Chapter – IV

RESULTS AND DISCUSSIONS

The results of the study have been discussed in this chapter. This study was designed to find out the effect of high intensity plyometric training, anaerobic training and cross training on selected motor fitness, physiological and skill variables of volleyball players. For this study, one hundred (N=100) men volleyball players who have participated in state and inter-collegiate volleyball tournament during the year 2012-2013 were selected as subjects from Madurai, Tamil nadu . They were randomly assigned into four groups of twenty five each (n=25). The experimental group-I underwent high intensity plyometric training, experimental group-II underwent anaerobic training, experimental group-III underwent cross training and the group IV acted as control. The experimental; groups underwent their respective training for twelve weeks at the rate of three days a week. The dependent variables selected for this study were agility, speed, explosive power, flexibility, co-ordination, resting pulse rate, respiratory rate,VO_2 max, breath holding time, anaerobic power, set, attack, block, pass and serve. All the subjects were tested prior to and immediately after the experimental period on the selected dependent variables.

The data obtained from the experimental groups before and after the experimental period were statistically analyzed with dependent 't'-test and Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post-test means was found to be significant, the Scheffe's test was applied as post-hoc test to determine the paired mean differences. The level of confidence was fixed at 0.05 level for all the cases.

4.1 ANALYSIS OF THE DATA

The influence of independent variables on each criterion variables has been analyzed and presented below.

Agility

The analysis of dependent 't'-test on the data obtained for agility of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table VII.

TABLE – VII

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON AGILITY OF EXPERIMENTALGROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	10.59	10.68	10.61	10.58
Post-test mean	10.26	10.20	9.90	10.59
't'-test	3.73*	6.00*	7.68*	0.03

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-VII showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 3.73, 6.00, 7.68 and 0.03 respectively. Since the obtained't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of agility.

The Analysis of covariance (ANCOVA) on agility of experimental groups has been presented in Table -VIII.

TABLE – VIII

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON AGILITY

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
	AnaerobicTraining Group-(II)	CrossTraining Group-(III)	ControlGroup-(IV)					
10.27	10.16	9.90	10.61	Between With in	6.35 6.81	3 95	2.12 0.07	29.51*

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-VIII the adjusted post test mean values of agility for high intensity plyometric training group, anaerobic training group, cross training group and control group was 10.27, 10.16, 9.90 and 10.61 respectively. The obtained F-ratio of 29.51 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicated that there was significant differences among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on agility.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table IX.

TABLE – IX

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON AGILITY

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
10.27	10.16	--	--	0.11*	0.10
10.27	--	9.90	--	0.39*	0.10
10.27	--	--	10.61	0.34*	0.10
--	10.16	9.90	--	0.26*	0.10
--	10.16	--	10.61	0.45*	0.10
--	--	9.90	10.61	0.71*	0.10

**** Significant at 0.05 level of confidence***

Table-IX showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were0.11, 0.39, 0.34, 0.26, 0.42 and 0.71 respectively and they were greater than the confidence interval value 0.10, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on agility between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on agility was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving agility.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on agility were graphically represented in the Figure -II.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on agility were graphically represented in the Figure -III.

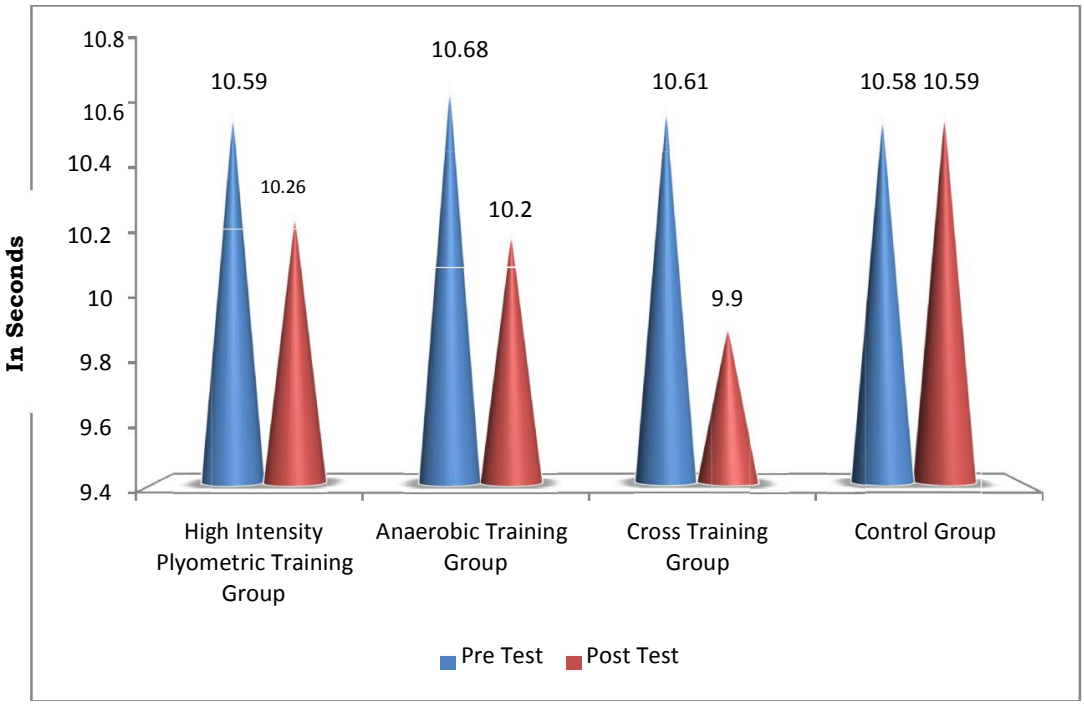

FIGURE-II: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON AGILITY

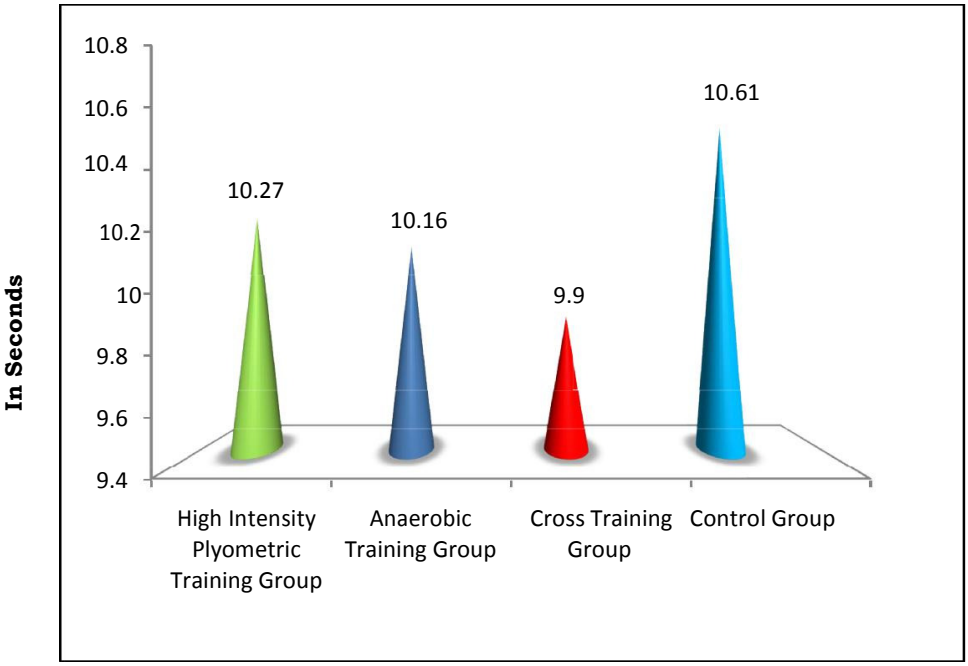

FIGURE-III: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON AGILITY

Speed

The analysis of dependent 't'-test on the data obtained for speed of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table X.

TABLE – X

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON SPEED OF EXPERIMENTALGROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	7.70	7.69	7.69	7.69
Post-test mean	7.37	6.98	6.84	7.68
't'-test	5.76*	11.85*	16.66*	0.21

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-X showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 5.76, 11.85, 16.66 and 0.21 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of speed.

The Analysis of covariance (ANCOVA) on speed of experimental groups has been presented in Table -XI.

TABLE – XI

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON SPEED

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
7.37	6.99	6.84	7.68	Between	10.80	3	3.60	84.38*
				With in	4.05	95	0.04	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XI the adjusted post test mean value of speed for high intensity plyometric training group, anaerobic training group, cross training group and control group was 7.37, 6.99, 6.84 and 7.68 respectively. The obtained F-ratio of 84.38 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicated that there was significant differences among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on speed.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XII.

TABLE – XII

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON SPEED

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
7.37	6.99	--	--	0.38*	0.08
7.37	--	6.84	--	0.53*	0.08
7.37	--	--	7.68	0.31*	0.08
--	6.99	6.84	--	0.15*	0.08
--	6.99	--	7.68	0.69*	0.08
--	--	6.84	7.68	0.84*	0.08

**** Significant at 0.05 level of confidence***

Table-XII showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 0.38, 0.53, 0.31, 0.15, 0.69 and 0.84 respectively and they were greater than the confidence interval value 0.08, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on speed between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on speed was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving speed.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on speed were graphically represented in the Figure -IV.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on speed were graphically represented in the Figure -V.

