05 level of confidence.

The result of the study shows that all the paired means of low performers differ significantly at their menstrual and secretory phases and proliferative and secretory phases on speed. And no significant difference between the paired means of menstrual and proliferative phases on speed.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on speed are graphically represented in Figure 2.

FIGURE 2

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE ON SPEED
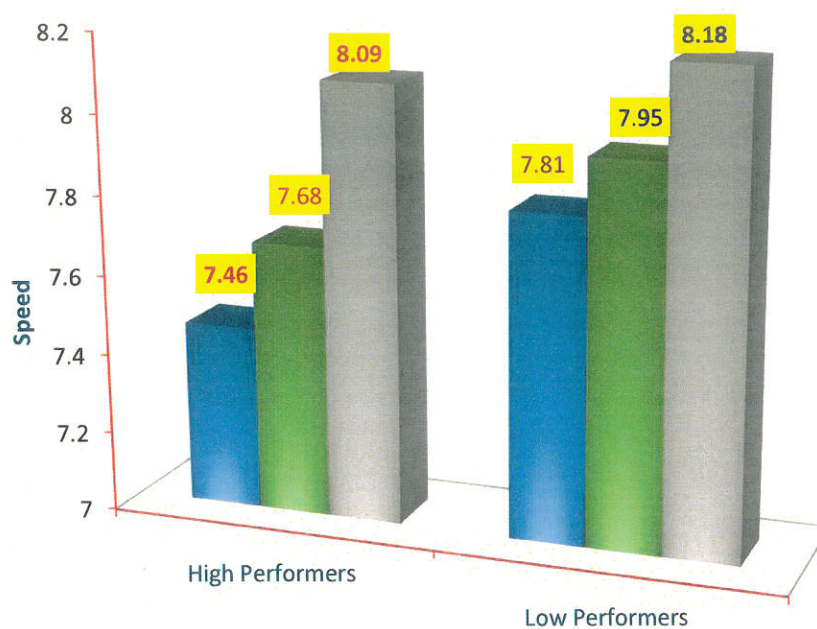
4.1.2 Analysis of Muscular Endurance

The mean and standard deviation values on muscular endurance of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table IV.

TABLE IV

THE MEAN AND STANDARD DEVIATION VALUES ON MUSCULAR ENDURANCE OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	42.37	40.17	35.50
	S.D	1.33	1.76	1.83
Low Performers	Mean	38.47	36.33	34.33
	S.D	1.83	1.81	1.67

The Table IV shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on muscular endurance are 42.37, 40.17 and 35.50 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on muscular endurance are 38.47, 36.33 and 34.33 respectively.

The two way analysis of variance values on muscular endurance of two levels of performance at their three phases of menstrual cycle have been presented in Table IV-A.

TABLE IV-A

THE TWO WAY ANALYSIS OF VARIANCE ON MUSCULAR ENDURANCE FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	396.05	1	396.05	134.74*
B Factor (Phases of Menstrual Cycle)	921.11	2	460.56	156.69*
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	72.93	2	36.47	12.41*
Error	511.43	174	2.94	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table IV-A shows that the obtained 'F' ratio value on muscular endurance 134.74 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on muscular endurance.

The obtained 'F' ratio value on muscular endurance 156.69 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory

Phase) irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveals that significant difference exist among different phases of menstrual cycle irrespective of their levels of performance on muscular endurance.

The obtained 'F' ratio value on muscular endurance 12.41 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was a significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on muscular endurance.

Since, the obtained 'F' ratio for the interaction was found significant, the simple effect test was applied as follow up test and it is presented in Table IV-B.

TABLE IV-B

THE SIMPLE EFFECT TEST FOR LEVEL OF PERFORMANCE AND

DIFFERENT PHASES OF MENSTRUAL CYCLE

ON MUSCULAR ENDURANCE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
Level of Performance and Menstrual Phase	228.15	1	228.15	77.62*
Level of Performance and Proliferative Phase	220.42	1	220.42	74.99*
Level of Performance and Secretory Phase	20.42	1	20.42	6.95*
Phases of Menstrual Cycle and High Performers	737.69	2	368.84	125.49*
Phases of Menstrual Cycle and Low Performers	256.36	2	128.18	43.61*
Error	511.43	174	2.94	

*Significant at .05 level of confidence.
The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table IV-B shows that the obtained 'F' ratio values on muscular endurance 77.62, 74.99 and 6.95 for level of performance and menstrual phase, level of performance and proliferative phase and level of performance and secretory phase are greater than the table value of 3.893 with df 2 and 174 required for significant at .05 level of confidence.

The results of the study indicates that there was a significant difference exist between level of performance and menstrual phase, level of performance and proliferative phase and level of performance and secretory phase on muscular endurance.

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Table IV -B also reveals that the obtained 'F' ratio value on muscular endurance 125.49 and 43.61 for phases of menstrual cycle and high performers and phases of menstrual cycle and low performers are greater than the table value 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that there was a significant difference between the phases of menstrual cycle and high performers and phases of menstrual cycle and low performers on muscular endurance.

Since, three different phases of menstrual cycle were compared, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any and the results of high and low performers are given in Tables IV – C and IV – D respectively.

TABLE IV-C

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED

MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES

ON MUSCULAR ENDURANCE OF HIGH PERFORMERS

Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
42.37	40.17	-	2.20*	1.093
42.37	-	35.50	6.87*	1.093
-	40.17	35.50	4.67*	1.093

* Significant at .05 level of confidence.

The table IV-C shows that the mean difference between the high performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 2.20, 6.87 and 4.67 respectively on muscular endurance are greater than the confidence interval value 1.093 at .05 level of confidence.

The results of the study show that all the paired means of high performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on muscular endurance.

TABLE IV-D

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON MUSCULAR ENDURANCE OF LOW PERFORMERS

| Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
38.47	36.33	-	2.13*	1.093
38.47	-	34.33	4.13*	1.093
-	36.33	34.33	2.00*	1.093

* Significant at .05 level of confidence.

The table IV-D shows that the mean difference between the low performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 2.13, 4.13 and 2.00 respectively on muscular endurance are greater than the confidence interval value 1.093 at .05 level of confidence.

The results of the study shows that all the paired means of low performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on muscular endurance.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on muscular endurance are graphically represented in Figure 3.