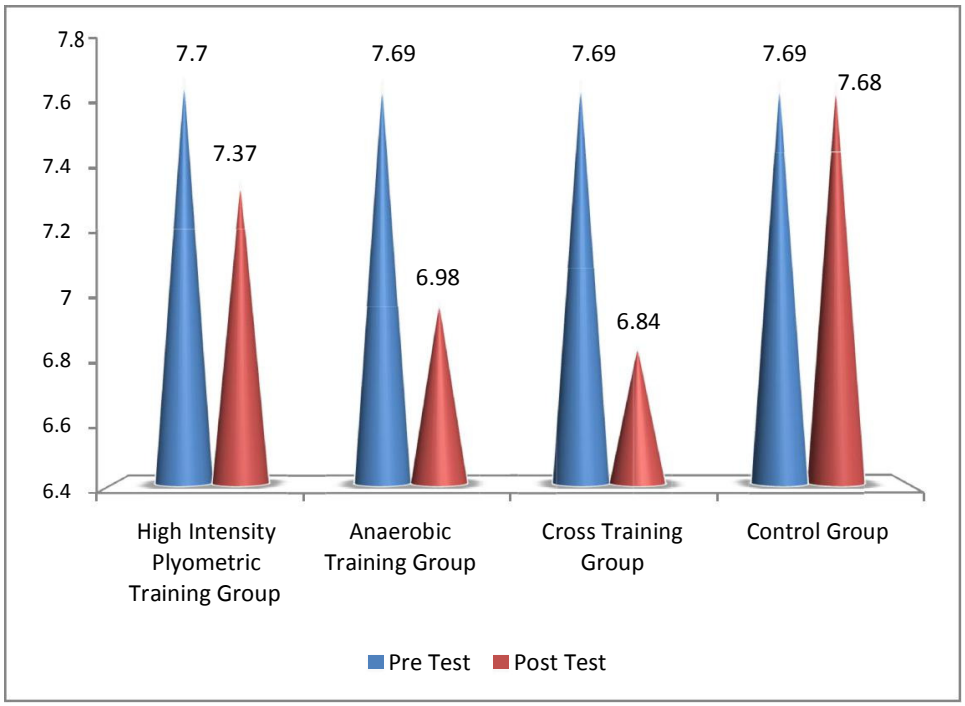

FIGURE-IV: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SPEED

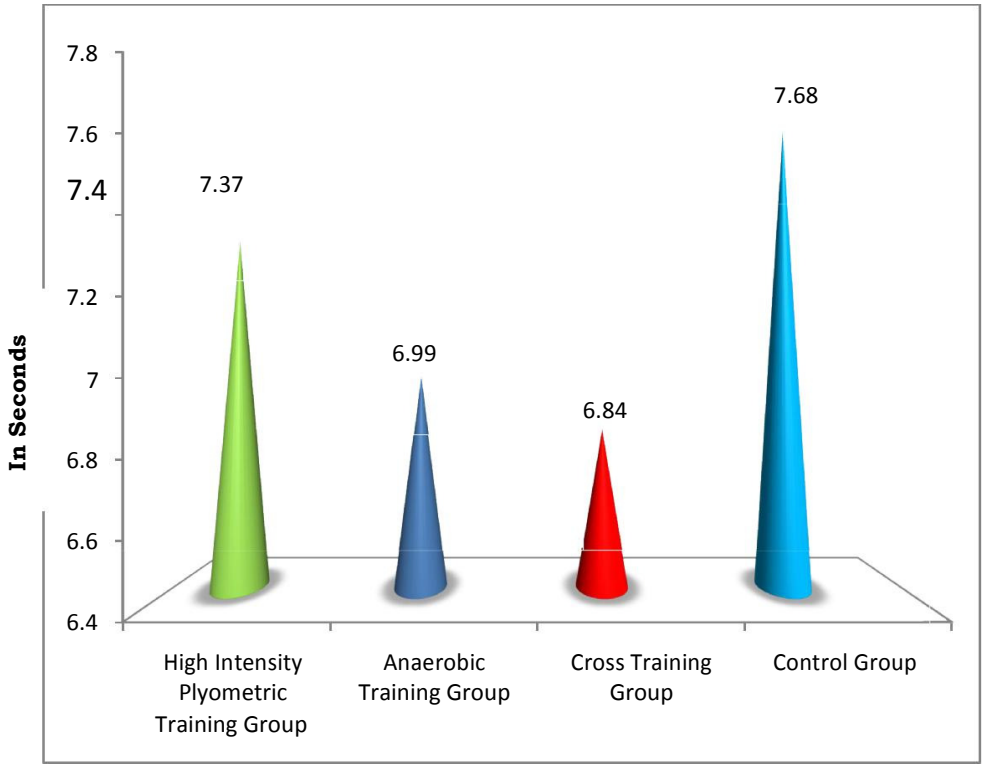

FIGURE-V: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SPEED

Explosive Power

The analysis of dependent 't'-test on the data obtained for explosive power of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XIII.

TABLE – XIII

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON EXPLOSIVE POWER OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	1.90	1.88	1.89	1.89
Post-test mean	2.15	2.14	2.20	1.90
't'-test	17.19*	16.63*	24.93*	0.80

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XIII showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 17.19, 16.63, 24.93 and 0.80 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and

cross training group has registered significant improvement on the performance of explosive power.

The Analysis of covariance (ANCOVA) on explosive power of experimental groups has been presented in Table -XIV.

TABLE – XIV

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON EXPLOSIVE POWER

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
High intensity Plyometric training Group-I	Anaerobic Training Group-(II)	Cross Training Group-(III)	Control Group-(IV)					
2.16	2.14	2.20	1.90	Between	1.37	3	0.46	187.55*
				With in	0.23	95	0.002	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XIV that the adjusted post test mean value of explosive power for high intensity plyometric training group, anaerobic training group, cross training group and control group was 2.16, 2.14, 2.20 and 1.90 respectively. The obtained F-ratio of 187.55 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was significant differences among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on explosive power.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XV.

TABLE – XV

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON EXPLOSIVE POWER

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
2.16	2.14	--	--	0.02*	0.02
2.15	--	2.20	--	0.05*	0.02
2.15	--	--	1.90	0.25*	0.02
--	2.14	2.20	--	0.06*	0.02
--	2.14	--	1.90	0.24*	0.02
--	--	2.20	1.90	0.30*	0.02

**** Significant at 0.05 level of confidence***

Table-XV showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group,

anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 20.02, 0.05, 0.25, 0.06, 0.24 and 0.30 respectively and they were greater than the confidence interval value 0.02, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on explosive power between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on explosive power was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving explosive power.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on explosive power were graphically represented in the Figure -VI.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on explosive power were graphically represented in the Figure -VII.

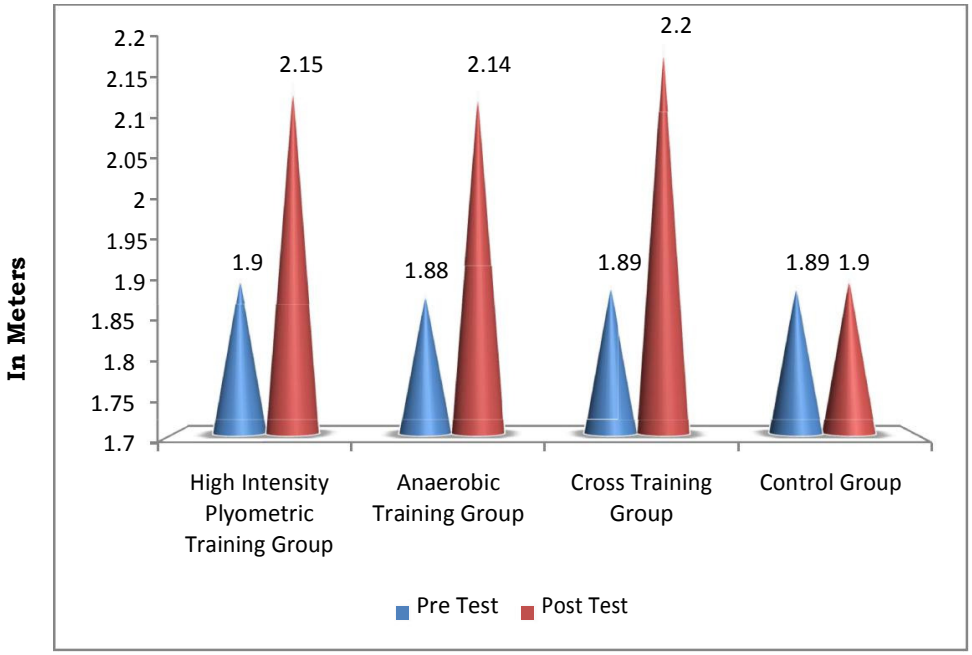

FIGURE-VI: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON EXPLOSIVE POWER

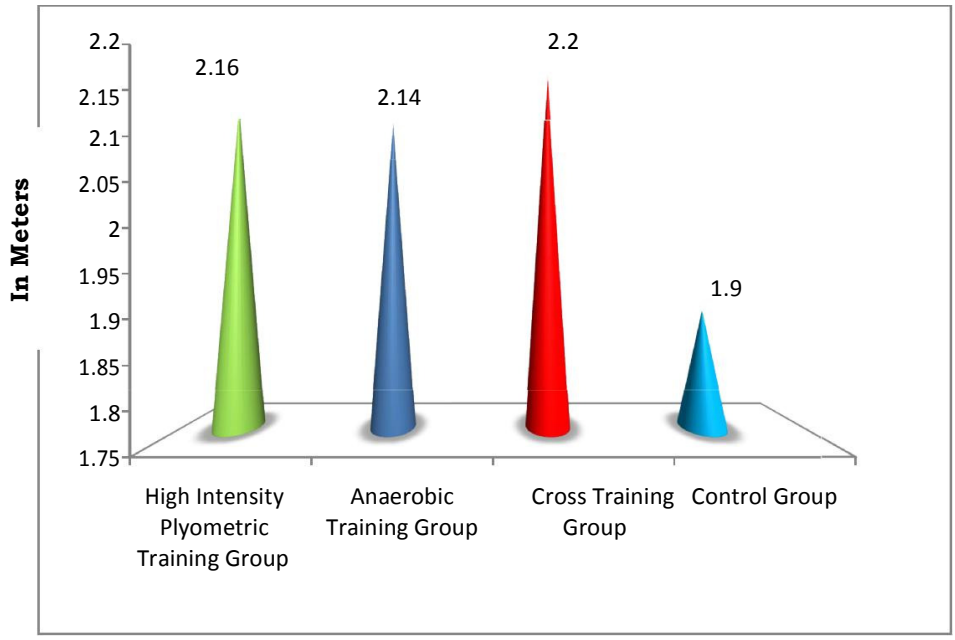

FIGURE-VII: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON EXPLOSIVE POWER

Flexibility

The analysis of dependent 't'-test on the data obtained for flexibility of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XVI.

TABLE – XVI

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON FLEXIBILITY OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	18.04	18.12	17.80	18.12
Post-test mean	21.72	21.40	23.50	18.20
't'-test	3.68*	5.27*	9.55*	0.13

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XVI showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 3.68, 5.27, 9.55 and 0.13 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of flexibility.

The Analysis of covariance (ANCOVA) on flexibility of experimental groups has been presented in Table -XVII.

TABLE – XVII

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON FLEXIBILITY

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)					
21.70	21.30	23.78	18.10	Between With in	411.3874 .79	39 5	137.130. 79	174.18*

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XVII the adjusted post test mean value of flexibility for high intensity plyometric training group, anaerobic training group, cross training group and control group was 21.70, 21.30, 23.78 and 18.10 respectively. The obtained F-ratio of 174.18 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on flexibility.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XVIII.

TABLE – XVIII

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON FLEXIBILITY

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
21.70	21.30	--	--	0.40*	0.33
21.70	--	23.78	--	2.08*	0.33
21.70	--	--	18.10	3.60*	0.33
--	21.30	23.78	--	2.48*	0.33
--	21.30	--	18.10	3.20*	0.33
--	--	23.78	18.10	5.68*	0.33

**** Significant at 0.05 level of confidence***

Table-XVIII showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 0.40, 2.08, 3.60, 2.48, 3.20 and 5.68 respectively and they were

greater than the confidence interval value 0.33, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on flexibility between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on flexibility was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving flexibility.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on flexibility were graphically represented in the Figure -VIII.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on flexibility were graphically represented in the Figure - IX.