FIGURE 3

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE ON MUSCULAR ENDURANCE
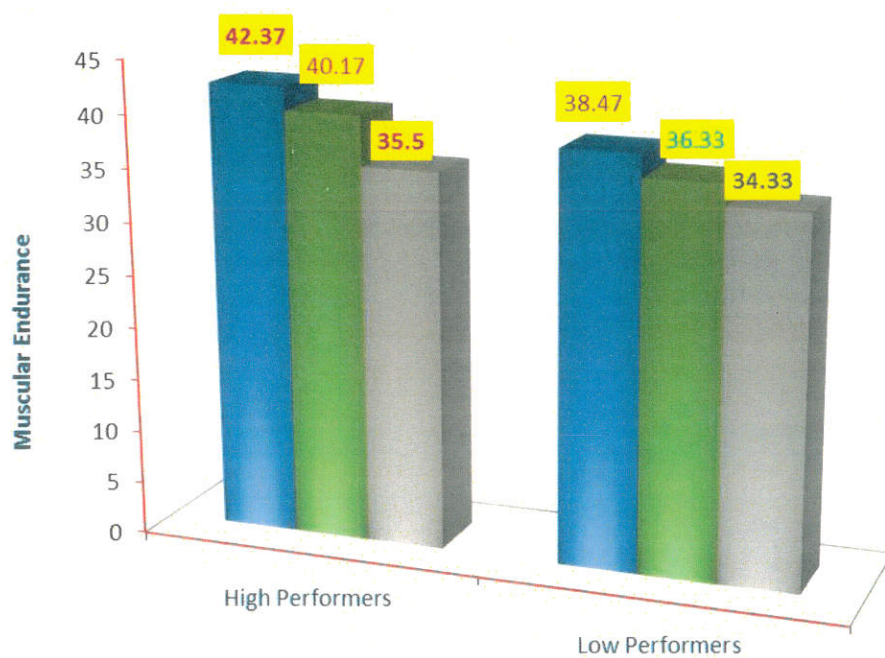
4.1.3 ANALYSIS OF EXPLOSIVE POWER

The mean and standard deviation values on explosive power of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table V.

TABLE V[1]

THE MEAN AND STANDARD DEVIATION VALUES ON EXPLOSIVE POWER OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	44.67	43.17	38.07
	S.D	1.81	1.84	2.89
Low Performers	Mean	40.97	38.73	35.73
	S.D	2.06	1.55	2.52

The Table V shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on explosive power are 44.67, 43.17 and 38.07 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on explosive power are 40.97, 38.73 and 35.73 respectively.

The two way analysis of variance values on explosive power of two levels of performance at their three phases of menstrual cycle have been presented in Table V-A.

TABLE V-A

THE TWO WAY ANALYSIS OF VARIANCE ON EXPLOSIVE POWER FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	547.75	1	547.75	117.46*
B Factor (Phases of Menstrual Cycle)	1097.88	2	548.94	117.72*
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	34.08	2	17.04	3.65*
Error	811.40	174	4.66	

*Significant at .05 level of confidence.
The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table V-A shows that the obtained 'F' ratio value on explosive power 117.46 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was explosive power than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on explosive power.

The obtained 'F' ratio value on explosive power 117.72 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of

the study reveal that significant difference exists among different phases of menstrual cycle irrespective of their levels of performance on explosive power.

The obtained 'F' ratio value on explosive power 3.65 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was a significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on explosive power.

Since, the obtained 'F' ratio for the interaction was found significant, the simple effect test was applied as follow up test and it is presented in Table V-B.

TABLE V-B

THE SIMPLE EFFECT TEST FOR LEVEL OF PERFORMANCE AND

DIFFERENT PHASES OF MENSTRUAL CYCLE ON EXPLOSIVE POWER

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
Level of Performance and Menstrual Phase	205.35	1	205.35	44.04*
Level of Performance and Proliferative Phase	294.82	1	294.82	63.22*
Level of Performance and Secretory Phase	81.67	1	81.67	17.51*
Phases of Menstrual Cycle and High Performers	718.20	2	359.10	77.01*
Phases of Menstrual Cycle and Low Performers	413.75	2	206.88	44.36*
Error	811.40	174	4.66	

*Significant at .05 level of confidence.
The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table V-B shows that the obtained 'F' ratio values on explosive power 44.04, 63.22 and 17.51 for level of performance and menstrual phase, level of performance and proliferative phase and level of performance and secretory phase are greater than the table value of 3.893 with df 2 and 174 required for significant at .05 level of confidence. The results of the study indicates that there was a significant difference

exist between level of performance and menstrual phase, level of performance and proliferative phase and level of performance and secretory phase on explosive power.

Table V -B also reveals that the obtained 'F' ratio value on explosive power 77.01 and 44.36 for phases of menstrual cycle and high performers and phases of menstrual cycle and low performers are greater than the table value 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that there was a significant difference between the phases of menstrual cycle and high performers and phases of menstrual cycle and low performers on explosive power.

Since, three different phases of menstrual cycle were compared, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any and the results of high and low performers are given in Tables V – C and V – D respectively.

TABLE V-C

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON EXPLOSIVE POWER OF HIGH PERFORMERS

Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
44.67	43.17	-	1.50*	1.377
44.67	-	38.07	6.60*	1.377
-	43.17	38.07	5.10*	1.377

* Significant at .05 level of confidence.

The table V-C shows that the mean difference between the high performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 1.50, 6.60 and 5.10 respectively on explosive power are greater than the confidence interval value 1.377 at .05 level of confidence.

The results of the study shows that all the paired means of high performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on explosive power.

TABLE V-D

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON EXPLOSIVE POWER OF LOW PERFORMERS

| Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
40.97	38.73	-	2.23*	1.377
40.97	-	35.73	5.23*	1.377
-	38.73	35.73	3.00*	1.377

* Significant at .05 level of confidence.

The table V-D shows that the mean difference between the low performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 2.23, 5.23 and 3.00 respectively on explosive power are greater than the confidence interval value 1.377 at .05 level of confidence.

The results of the study shows that all the paired means of low performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on explosive power.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on explosive power are graphically represented in Figure 4.

FIGURE 4

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE ON EXPLOSIVE POWER
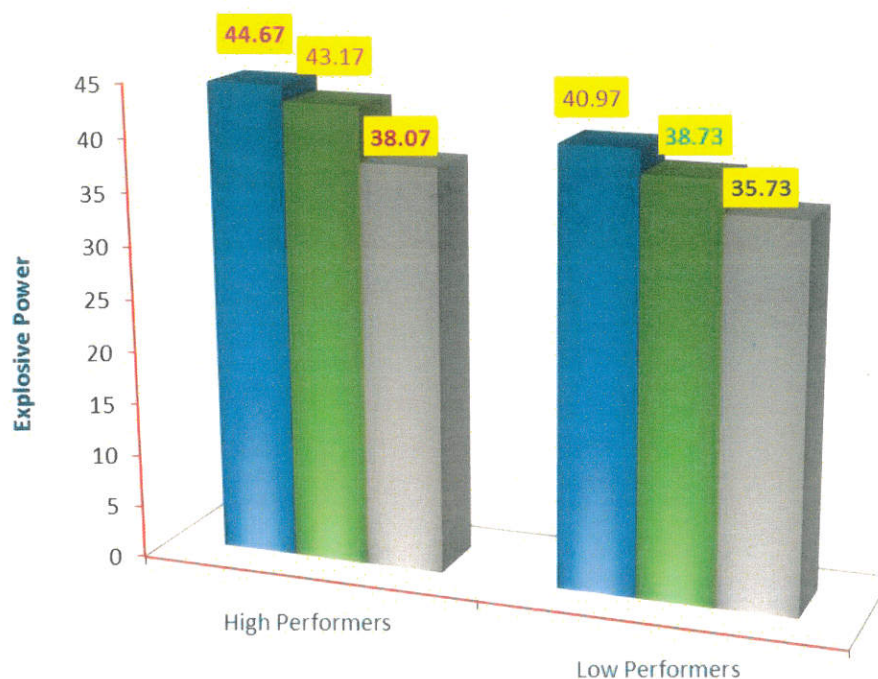
4.1.4 ANALYSIS OF AGILITY

The mean and standard deviation values on agility of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table VI.

TABLE VI

THE MEAN AND STANDARD DEVIATION VALUES ON AGILITY OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	11.31	11.68	12.25
	S.D	0.12	0.21	0.27
Low Performers	Mean	11.92	12.23	12.65
	S.D	0.26	0.26	0.18

The Table VI shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on agility are 11.31, 11.68 and 12.25 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on agility are 11.92, 12.23 and 12.65 respectively.

The two way analysis of variance values on agility of two levels of performance at their three phases of menstrual cycle have been presented in Table VI-A.

TABLE VI-A

THE TWO WAY ANALYSIS OF VARIANCE ON AGILITY FOR WOMEN

KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE

DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	12.11	1	12.11	245.01*
B Factor (Phases of Menstrual Cycle)	20.97	2	12.11	212.10*
AB Factor (interaction)　(Level of Performance x Phases of Menstrual Cycle)	0.35	2	0.18	3.59*
Error	8.60	174	0.05	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table VI-A shows that the obtained 'F' ratio value on agility 245.01 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on agility.

The obtained 'F' ratio value on agility 212.10 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that significant difference exists among different phases of menstrual cycle irrespective of their levels of performance on agility.

The obtained 'F' ratio value on agility 3.59 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was a significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on agility.

Since, the obtained 'F' ratio for the interaction was found significant, the simple effect test was applied as follow up test and it is presented in Table VI-B.

TABLE VI-B

THE SIMPLE EFFECT TEST FOR LEVEL OF PERFORMANCE AND

DIFFERENT PHASES OF MENSTRUAL CYCLE ON AGILITY

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
Level of Performance and Menstrual Phase	5.55	1	5.55	112.18*
Level of Performance and Proliferative Phase	4.55	1	4.55	92.02*
Level of Performance and Secretory Phase	2.37	1	2.37	47.99*
Phases of Menstrual Cycle and High Performers	13.36	2	6.68	135.12*
Phases of Menstrual Cycle and Low Performers	7.96	2	3.98	80.56*
Error	8.60	174	0.05	

*Significant at .05 level of confidence.
The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table VI-B shows that the obtained 'F' ratio values on agility 112.18, 92.02 and 47.99 for level of performance and menstrual phase, level of performance and proliferative phase and level of performance and secretory phase are greater than the table value of 3.893 with df 2 and 174 required for significant at .05 level of confidence. The results of the study indicates that there was a significant difference

exist between level of performance and menstrual phase, level of performance and proliferative phase and level of performance and secretory phase on agility.

Table VI -B also reveals that the obtained 'F' ratio value on agility 135.12 and 80.56 for phases of menstrual cycle and high performers and phases of menstrual cycle and low performers are greater than the table value 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that there was a significant difference between the phases of menstrual cycle and high performers and phases of menstrual cycle and low performers on agility.

Since, three different phases of menstrual cycle were compared, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any and the results of high and low performers are given in Tables VI – C and VI – D respectively.

TABLE VI-C

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON AGILITY OF HIGH PERFORMERS

| Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
11.31	11.68	-	0.366*	0.142
11.31	-	12.25	0.936*	0.142
-	11.68	12.25	0.570*	0.142

* Significant at .05 level of confidence.

The table VI-C shows that the mean difference between the high performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 0.366, 0.936 and 0.570 respectively on agility are greater than the confidence interval value 0.142 at .05 level of confidence.

The results of the study shows that all the paired means of high performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on agility.

TABLE VI-D

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF DIFFERENT MENSTRUAL CYCLE PHASES ON AGILITY OF LOW PERFORMERS

Menstrual Phase	Proliferative Phase	Secretory Phase	Mean Difference	Confidence Interval
11.92	12.23	-	0.309*	0.142
11.92	-	12.65	0.726*	0.142
-	12.23	12.65	0.417*	0.142

* Significant at .05 level of confidence.

The table VI-D shows that the mean difference between the low performers at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases are 0.309, 0.726 and 0.417 respectively on agility are greater than the confidence interval value 0.142 at .05 level of confidence.

The results of the study shows that all the paired means of low performers differ significantly at their menstrual and proliferative phases, menstrual and secretory phases and proliferative and secretory phases on agility.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on agility are graphically represented in Figure 5.