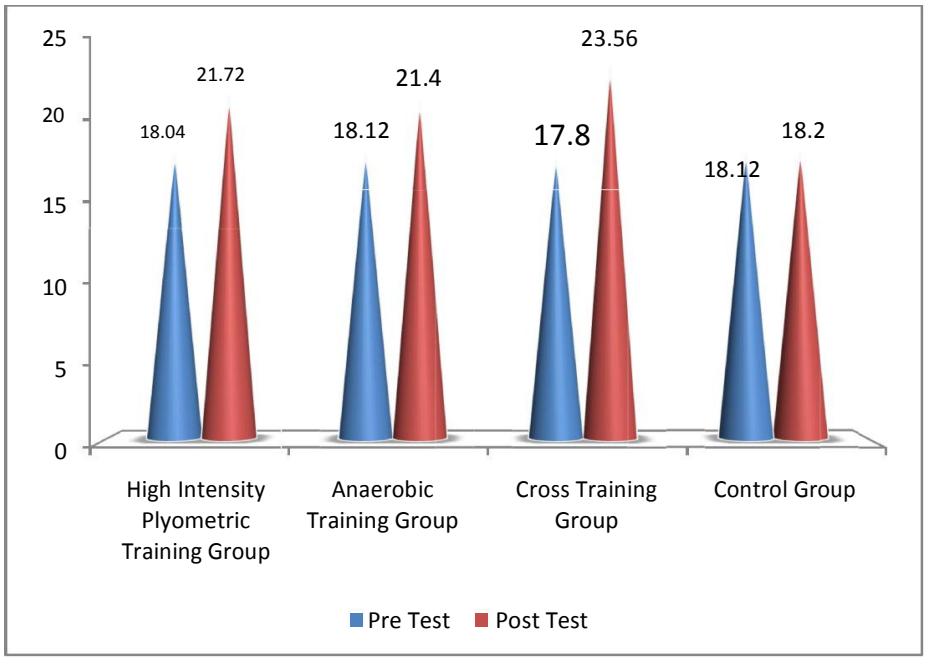

FIGURE-VIII: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON FLEXIBILITY

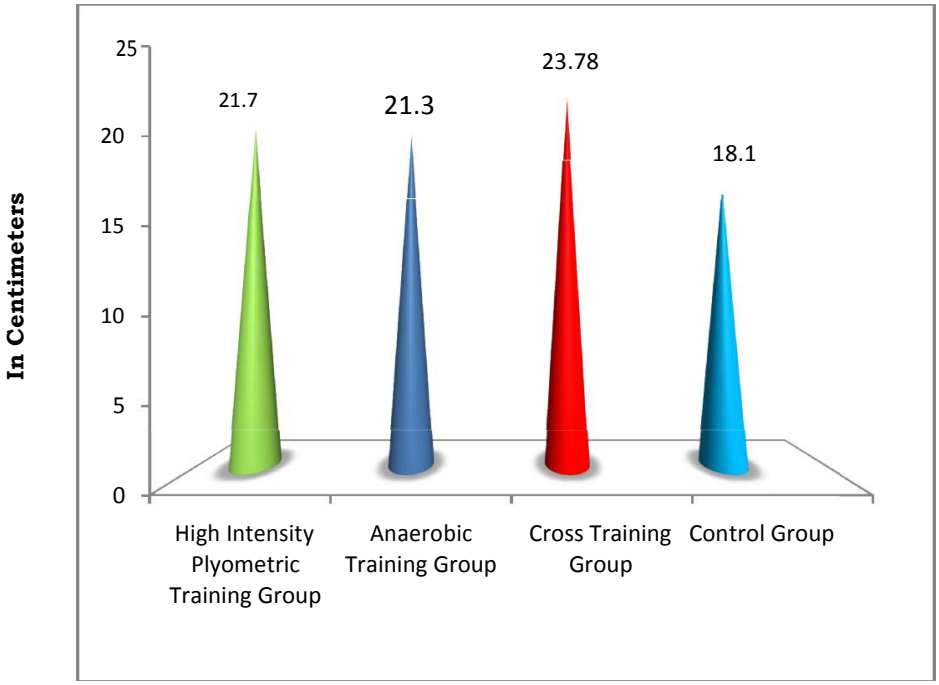

FIGURE-IX:THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON FLEXIBILITY

Co-ordination

The analysis of dependent 't'-test on the data obtained for co-ordination of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XIX.

TABLE – XIX

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON CO-ORDINATION OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	2.11	2.09	2.21	2.20
Post-test mean	1.86	1.89	1.78	2.21
't'-test	7.10*	5.39*	12.15*	0.09

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XIX showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 7.10, 5.39, 12.15 and 0.09 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of co-ordination.

The Analysis of covariance (ANCOVA) on co-ordination of experimental groups has been presented in Table -XX.

TABLE – XX

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON CO-ORDINATION

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
				Between	2.47	3	0.82	
1.88	1.93	1.74	2.18					174.86*
				With in	0.45	95	0.005	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XX the adjusted post test mean value of co-ordination for high intensity plyometric training group, anaerobic training group, cross training group and control group was 1.88, 1.93, 1.74 and 2.18 respectively. The obtained F-ratio of 174.86 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on co-ordination.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXI.

TABLE – XXI

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON CO-ORDINATION

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
1.88	1.93	--	--	0.05*	0.03
1.88	--	1.74	--	0.14*	0.03
1.88	--	--	2.18	0.30*	0.03
--	1.93	1.74	--	0.19*	0.03
--	1.93	--	2.18	0.25*	0.03
--	--	1.74	2.18	0.44*	0.03

**** Significant at 0.05 level of confidence***

Table-XXI showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 0.05, 0.14, 0.30, 0.19, 0.25 and 0.44 respectively and they were greater than the confidence interval value 0.03, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on co-ordination between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on co-ordination was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving co-ordination.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on co-ordination were graphically represented in the Figure -X.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on co-ordination were graphically represented in the Figure -XI.

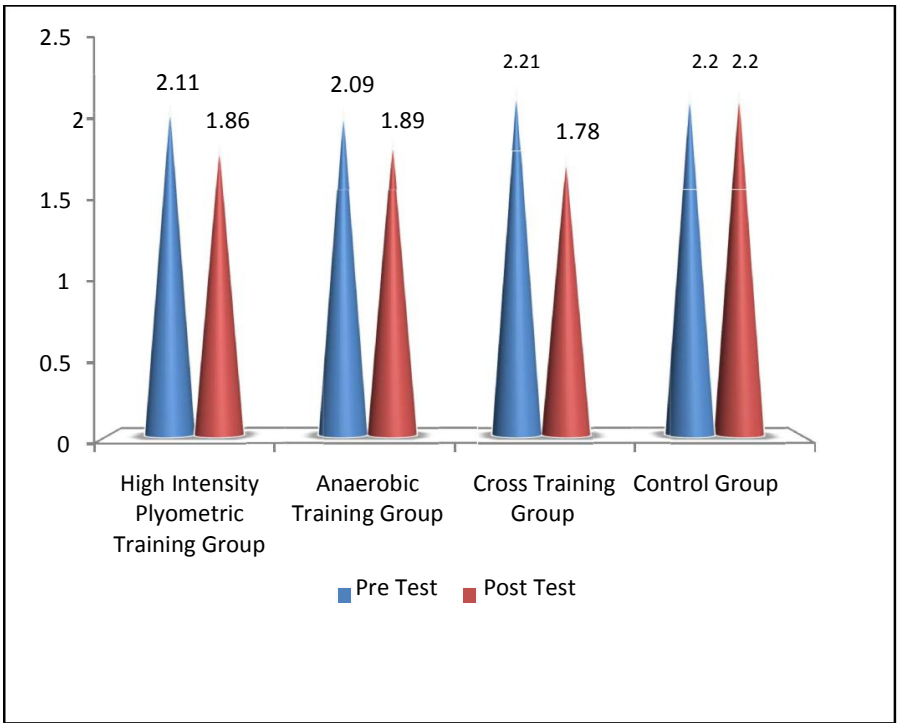

FIGURE-X: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON CO-ORDINATION

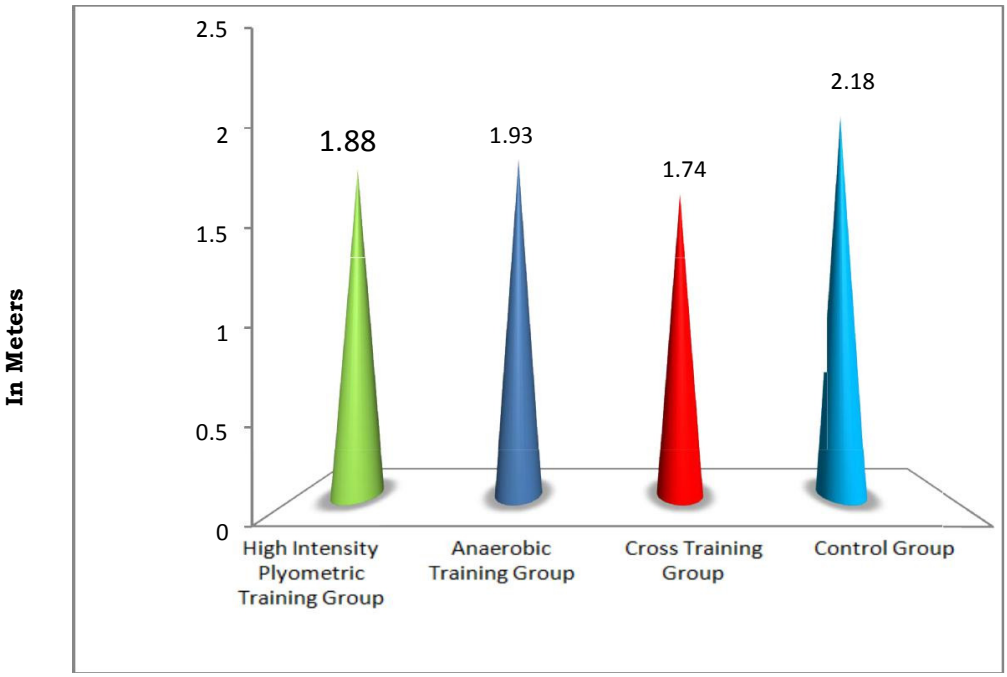

FIGURE-XI: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPSAND CONTROL GROUP ON CO-ORDINATION

Resting Pulse Rate

The analysis of dependent 't'-test on the data obtained for resting pulse rate of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XXII.

TABLE – XXII

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON RESTING PULSE RATE OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	74.32	74.44	74.36	72.08
Post-test mean	72.36	72.48	72.00	72.20
't'-test	4.19*	4.20*	6.82*	0.32

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XXII showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 4.19, 4.20, 6.82 and 0.32 respectively. Since the obtained t'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of resting pulse rate.

The Analysis of covariance (ANCOVA) on resting pulse rate of experimental groups has been presented in Table -XXIII.

TABLE – XXIII

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON RESTING PULSE RATE

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
High intensity Plyometric training group (I)	Anaerobic Training Group (II)	Cross Training Group (III)	Control Group (IV)					
71.90	71.91	71.50	73.74	Between	52.97	3	17.66	94.40*
				With in	17.77	95	0.19	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XXIII the adjusted post test mean value of resting pulse rate for high intensity plyometric training group, anaerobic training group, cross training group and control group was 71.90, 71.91, 71.50 and 73.74 respectively. The obtained F-ratio of 94.40 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on resting pulse rate.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXIV.

TABLE – XXIV

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON RESTING PULSE RATE

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
71.90	71.91	--	--	0.01	0.16
71.90	--	71.50	--	0.40*	0.16
71.90	--	--	73.74	1.84*	0.16
--	71.91	71.50	--	0.41*	0.16
--	71.91	--	73.74	1.83*	0.16
--	--	71.50	73.74	1.90*	0.16

**** Significant at 0.05 level of confidence***

Table-XXIV showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 0.40, 1.84, 0.41, 1.83 and 1.90 respectively and they were greater than the confidence interval value 0.16, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric training group and anaerobic training group was 0.01, it is lesser than

the confidence interval value 0.16, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on resting pulse rate between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. Further the results showed between high intensity plyometric training group and anaerobic training group was insignificant difference.