FIGURE 5

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE ON AGILITY
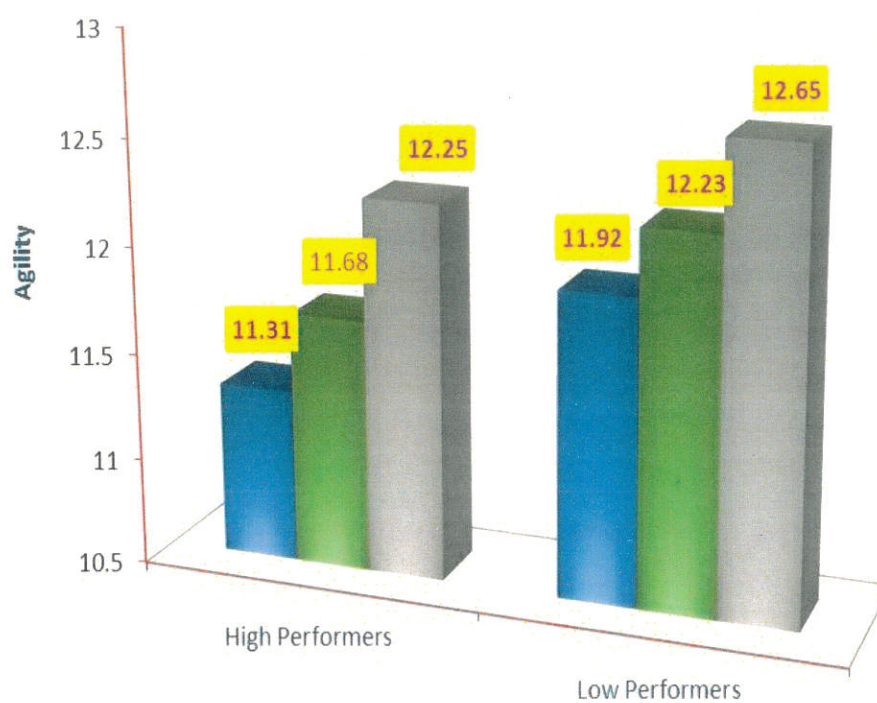
4.1.5 ANALYSIS OF FLEXIBILITY

The mean and standard deviation values on flexibility of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table VII.

TABLE VII

THE MEAN AND STANDARD DEVIATION VALUES ON FLEXIBILITY OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	32.90	32.07	31.10
	S.D	0.92	0.74	0.96
Low Performers	Mean	31.73	31.07	30.07
	S.D	1.11	1.05	0.94

The Table VII shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on flexibility are 32.90, 32.07 and 31.10 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on flexibility are 31.73, 31.07 and 30.07 respectively.

The two way analysis of variance values on flexibility of two levels of performance at their three phases of menstrual cycle have been presented in Table VII-A.

TABLE VII-A

THE TWO WAY ANALYSIS OF VARIANCE ON FLEXIBILITY FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	51.20	1	51.20	55.38*
B Factor (Phases of Menstrual Cycle)	90.68	2	45.34	49.04*
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	0.23	2	0.12	0.126
Error	160.87	174	0.92	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table VII-A shows that the obtained 'F' ratio value on flexibility 55.38 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on flexibility.

The obtained 'F' ratio value on flexibility 49.04 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that significant difference exists among different phases of menstrual cycle irrespective of their levels of performance on flexibility.

The obtained 'F' ratio value on flexibility 0.126 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was lesser than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was no significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on flexibility.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on flexibility are graphically represented in Figure 6.

FIGURE 6

**THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW
PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE
ON FLEXIBILITY**
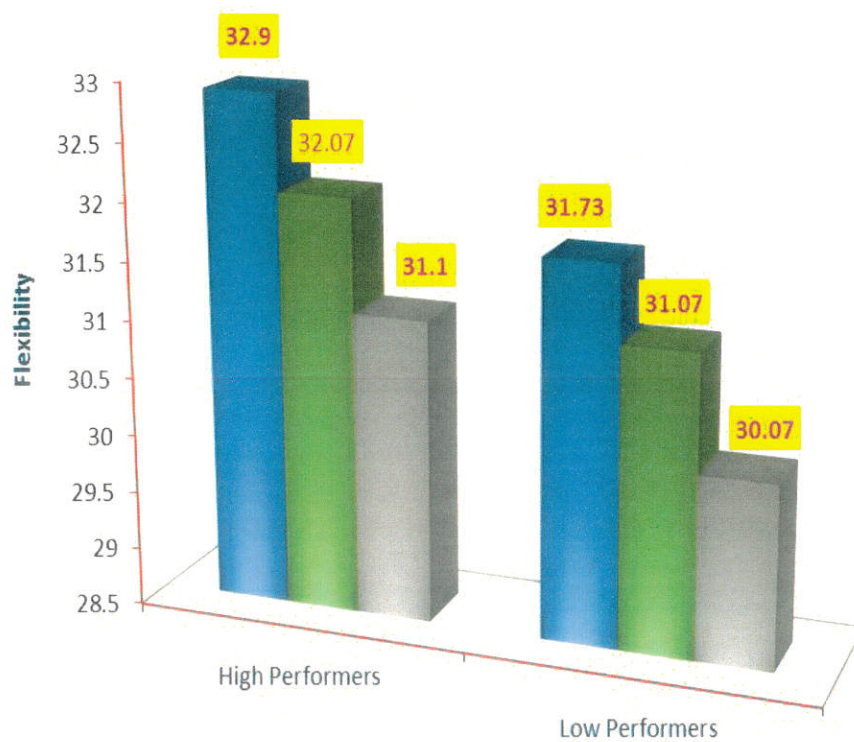
4.1.6 ANALYSIS OF RESTING PULSE RATE

The mean and standard deviation values on resting pulse rate of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table VIII.

TABLE VIII

THE MEAN AND STANDARD DEVIATION VALUES ON RESTING PULSE RATE OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	71.07	71.80	72.07
	S.D	1.01	0.96	1.39
Low Performers	Mean	72.43	72.73	72.93
	S.D	1.30	1.62	1.14

The Table VIII shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on resting pulse rate are 71.07, 71.80 and 72.07 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on resting pulse rate are 72.43, 72.73 and 72.93 respectively.

The two way analysis of variance values on resting pulse rate of two levels of performance at their three phases of menstrual cycle have been presented in Table VIII-A.

TABLE VIII-A

THE TWO WAY ANALYSIS OF VARIANCE ON RESTING PULSE RATE

FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR

THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	50.14	1	50.14	31.65*
B Factor (Phases of Menstrual Cycle)	17.68	2	8.84	5.58*
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	2.21	2	1.11	0.70
Error	275.63	174	1.58	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table VIII-A shows that the obtained 'F' ratio value on resting pulse rate 31.65 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on resting pulse rate.

The obtained 'F' ratio value on resting pulse rate 5.58 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase)

irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveals that significant difference exist among different phases of menstrual cycle irrespective of their levels of performance on resting pulse rate.

The obtained 'F' ratio value on resting pulse rate 0.70 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was lesser than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was no significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on resting pulse rate.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on resting pulse rate are graphically represented in Figure 7.

FIGURE 7

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW

PERFORMERS AT THEIR DIFFERENT PHASES OF

MENSTRUAL CYCLE ON RESTING PULSE RATE
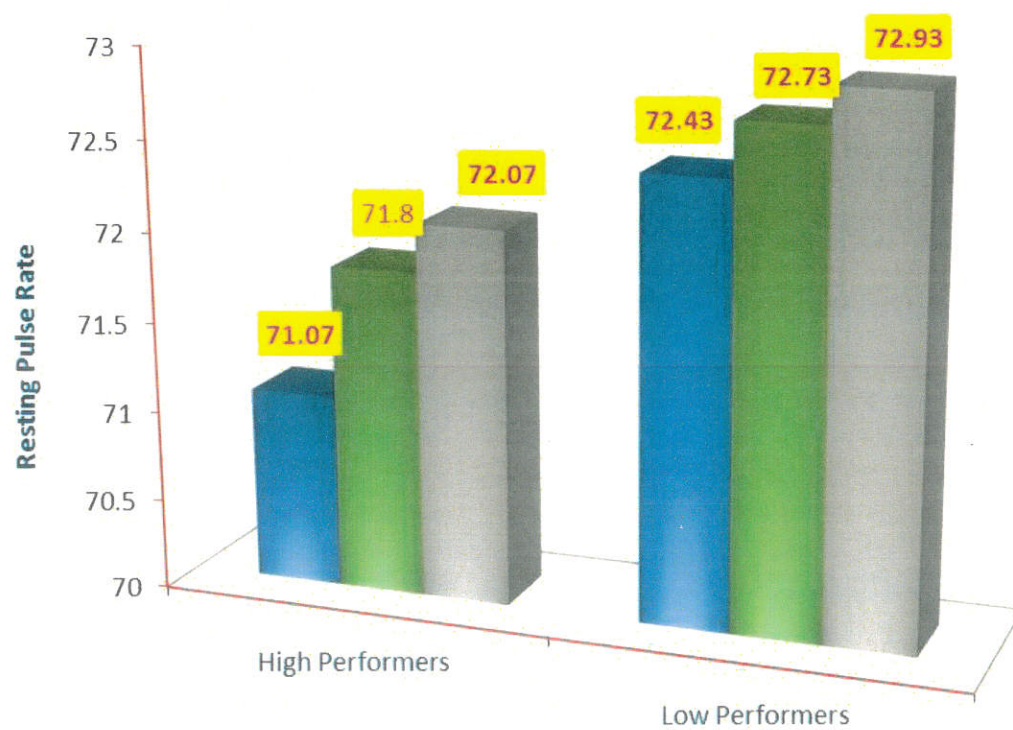
4.1.7 ANALYSIS OF SYSTOLIC BLOOD PRESSURE

The mean and standard deviation values on systolic blood pressure of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table IX.

TABLE IX

THE MEAN AND STANDARD DEVIATION VALUES ON SYSTOLIC BLOOD PRESSURE OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	78.93	79.10	79.57
	S.D	1.39	2.29	1.79
Low Performers	Mean	79.90	80.00	80.73
	S.D	1.09	1.49	1.80

The Table IX shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on systolic blood pressure are 78.93, 79.10 and 79.57 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on systolic blood pressure are 79.90, 80.00 and 80.73 respectively.

The two way analysis of variance values on systolic blood pressure of two levels of performance at their three phases of menstrual cycle have been presented in Table IX-A.

TABLE IX-A

THE TWO WAY ANALYSIS OF VARIANCE ON SYSTOLIC BLOOD

PRESSURE FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT

THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	Df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	46.01	1	46.01	16.19*
B Factor (Phases of Menstrual Cycle)	18.31	2	9.16	3.22*
Ab Factor (Interaction) (Level of Performance X Phases of Menstrual Cycle)	0.58	2	0.29	0.10
Error	494.50	174	2.84	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table IX-A shows that the obtained 'F' ratio value on systolic blood pressure 16.19 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on systolic blood pressure.

The obtained 'F' ratio value on systolic blood pressure 3.22 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was greater than the table value of

3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveals that significant difference exist among different phases of menstrual cycle irrespective of their levels of performance on systolic blood pressure.

The obtained 'F' ratio value on systolic blood pressure 0.10 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was lesser than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was no significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on systolic blood pressure.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on systolic blood pressure are graphically represented in Figure 8.

FIGURE 8

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND

LOW PERFORMERS AT THEIR DIFFERENT PHASES

OF MENSTRUAL CYCLE ON SYSTOLIC
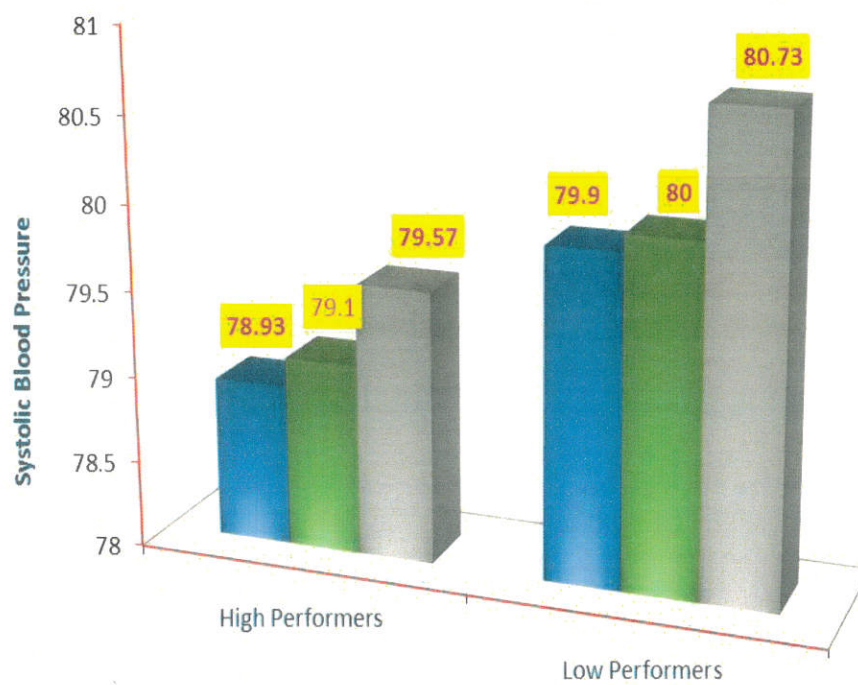
BLOOD PRESSURE

4.1.8 ANALYSIS OF DIASTOLIC BLOOD PRESSURE

The mean and standard deviation values on diastolic blood pressure of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table X.