However, the improvement on resting pulse rate was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving resting pulse rate.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on resting pulse rate were graphically represented in the Figure -XII.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on resting pulse rate were graphically represented in the Figure -XIII.

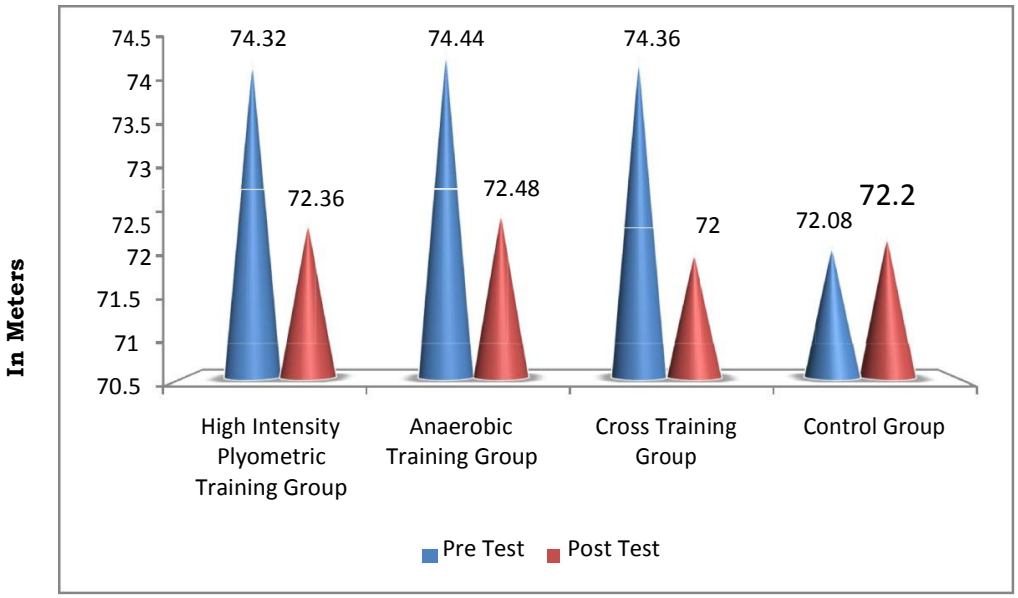

FIGURE-XII: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON RESTING PULSE RATE

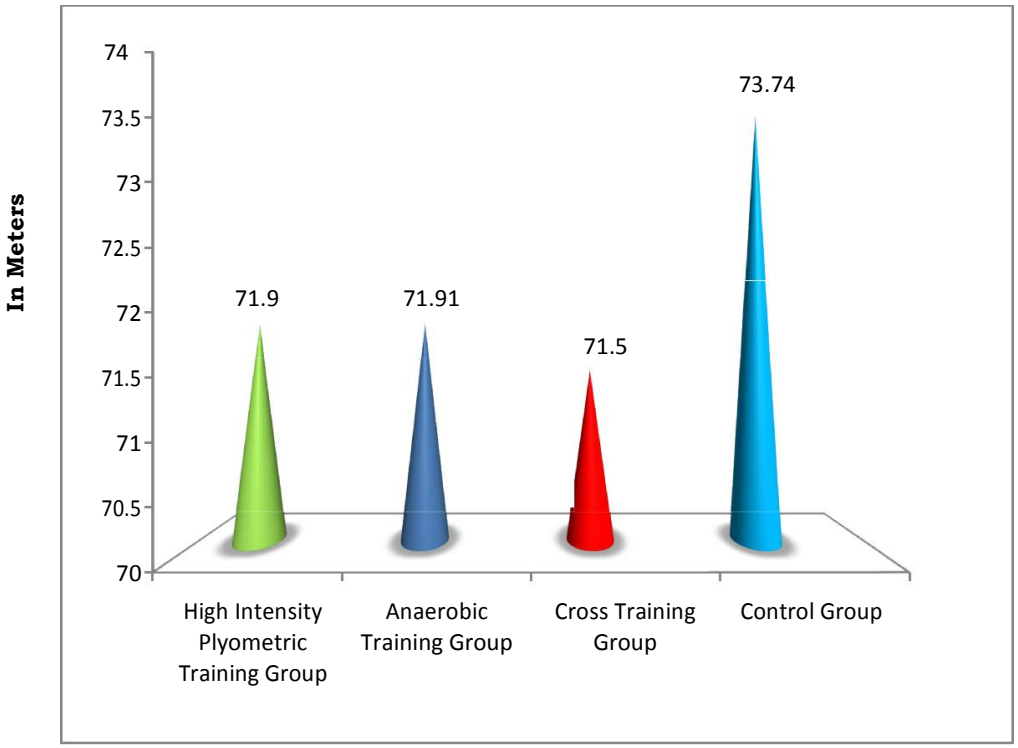

FIGURE-XIII: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON RESTING PULSE RATE

Respiratory Rate

The analysis of dependent 't'-test on the data obtained for respiratory rate of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XXV.

TABLE – XXV

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON RESPIRATORY RATE OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	18.56	18.60	18.96	18.56
Post-test mean	17.48	17.36	16.60	18.48
't'-test	2.95*	3.21*	9.03*	0.20

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XXV showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 2.95, 3.21, 9.03 and 0.20 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of respiratory rate.

The Analysis of covariance (ANCOVA) on respiratory rate of experimental groups has been presented in Table -XXVI.

TABLE – XXVI

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON RESPIRATORY RATE

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
17.58	17.42	16.33	18.58	Between	62.71	3	20.90	94.54*
				With in	21.00	95	0.22	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XXVI the adjusted post test mean value of respiratory rate for high intensity plyometric training group, anaerobic training group, cross training group and control group was 17.58, 17.42, 16.33 and 18.58 respectively. The obtained F-ratio of 94.54 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on respiratory rate.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXVII.

TABLE – XXVII

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON RESPIRATORY RATE

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
17.58	17.42	--	--	0.16	0.18
17.58	--	16.33	--	1.25*	0.18
17.58	--	--	18.58	1.00*	0.18
--	17.42	16.33	--	1.09*	0.18
--	17.42	--	18.58	1.16*	0.18
--	--	16.33	18.58	2.25*	0.18

**** Significant at 0.05 level of confidence***

Table-XXVII showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 2.56, 4.00 and 2.90 respectively and they were greater than the confidence interval value 0.18, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric

training group and anaerobic training group was 0.16, which was lesser than the confidence interval value 0.18, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on respiratory rate between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. The mean differences between high intensity plyometric training group and anaerobic training group showed insignificant difference.

However, the improvement on respiratory rate was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving respiratory rate.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on respiratory rate were graphically represented in the Figure -XIV.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on respiratory rate were graphically represented in the Figure -XV.

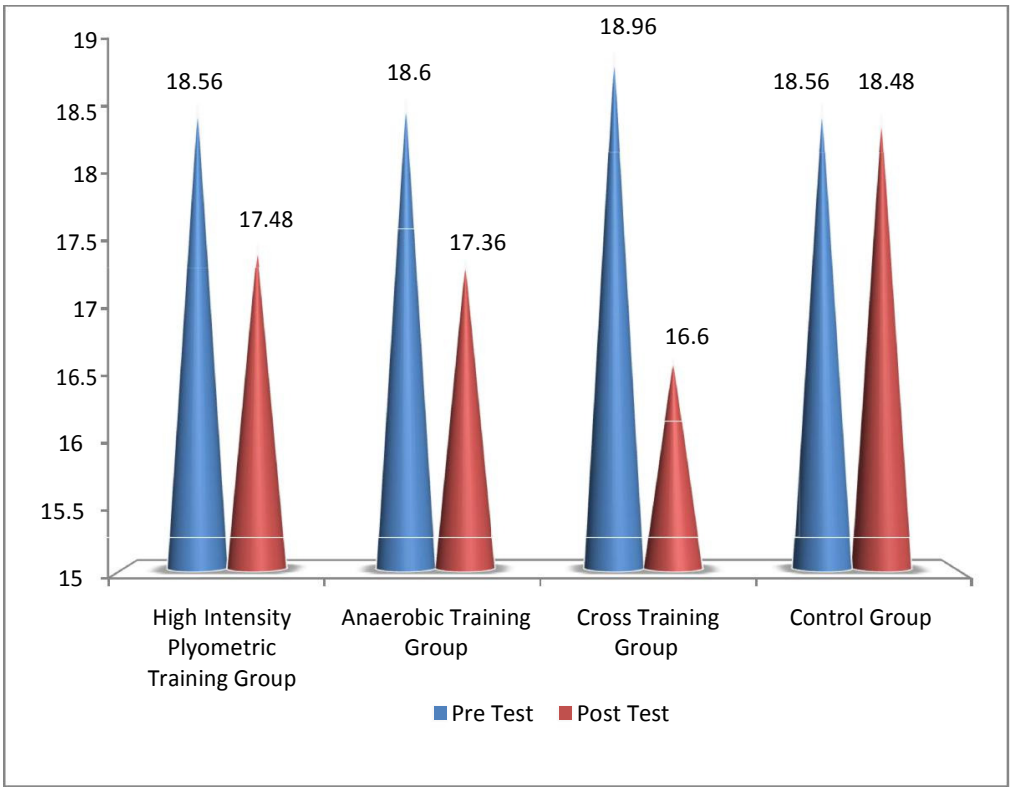

FIGURE-XIV: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON RESPIRATORY RATE

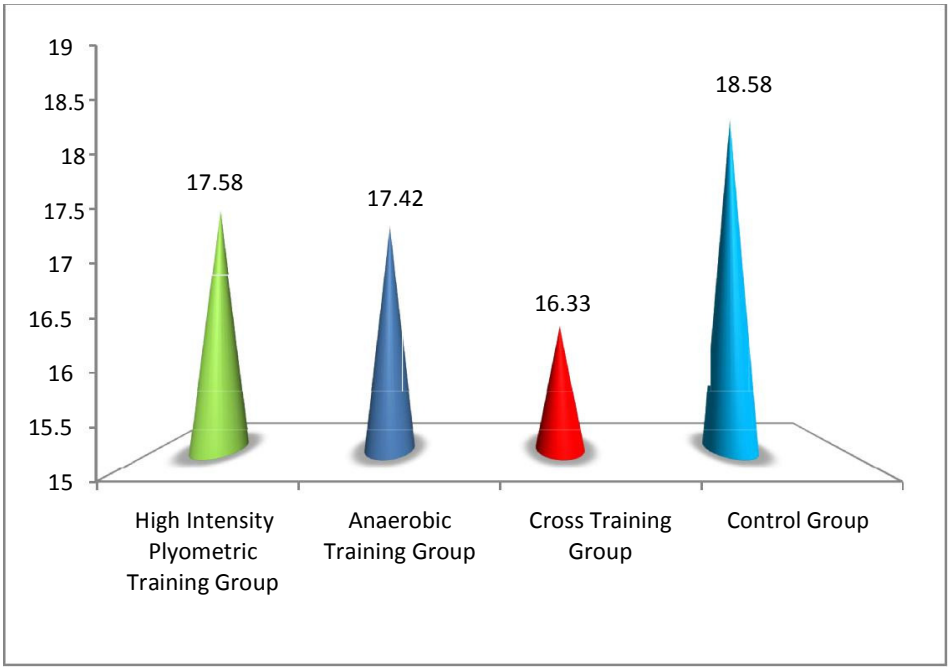

FIGURE-XV: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON RESPIRATORY RATE

VO2 max

The analysis of dependent 't'-test on the data obtained for VO2 max of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XXVIII.