TABLE X

THE MEAN AND STANDARD DEVIATION VALUES ON DIASTOLIC BLOOD PRESSURE OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	118.90	119.17	119.97
	S.D	1.42	1.09	1.19
Low Performers	Mean	120.53	121.13	121.70
	S.D	1.25	1.53	1.78

The Table X shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on diastolic blood pressure are 118.90, 119.17 and 119.97 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on diastolic blood pressure are 120.53, 121.13 and 121.70 respectively.

The two way analysis of variance values on diastolic blood pressure of two levels of performance at their three phases of menstrual cycle have been presented in Table X-A.

TABLE X-A

THE TWO WAY ANALYSIS OF VARIANCE ON DIASTOLIC BLOOD PRESSURE FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	142.22	1	142.22	72.99*
B Factor (Phases of Menstrual Cycle)	38.02	2	19.02	9.76*
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	0.88	2	0.44	0.23
Error	339.07	174	1.95	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table X-A shows that the obtained 'F' ratio value on diastolic blood pressure 72.99 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on diastolic blood pressure.

The obtained 'F' ratio value on diastolic blood pressure 9.76 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveals that significant difference exist among different phases of menstrual cycle irrespective of their levels of performance on diastolic blood pressure.

The obtained 'F' ratio value on diastolic blood pressure 0.23 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was lesser than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was no significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on diastolic blood pressure.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on diastolic blood pressure are graphically represented in Figure 9.

FIGURE 9

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW

PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

ON DIASTOLIC BLOOD PRESSURE
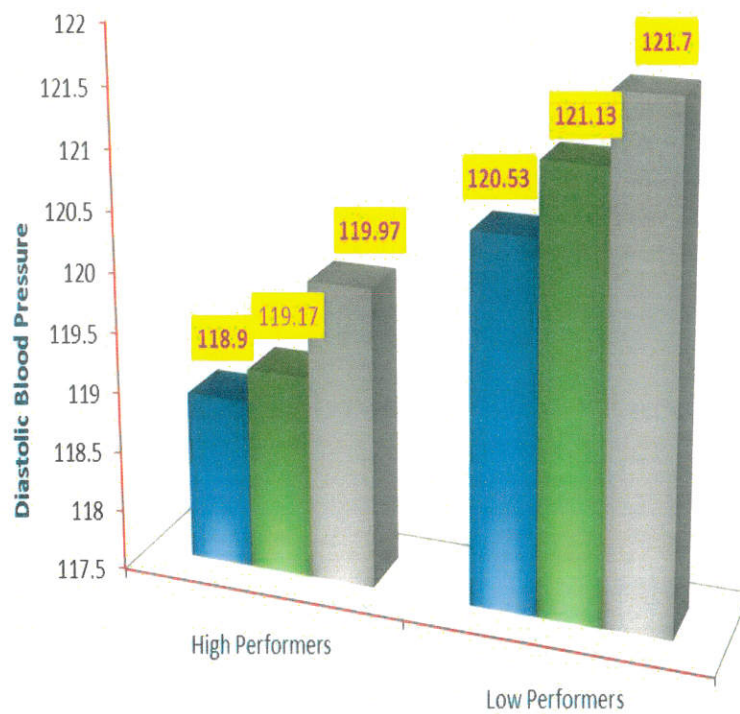
4.1.9 ANALYSIS OF MEAN ARTERIAL PRESSURE

The mean and standard deviation values on mean arterial pressure of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table XI.

TABLE XI

THE MEAN AND STANDARD DEVIATION VALUES ON MEAN ARTERIAL PRESSURE OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	105.58	105.81	106.50
	S.D	1.01	1.12	0.92
Low Performers	Mean	106.99	107.42	108.04
	S.D	0.93	1.19	1.34

The Table XI shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on mean arterial pressure are 105.58, 105.81 and 106.50 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on mean arterial pressure are 106.99, 107.42 and 108.04 respectively.

The two way analysis of variance values on mean arterial pressure of two levels of performance at their three phases of menstrual cycle have been presented in Table XI-A.

TABLE XI-A

THE TWO WAY ANALYSIS OF VARIANCE ON MEAN ARTERIAL

PRESSURE FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS

AT THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	104.27	1	104.27	86.89*
B Factor (Phases of Menstrual Cycle)	30.38	2	15.19	12.66*
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	0.31	2	0.16	0.13
Error	208.34	174	1.20	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 &

174 and 2 & 174 are 3.893 and 3.05 respectively.

Table XI-A shows that the obtained 'F' ratio value on mean arterial pressure

86.89 for factor-A (Level of performance – High and Low performers) irrespective of

their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and

174 required for significance at .05 level of confidence. The results of the study

indicate that there was a significant difference between women Kho-Kho high and

low performers irrespective of their different phases of menstrual cycle on mean

arterial pressure.

The obtained 'F' ratio value on mean arterial pressure 12.66 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveals that significant difference exist among different phases of menstrual cycle irrespective of their levels of performance on mean arterial pressure.

The obtained 'F' ratio value on mean arterial pressure 0.13 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was lesser than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was no significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on mean arterial pressure.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on mean arterial pressure are graphically represented in Figure 10.