TABLE – XXVIII

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON VO2 max OFEXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	43.88	44.04	43.96	44.16
Post-test mean	45.56	46.08	49.60	44.08
't'-test	2.77*	2.93*	8.58*	0.12

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XXVIII showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 2.77, 2.93, 8.58 and 0.12 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of VO2 max .

The Analysis of covariance (ANCOVA) on VO2 max of experimental groups has been presented in Table -XXIX.

TABLE – XXIX

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON VO2 max

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
High Intensity Plyometric Training Group (I)	Anaerobic Training Group (II)	Cross Training Group (III)	Control Group (IV)					
45.66	46.06	49.64	43.97	Between With in	426.15 127.82	3 95	142.05 1.35	105.58*

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XXIX the adjusted post test mean value of VO2 max for high intensity plyometric training group, anaerobic training group, cross training group and control group was 45.66, 46.06, 49.64 and 43.97 respectively. The obtained F-ratio of 105.58 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group onVO2 max.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXX.

TABLE – XXX

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON VO2 max

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
45.66	46.06	--	--	0.40	0.44
45.66	--	49.64	--	3.98*	0.44
45.66	--	--	43.97	1.69*	0.44
--	46.06	49.64	--	3.58*	0.44
--	46.06	--	43.97	2.09*	0.44
--	--	49.64	43.97	5.67*	0.44

**** Significant at 0.05 level of confidence***

Table-XXX showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 3.98, 1.69, 3.58, 2.09 and 5.67 respectively and they were greater than the confidence interval value 0.44, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric

training group and anaerobic training group is 0.40, which was lesser than the confidence interval value 0.44, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on VO_2 max between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. The differences between high intensity plyometric training group and anaerobic training group showed insignificant difference.

However, the improvement on VO2 max was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving VO2 max .

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on VO2 max were graphically represented in the Figure -XVI.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on VO2 max were graphically represented in the Figure -XVII.

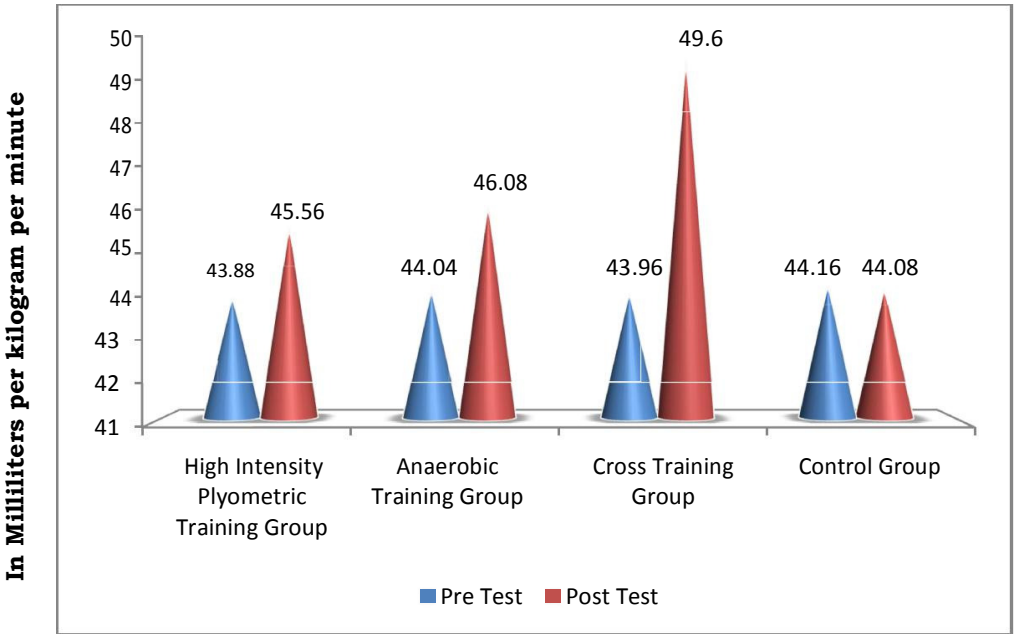

FIGURE-XVI: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON VO2 max

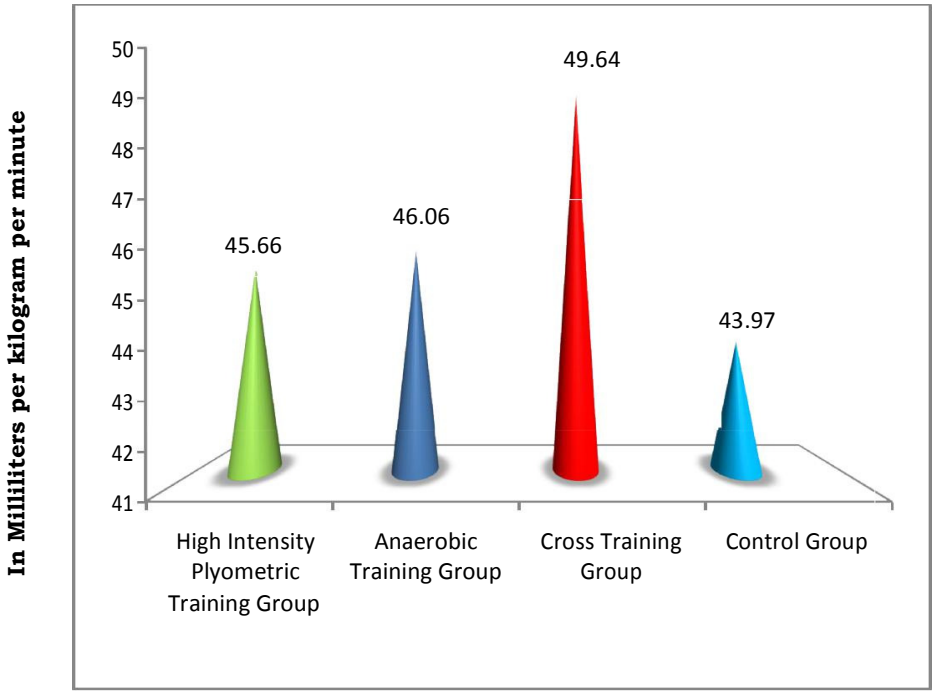

FIGURE-XVII: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON VO2 max

Breath Holding Time

The analysis of dependent 't'-test on the data obtained for breath holding time of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XXXI.

TABLE – XXXI

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON BREATH HOLDING TIME OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	29.80	29.76	29.40	29.52
Post-test mean	32.28	31.96	33.60	29.60
't'-test	3.57*	3.27*	5.38*	0.10

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XXXI showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 3.57, 3.27, 5.38 and 0.10 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of breath holding time.

The Analysis of covariance (ANCOVA) on breath holding time of experimental groups has been presented in Table -XXXII.

TABLE – XXXII

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON BREATH HOLDING TIME

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
32.11	31.83	33.81	29.70	Between	213.77	3	71.26	157.63*
				With in	42.94	95	0.45	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XXXII the adjusted post test mean value of breath holding time for high intensity plyometric training group, anaerobic training group, cross training group and control group was 32.11, 31.83, 33.81 and 29.70 respectively. The obtained F-ratio of 157.63 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on breath holding time.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXXIII.

TABLE – XXXIII

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON BREATH HOLDING TIME

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
32.11	31.83	--	--	0.28*	0.25
32.11	--	33.81	--	1.70*	0.25
32.11	--	--	29.70	2.41*	0.25
--	31.83	33.81	--	1.98*	0.25
--	31.83	--	29.70	2.13*	0.25
--	--	33.81	29.70	4.11*	0.25

**** Significant at 0.05 level of confidence***

Table-XXXIII showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group

were 0.28, 1.70, 2.41, 1.98, 2.13 and 4.11 respectively and they were greater than the confidence interval value 0.25, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on breath holding time between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on breath holding time was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving breath holding time.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on breath holding time were graphically represented in the Figure -XVIII.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on breath holding time were graphically represented in the Figure -XIX.

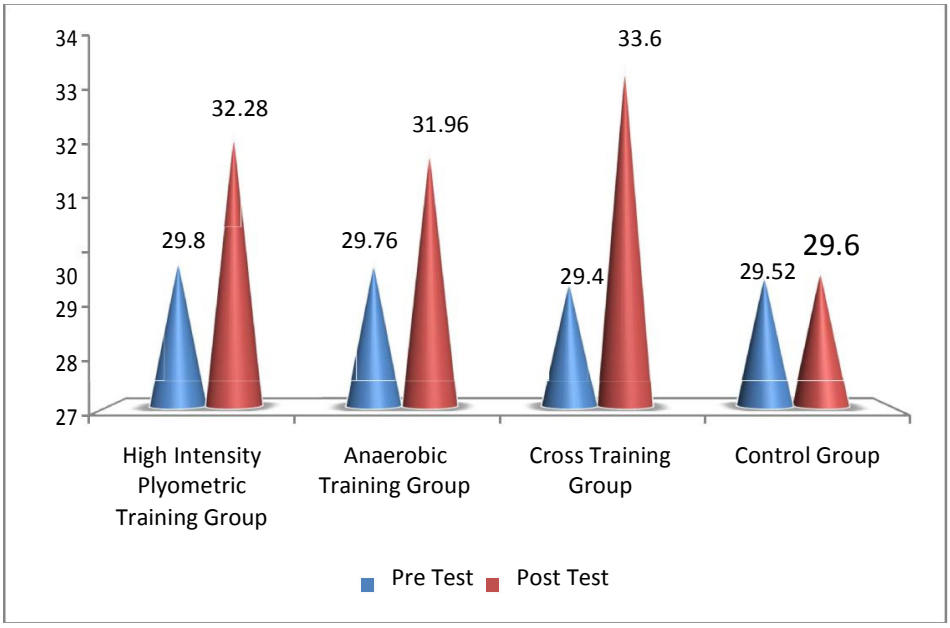

FIGURE-XVIII: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON BREATH HOLDING TIME

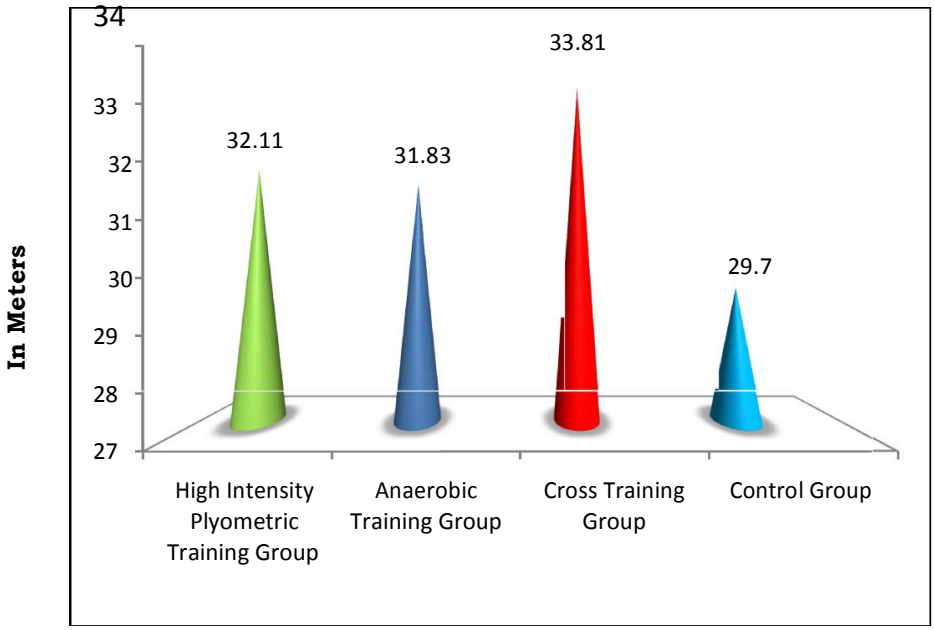

FIGURE-XIX: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON BREATH HOLDING TIME

Anaerobic Power

The analysis of dependent 't'-test on the data obtained for anaerobic power of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XXXIV.

TABLE – XXXIV

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON ANAEROBIC POWER OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	87.10	87.18	86.88	87.53
Post-test mean	98.12	97.97	110.21	87.61
't'-test	6.16*	6.01	7.96*	0.04

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XXXIV showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 6.16, 6.01, 7.96 and 0.04 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of anaerobic power.

The Analysis of covariance (ANCOVA) on anaerobic power of experimental groups has been presented in Table -XXXV.

TABLE – XXXV

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON ANAEROBIC POWER

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
High Intensity Plyometric training Group-(I)	Anaerobic Training Group-(II)	Cross Training Group-(III)	Control Group-(IV)					
98.17	97.96	110.40	87.38	Between	6631.32	3	2210.44	39.81*
				With in	5274.53	95	55.52	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

Table-XXXV showed that the adjusted post test mean value of anaerobic power for high intensity plyometric training group, anaerobic training group, cross training group and control group was 98.17, 97.96, 110.40 and 87.38 respectively. The obtained F-ratio of 39.81 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 dfat 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group onanaerobic power.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXXVI.

TABLE – XXXVI

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON ANAEROBIC POWER

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
98.17	97.96	--	--	0.21	2.80
98.17	--	110.40	--	12.23*	2.80
98.17	--	--	87.38	10.79*	2.80
--	97.96	110.40	--	12.44*	2.80
--	97.96	--	87.38	10.58*	2.80
--	--	110.40	87.38	23.02*	2.80

**** Significant at 0.05 level of confidence***

Table-XXXVI showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 12.23, 10.79, 12.44, 10.58 and 23.02 respectively and they were greater than the confidence interval value 2.80, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric training group and anaerobic training group,

which was lesser than the confidence interval value 2.80, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on anaerobic power between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. The values between high intensity plyometric training group and anaerobic training group showed insignificant difference.

However, the improvement on anaerobic power was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving anaerobic power.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on anaerobic power were graphically represented in the Figure -XX.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on anaerobic power were graphically represented in the Figure -XXI.

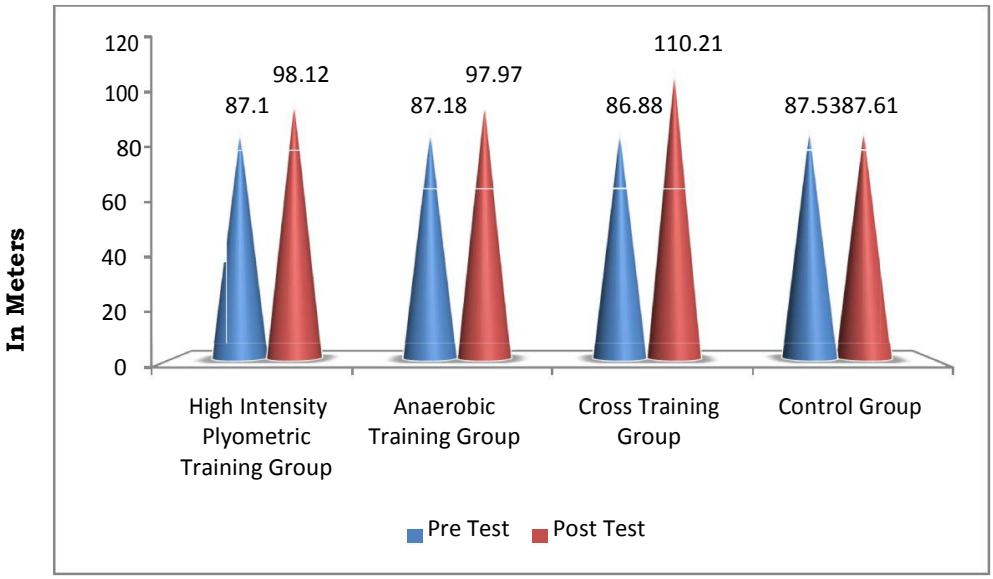

FIGURE-XX: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON ANAEROBIC POWER

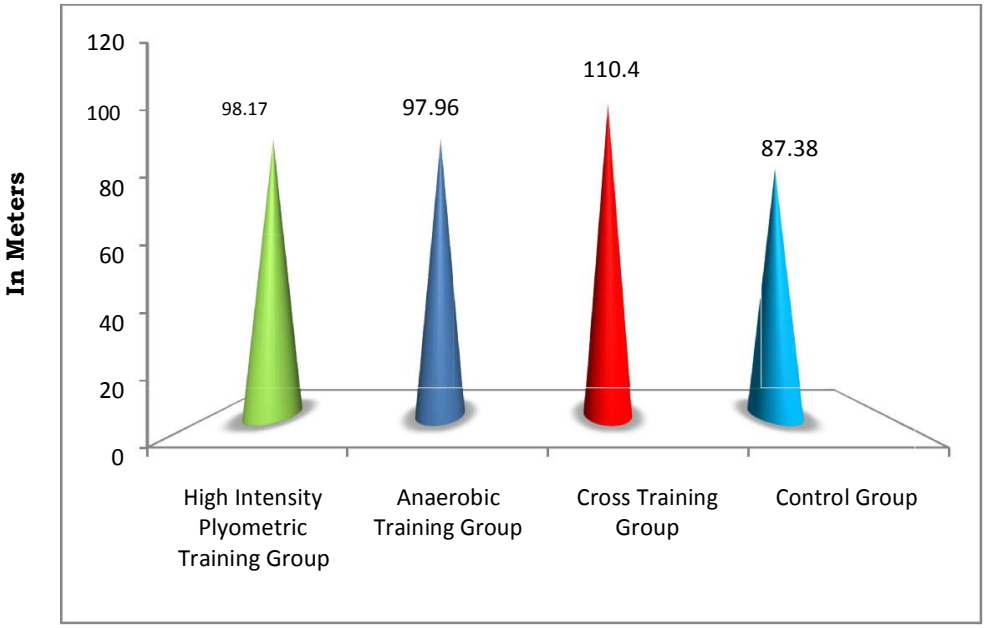

FIGURE-XXI: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON ANAEROBIC POWER

Set

The analysis of dependent 't'-test on the data obtained for set of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XXXVII.

TABLE – XXXVII

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON SET OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	45.60	45.68	45.24	45.40
Post-test mean	48.48	48.44	51.04	45.48
't'-test	3.14*	2.88*	6.19*	0.08

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XXXVII showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 3.14, 2.88, 6.19 and 0.08 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of set.

The Analysis of covariance (ANCOVA) on set of experimental groups has been presented in Table -XXXVIII.

TABLE – XXXVIII

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON SET

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
High Intensity Plyometric Training Group-I	Anaerobic Training Group-II	Cross Training Group-III	Control Group-IV					
48.37	48.26	51.25	45.55	Between With in	406.55 214.84	3 95	135.52 2.26	59.92*

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XXXVIII the adjusted post test mean value of set for high intensity plyometric training group, anaerobic training group, cross training group and control group was 48.37, 48.26, 51.25 and 45.55 respectively. The obtained F-ratio of 59.92 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 dfat 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on set.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XXXIX.

TABLE – XXXIX

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON SET

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
48.37	48.26	--	--	0.11	0.56
48.37	--	51.25	--	2.88*	0.56
48.37	--	--	45.55	2.82*	0.56
--	48.26	51.25	--	2.99*	0.56
--	48.26	--	45.55	2.71*	0.56
--	--	51.25	45.55	5.70*	0.56

**** Significant at 0.05 level of confidence***

Table-XXXIX showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 2.88, 2.82, 2.99, 2.71 and 5.70 respectively and they were greater than the confidence interval value 0.56, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric training group and anaerobic training group

is 0.11, which was lesser than the confidence interval value 0.56, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on set between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. The values between high intensity plyometric training group and anaerobic training group showed insignificant difference.

However, the improvement on set was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving set.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on set were graphically represented in the Figure -XXII.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on set were graphically represented in the Figure -XXIII.

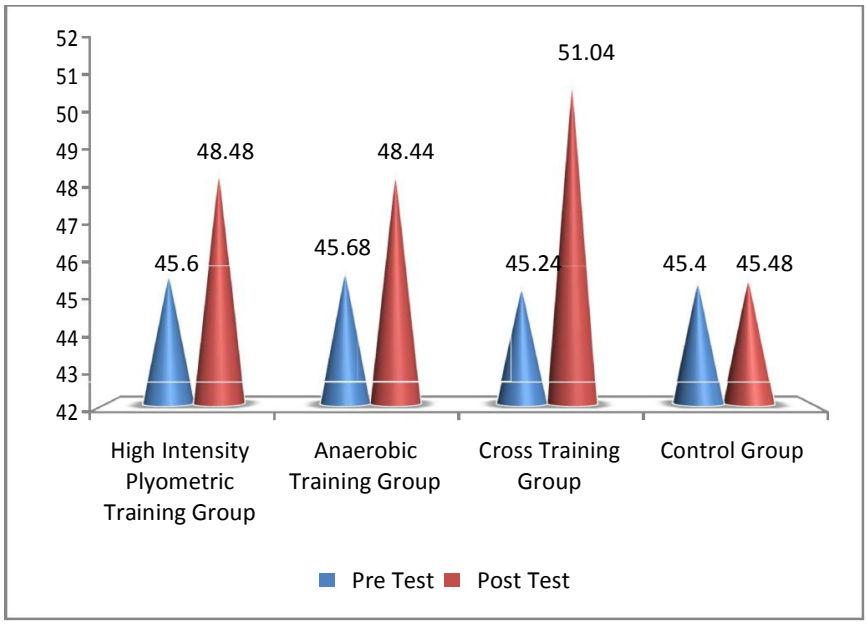

FIGURE-XXII: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SET

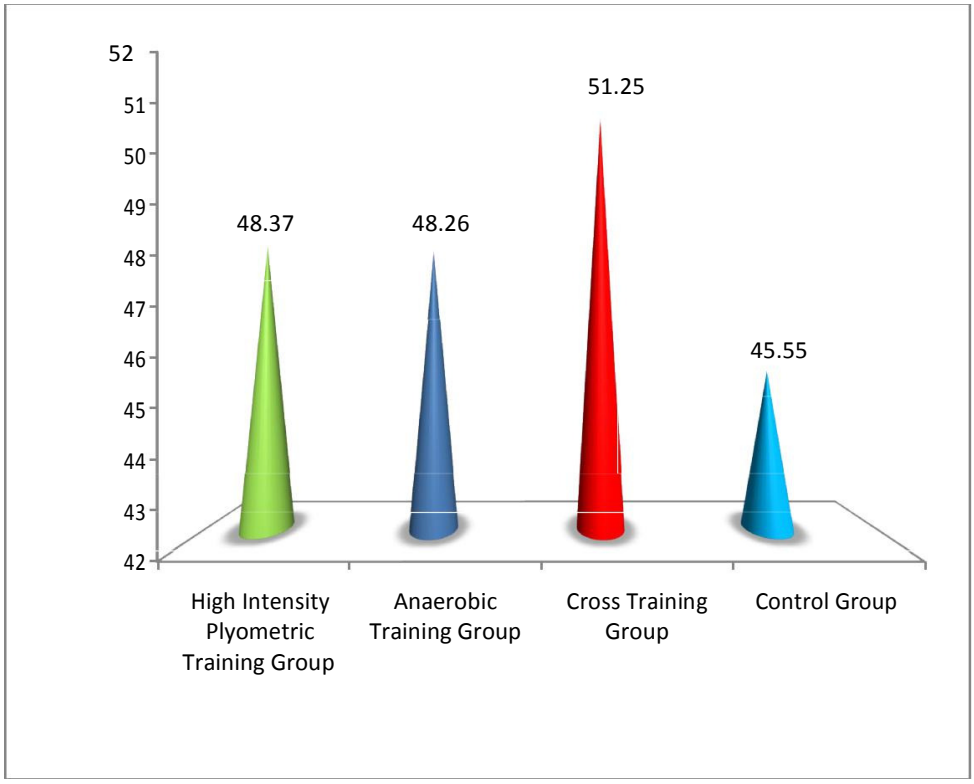

FIGURE-XXIII: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SET

Attack

The analysis of dependent 't'-test on the data obtained for attack of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XL.