FIGURE 10

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE ON MEAN ARTERIAL PRESSURE
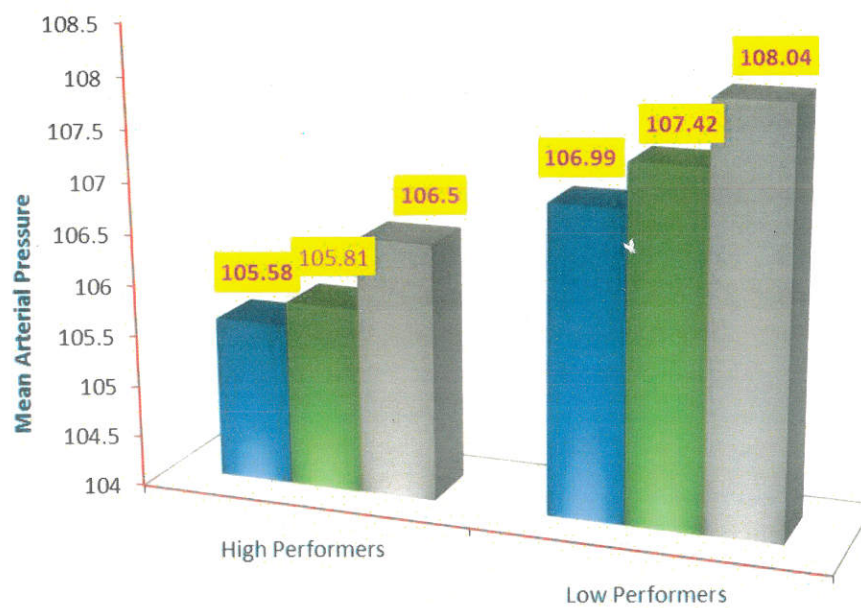
4.1.10 ANALYSIS OF RESPIRATORY RATE

The mean and standard deviation values on respiratory rate of women Kho-Kho high and low performers at their different phases of menstrual cycle have been analyzed and presented in Table XII.

TABLE XII

THE MEAN AND STANDARD DEVIATION VALUES ON RESPIRATORY RATE OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE

Groups		Menstrual Phase	Proliferative Phase	Secretory Phase
High Performers	Mean	14.13	14.17	14.23
	S.D	0.97	0.83	0.90
Low Performers	Mean	15.27	15.33	15.47
	S.D	1.76	1.56	1.53

The Table XII shows that the mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho high performers on respiratory rate are 14.13, 14.17 and 14.23 respectively. The mean values at menstrual phase, proliferative phase and secretory phase of women Kho-Kho low performers on respiratory rate are 15.27, 15.33 and 15.47 respectively.

The two way analysis of variance values on respiratory rate of two levels of performance at their three phases of menstrual cycle have been presented in Table XII-A.

TABLE XII-A

THE TWO WAY ANALYSIS OF VARIANCE ON RESPIRATORY RATE FOR WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR THREE DIFFERENT PHASES OF MENSTRUAL CYCLE

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" Ratio
A Factor (Level of Performance)	62.42	1	62.42	36.33*
B Factor (Phases of Menstrual Cycle)	0.70	2	0.35	0.20
AB Factor (interaction) (Level of Performance x Phases of Menstrual Cycle)	0.08	2	0.04	0.02
Error	299	174	1.72	

*Significant at .05 level of confidence.

The table value required for significance at .05 level of confidence with df 1 & 174 and 2 & 174 are 3.893 and 3.05 respectively.

Table XII-A shows that the obtained 'F' ratio value on respiratory rate 36.33 for factor-A (Level of performance – High and Low performers) irrespective of their phases of menstrual cycle was greater than the table value of 3.893 with df 1 and 174 required for significance at .05 level of confidence. The results of the study indicate that there was a significant difference between women Kho-Kho high and low performers irrespective of their different phases of menstrual cycle on respiratory rate.

The obtained 'F' ratio value on respiratory rate 0.20 for factor-B (Phases of Menstrual Cycle – Menstrual Phase, Proliferative Phase and Secretory Phase) irrespective of their levels of performance was lesser than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study reveal that no significant difference exists among different phases of menstrual cycle irrespective of their levels of performance on respiratory rate.

The obtained 'F' ratio value on respiratory rate 0.02 for interaction [AB factor - (Level of Performance x Phases of Menstrual Cycle)] was greater than the table value of 3.05 with df 2 and 174 required for significance at .05 level of confidence. The results of the study shows that there was no significant difference among women Kho-Kho high and low performers at their different phases of menstrual cycle namely menstrual phase, proliferative phase and secretory phase on respiratory rate.

The mean values of women Kho-Kho high and low performers at their different phases of menstrual cycle on respiratory rate are graphically represented in Figure 11.

FIGURE 11

THE MEAN VALUES OF WOMEN KHO-KHO HIGH AND LOW PERFORMERS AT THEIR DIFFERENT PHASES OF MENSTRUAL CYCLE ON RESPIRATORY RATE
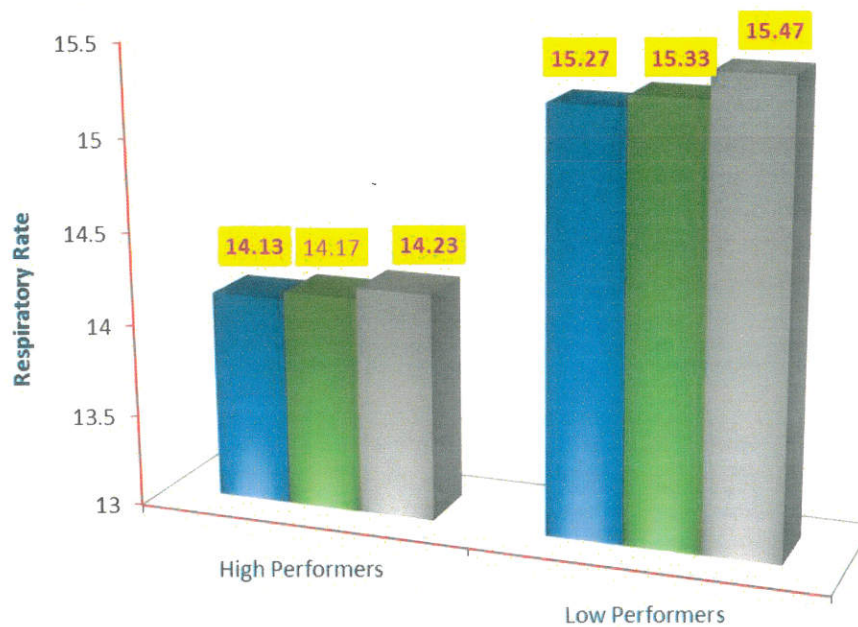
4.2 RESULTS OF THE STUDY

4.2.1 MOTOR ABILITY COMPONENTS

(Speed, Muscular Endurance, Explosive Power, Agility and Flexibility)

There was a significant difference on selected motor ability components such as speed, muscular endurance, explosive power, agility and flexibility between high and low performers of women kho – kho players irrespective of their different menstrual cycle phases. There was a significant difference on selected motor ability components such as speed, muscular endurance, explosive power, agility and flexibility among different menstrual cycle phases of women kho – kho players irrespective of their performance level. There was a significant difference between high and low performers of kho – kho players in their different menstrual cycle phases on selected motor ability components such as speed, muscular endurance, explosive power, agility. There was no significant difference between high and low performers of kho – kho players in their different menstrual cycle phases on flexibility.

4.2.2 PHYSIOLOGICAL VARIABLES

(Resting Pulse Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure and Resting Respiratory Rate)

There was a significant difference on selected physiological variables such as resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate between high and low performers of women kho – kho players irrespective of their different menstrual cycle phases. There was a significant difference on selected physiological variables such as resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate among different menstrual cycle phases of women kho – kho players

irrespective of their performance level. There was no significant difference on resting respiratory rate among different menstrual cycle phases of women kho – kho players irrespective of their performance level. There was no significant difference between high and low performers of kho – kho players in their different menstrual cycle phases on selected physiological variables such as resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate.

4.3 DISCUSSIONS ON FINDINGS

Hansen.M (2013) and others conducted a study on impact of oral contraceptive use and menstrual phases on patellar tendon morphology, biochemical composition, and biomechanical properties in female athletes. The results indicate that long-term OC use or menstrual phases does not influence structure or mechanical properties of the patellar tendon in female team handball athletes.

Girija B and Veeraiah S (2011) studied the effect of different phases of menstrual cycle on physical working capacity in Indian population. The study of effects of phases of menstrual cycle on physical working capacity was undertaken in 40 female students of Bangalore Medical College. The subjects were instructed to come to the lab during each of three different phases of menstrual cycle. Resting heart rate (HR), respiratory rate (RR), BP were recorded. Subjects were made to exercise on Bicycle Ergometer and their maximum aerobic capacity was assessed as PWC170 (Physical working capacity at the heart rate 170). It can be concluded that resting HR and RR are increased during the luteal phase. Also PWC170 is decreased during the luteal and menstrual phases, this can have an adverse effect on the physical work output of females during these two phases.

Lebrun CM (1995) and others made a research to find out the effects of menstrual cycle phase on athletic performance. The results suggest that the cyclic increases in endogenous female steroid hormones of an ovulatory menstrual cycle may have a slight, deleterious influence on aerobic capacity, with potential implications for individual athletes. Nevertheless, the cycle phase did not impact significantly on the majority of the other performance tests and cardiorespiratory variables measured in this study.

Manhem K and Jern S. (1994) made an attempt to evaluate the influence of daily-life activation on pulse rate and blood pressure changes during the menstrual cycle. In the present study we find evidence of an altered response in haemodynamic recordings to environmental stress during the menstrual cycle. This interpretation is supported by previous findings of increased responses to experimental stress and extends these observations to naturally occurring stress in daily-life.

Lebrun CM (1993) designed a study to find out the effect of the different phases of the menstrual cycle and oral contraceptives on athletic performance. Many of the women studied associated premenstrual symptoms, such as fluid retention, weight gain, mood changes, and dysmenorrhoea with performance decrement. Such factors have also been causally linked with an increase in traumatic musculoskeletal injuries during the premenstrual and menstrual period.

De-Souza and Others (1990) made an effort to investigate the effects of menstrual phase and amenorrhea on exercise performance in runners. They conclude that neither menstrual phase (follicular Vs luteal) nor menstrual status (eumenorrheic Vs amenorrheic) alters or limits exercise performance in female athletes.

Choi and Salmon (1995) conducted a study on symptom changes across the menstrual cycle in competitive sports women, exercises and sedentary women. The

women were 35 competitive sports women, two groups of exercisers (33 high exercisers and 36 low exercisers) and 39 sedentary women. Principal component analysis of their responses to a mood and physical symptom checklist revealed five dimensions: positive affect, negative affect, physical symptoms, fatigue and irritability. Component based subscale scores were calculated for all dimensions. In general mood and symptoms were worse menstrually and premenstrually than mid cycle. The high exercisers experienced the greater positive affect and sedentary women the least. The high exercisers also reported the least negative affect. The difference between exercise groups and others were greatest during the premenstrual and menstrual phases. These results are consistent with the belief that women who frequently exercise may be to some extent protected from deterioration of mood before and during menstruation. This, however, is not the case for competitive sports women.where the results of the above mentioned research studies were correlated with the results of the present research.

4.4 DISCUSSIONS ON HYPOTHESES

During the initial stage of the study, the researcher had formulated three hypotheses,

In first, it was hypothesized that there would be significant difference on selected motor ability components and physiological variables between high and low performers of women kho – kho players irrespective of their different menstrual cycle phases. The results of the study showed that there was a significant difference on selected motor ability components such as speed, muscular endurance, explosive power, agility and flexibility between high and low performers of women kho – kho players irrespective of their different menstrual cycle phases. And there was a

significant difference on selected physiological variables such as resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate between high and low performers of women kho – kho players irrespective of their different menstrual cycle phases. Hence, the researcher's hypothesis was accepted.

The second hypothesis was that there would be significant difference on selected motor ability components and physiological variables among different menstrual cycle phases of women kho – kho players irrespective of their performance level. The results of the study showed that there was a significant difference on selected motor ability components such as speed, muscular endurance, explosive power, agility and flexibility among different menstrual cycle phases of women kho – kho players irrespective of their performance level. And there was a significant difference on selected physiological variables such as resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate among different menstrual cycle phases of women kho – kho players irrespective of their performance level. Further, it was resulted that there was no significant difference on resting respiratory rate among different menstrual cycle phases of women kho – kho players irrespective of their performance level. Hence, the researcher's second hypothesis was partially accepted.

In third, it was hypothesized that there would be significant difference between high and low performers of kho – kho players in their different menstrual cycle phases on selected motor ability components and physiological variables. The results of the study showed that there was a significant difference between high and

low performers of kho – kho players in their different menstrual cycle phases on selected motor ability components such as speed, muscular endurance, explosive power, agility. And no significant difference between high and low performers of kho – kho players in their different menstrual cycle phases on flexibility.

Further, it was resulted that there was no significant difference between high and low performers of kho – kho players in their different menstrual cycle phases on selected physiological variables such as resting pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and resting respiratory rate. Hence, the researcher's third hypothesis was also partially accepted.