TABLE – XL

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON ATTACK OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	45.84	45.64	45.16	45.52
Post-test mean	49.80	48.28	50.88	45.60
't'-test	3.22*	2.83*	6.38*	0.08

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XL showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 3.22, 2.83, 6.38 and 0.08 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of attack.

The Analysis of covariance (ANCOVA) on attack of experimental groups has been presented in Table -XLI.

TABLE – XLI

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON ATTACK

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
48.53	48.19	51.23	45.62	Between	394.21	3	131.40	120.66*
				With in	103.46	95	1.09	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XLI the adjusted post test mean value of attack for high intensity plyometric training group, anaerobic training group, cross training group and control group was 48.53, 48.19, 51.23 and 45.62 respectively. The obtained F-ratio of 120.66 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on attack.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XLII.

TABLE – XLII

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON ATTACK

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
48.53	48.19	--	--	0.34	0.39
48.53	--	51.23	--	2.70*	0.39
48.53	--	--	45.62	2.91*	0.39
--	48.19	51.23	--	3.04*	0.39
--	48.19	--	45.62	2.57*	0.39
--	--	51.23	45.62	5.61*	0.39

**** Significant at 0.05 level of confidence***

Table-XLII showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 2.70, 2.91, 3.04, 2.57 and 5.61 respectively and they were greater than the confidence interval value 0.39, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric training group and anaerobic training group is 0.34, which was lesser than the confidence interval value 0.39, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on attack between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on attack was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving attack.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on attack were graphically represented in the Figure -XXIV.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on attack were graphically represented in the Figure -XXV.

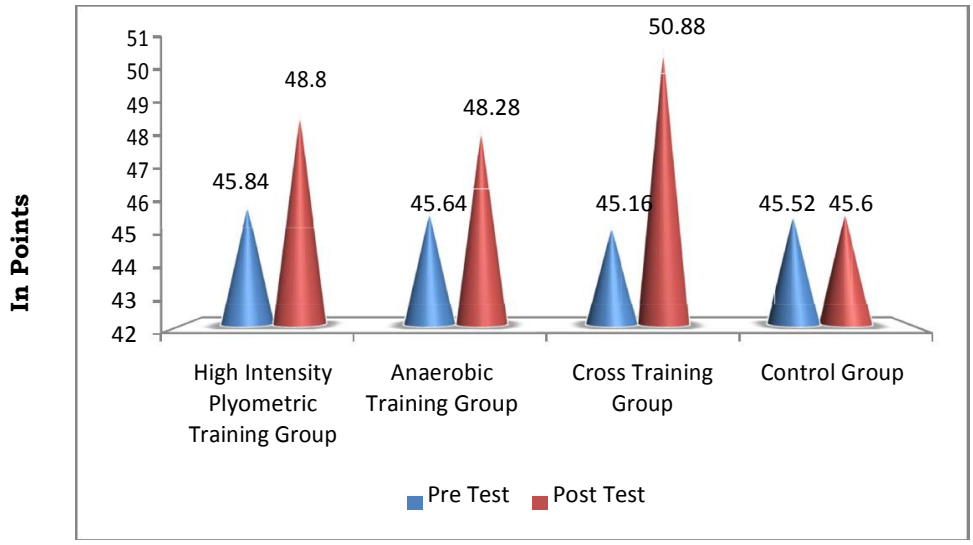

FIGURE-XXIV: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON ATTACK

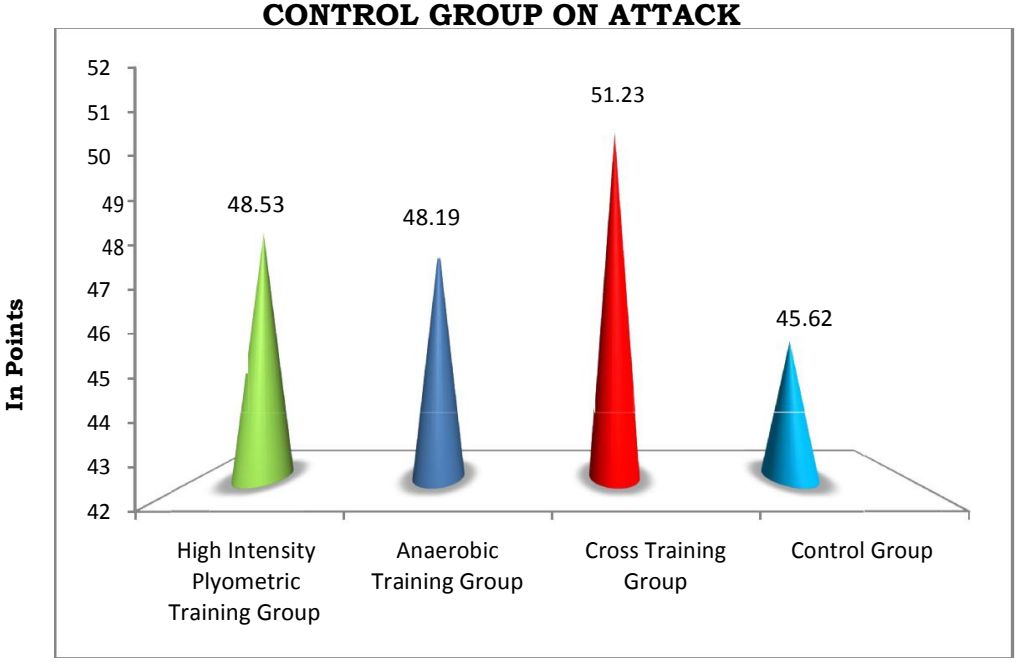

FIGURE-XXV: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON ATTACK

Block

The analysis of dependent 't'-test on the data obtained for block of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XLIII.

TABLE – XLIII

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON BLOCK OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	46.24	45.12	45.44	45.48
Post-test mean	49.36	47.88	51.32	45.56
't'-test	3.30*	2.92*	6.82*	0.07

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XLIII showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 3.30, 2.92, 6.82 and 0.07 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of block.

The Analysis of covariance (ANCOVA) on block of experimental groups has been presented in Table -XLIV.

TABLE – XLIV

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON BLOCK

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
Plyometric Training Group-I (I)	Anaerobic Training Group-II (II)	Cross Training Group-III (III)	Control Group-IV (IV)					
48.76	48.29	51.44	45.64	Between With in	422.68 112.50	3 95	140.89 1.18	118.98*

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XLIV the adjusted post test mean value of block for high intensity plyometric training group, anaerobic training group, cross training group and control group was 48.76, 48.29, 51.44 and 45.64 respectively. The obtained F-ratio of 118.98 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity

plyometric training group, anaerobic training group, cross training group and control group on block.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XLV.

TABLE – XLV

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON BLOCK

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
48.76	48.29	--	--	0.47*	0.41
48.76	--	51.44	--	2.68*	0.41
48.76	--	--	45.64	3.12*	0.41
--	48.29	51.44	--	3.15*	0.41
--	48.29	--	45.64	2.65*	0.41
--	--	51.44	45.64	5.80*	0.41

**** Significant at 0.05 level of confidence***

Table-XLV showed that the adjusted post test mean differences on high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 0.47, 2.68, 3.12, 3.15, 2.65 and 5.80 respectively and they were

greater than the confidence interval value 0.41, which showed significant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on block between the adjusted post test means of high intensity plyometric training group and anaerobic training group, high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group.

However, the improvement on block was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving block.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on block were graphically represented in the Figure -XXVI.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on block were graphically represented in the Figure - XXVII.

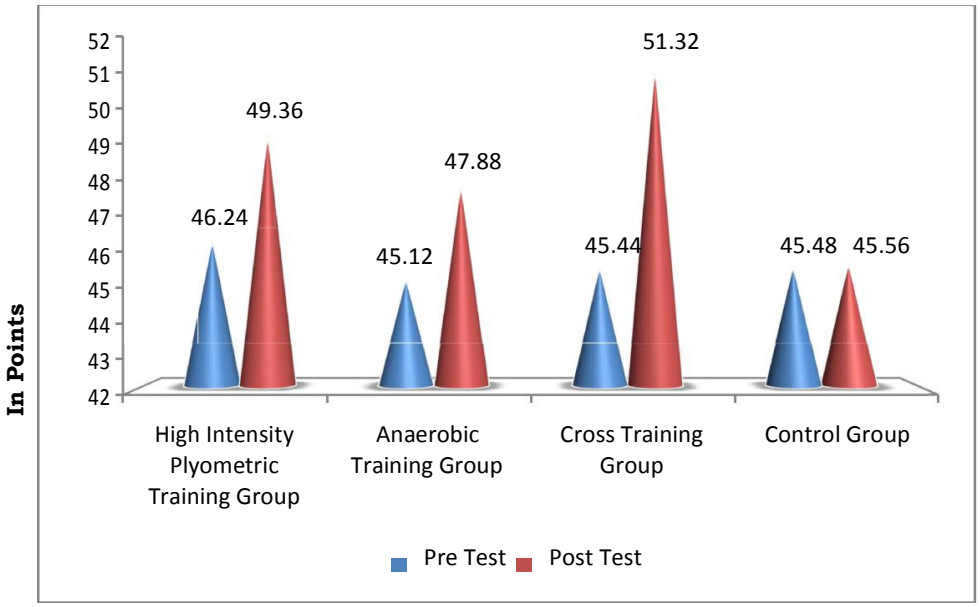

FIGURE-XXVI: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON BLOCK

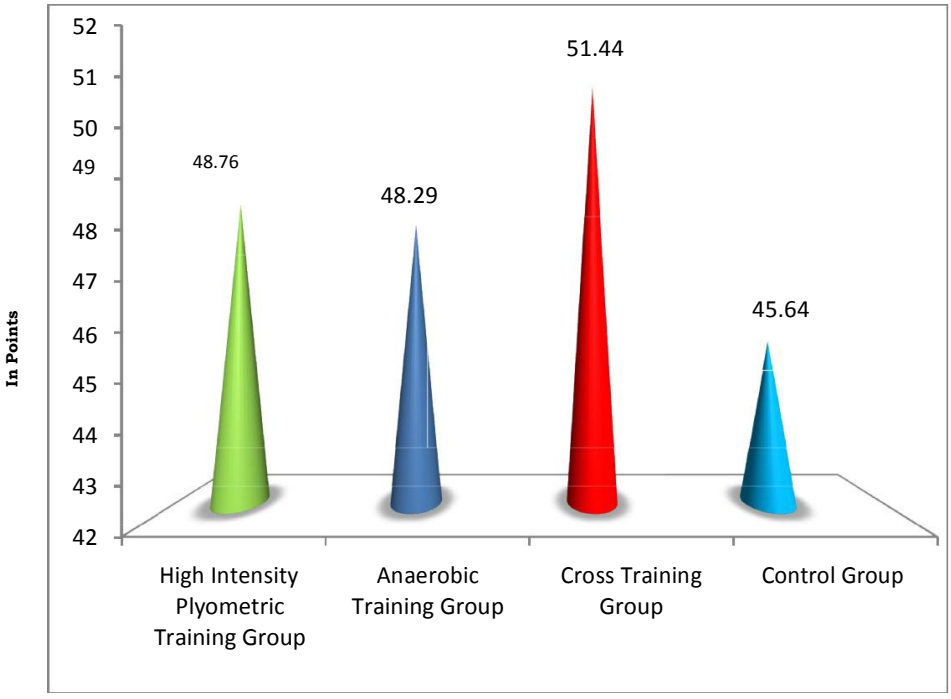

FIGURE-XXVII: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON BLOCK

Pass

The analysis of dependent 't'-test on the data obtained for pass of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XLVI.

TABLE – XLVI

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON PASS OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	46.28	45.60	45.24	45.56
Post-test mean	49.48	48.56	51.48	45.64
't'-test	3.31*	3.13*	7.42*	0.07

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XLVI showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were, 3.31, 3.13, 7.42 and 0.07 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of pass.

The Analysis of covariance (ANCOVA) on pass of experimental groups has been presented in Table -XLVII.

TABLE – XLVII

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON PASS

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
48.94	48.62	51.86	45.74	Between	469.47	3	156.49	91.99*
				With in	161.62	95	1.70	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-XLVII the adjusted post test mean value of pass for high intensity plyometric training group, anaerobic training group, cross training group and control group was 48.94, 48.62, 51.86 and 45.74 respectively. The obtained F-ratio of 91.99 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity

plyometric training group, anaerobic training group, cross training group and control group on pass.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table XLVIII.

TABLE – XLVIII

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON PASS

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
48.94	48.62	--	--	0.32	0.49
48.94	--	51.86	--	2.92*	0.49
48.94	--	--	45.74	3.20*	0.49
--	48.62	51.86	--	3.24*	0.49
--	48.62	--	45.74	2.88*	0.49
--	--	51.86	45.74	6.12*	0.49

**** Significant at 0.05 level of confidence***

Table-XLVIII showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 2.92, 3.20, 3.24, 2.88 and 6.12 respectively and they were greater than the confidence interval value 0.49, which showed

significant differences at 0.05 level of confidence. The values between high intensity plyometric training group and anaerobic training group, is 0.32, which was lesser than the confidence interval value 0.49, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on pass between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. The values between high intensity plyometric training group and anaerobic training group, showed insignificant differences.

However, the improvement on pass was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving pass.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on pass were graphically represented in the Figure -XXVIII.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on pass were graphically represented in the Figure -XXIX.

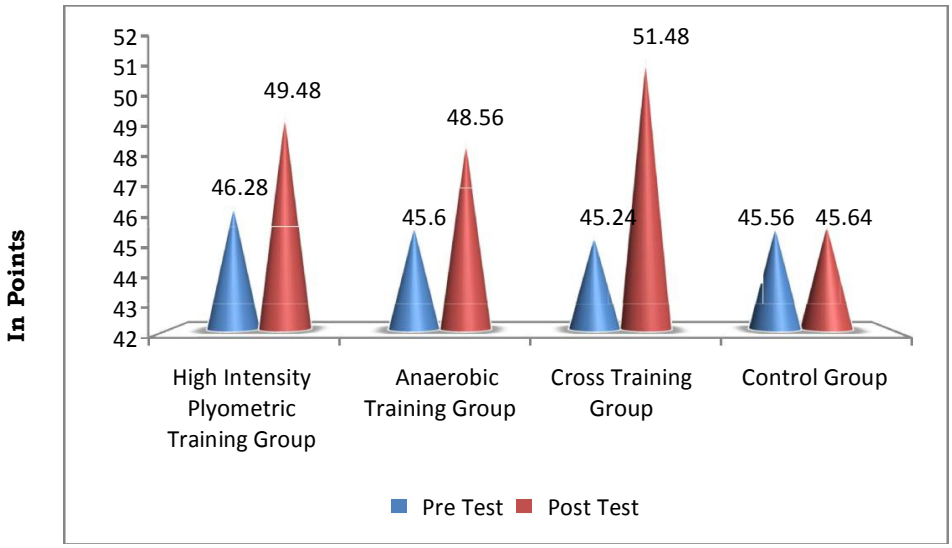

FIGURE-XXVIII: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON PASS

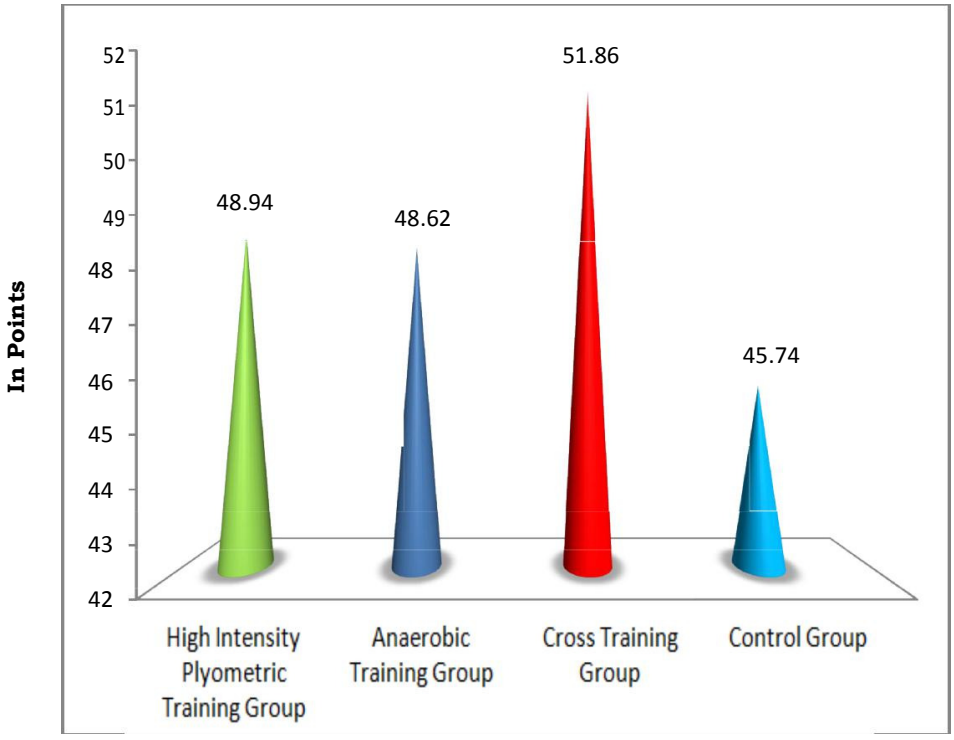

FIGURE-XXIX: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON PASS

Serve

The analysis of dependent 't'-test on the data obtained for serve of the subjects in the pre-test and post-test of experimental groups and control group have been presented in Table XLIX.

TABLE – XLIX

THE SUMMARY OF MEAN AND DEPENDENT 'T' TEST FOR THE PRE AND POST TESTS ON SERVE OF EXPERIMENTAL GROUPS AND CONTROL GROUP

Mean	High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)
Pre- test mean	45.72	45.76	45.24	45.64
Post-test mean	48.68	8.40	50.96	45.72
't'-test	3.15*	2.73*	6.55*	0.08

**** Significant at 0.05 level.***

(Table value required for significance at .05 level for 't'-test with df 24 is 2.06)

Table-XLIX showed that the dependent 't' test values between the pre and post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group were 3.15, 2.73, 6.55 and 0.08 respectively. Since the obtained 't'-test value of experimental groups were greater than the table value 2.06 with df 24 at .05 level of confidence, it is concluded that high intensity plyometric training group, anaerobic training group and cross training group has registered significant improvement on the performance of serve.

The Analysis of covariance (ANCOVA) on serve of experimental groups has been presented in Table -L.

TABLE – L

VALUES OF ANALYSIS OF COVARIANCE FOR EXPERIMENTAL GROUPS AND CONTROL GROUP ON SERVE

Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
48.56	48.25	51.28	45.67	Between	329.81	3	130.94	120.74*
				With in	103.02	95	1.08	

**** Significant at.05 level of confidence***

(The table value required for Significance at 0.05 level with df 3 and 95 is 2.71)

As shown in Table-L the adjusted post test mean value of serve for high intensity plyometric training group, anaerobic training group, cross training group and control group was 48.56, 48.25, 51.28 and 45.67 respectively. The obtained F-ratio of 120.74 for the adjusted post test mean was higher than the required table value of 2.71 at 3 and 95 df at 0.05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of high intensity plyometric training group, anaerobic training group, cross training group and control group on serve.

To determine which of the paired means had a significant difference, Scheffe's test was applied as post hoc test and the results were presented in Table LI.

TABLE – LI

THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST TESTS PAIRED MEANS ON SERVE

Adjusted Post test Means				Mean Difference	Confidence Interval
High Intensity Plyometric Training Group – (I)	Anaerobic Training Group – (II)	Cross Training Group – (III)	Control Group – (IV)		
48.56	48.25	--	--	0.31	0.39
48.56	--	51.28	--	2.72*	0.39
48.56	--	--	45.67	2.89*	0.39
--	48.25	51.28	--	3.03*	0.39
--	48.25	--	45.67	2.58*	0.39
--	--	51.28	45.67	5.61*	0.39

**** Significant at 0.05 level of confidence***

Table-LI showed that the adjusted post test mean differences on high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group were 2.72,

2.89, 3.03, 2.58 and 5.61 respectively and they were greater than the confidence interval value 0.39, which showed significant differences at 0.05 level of confidence. The values between high intensity plyometric training group and anaerobic training group, is 0.31, which was lesser than the confidence interval value 0.39, which showed insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there was a significant difference on serve between the adjusted post test means of high intensity plyometric training group and cross training group, high intensity plyometric training group and control group, anaerobic training group and cross training, anaerobic training group and control group and cross training group and control group. The difference between high intensity plyometric training group and anaerobic training group showed insignificant.

However, the improvement on serve was significantly higher for cross training group than high intensity plyometric training group and anaerobic training group.

It may be concluded that the cross training group has exhibited better than the other experimental groups on improving serve.

The mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on serve were graphically represented in the Figure -XXX.

The adjusted post test mean values of high intensity plyometric training group, anaerobic training group, cross training group and control group on serve were graphically represented in the Figure -XXXI.

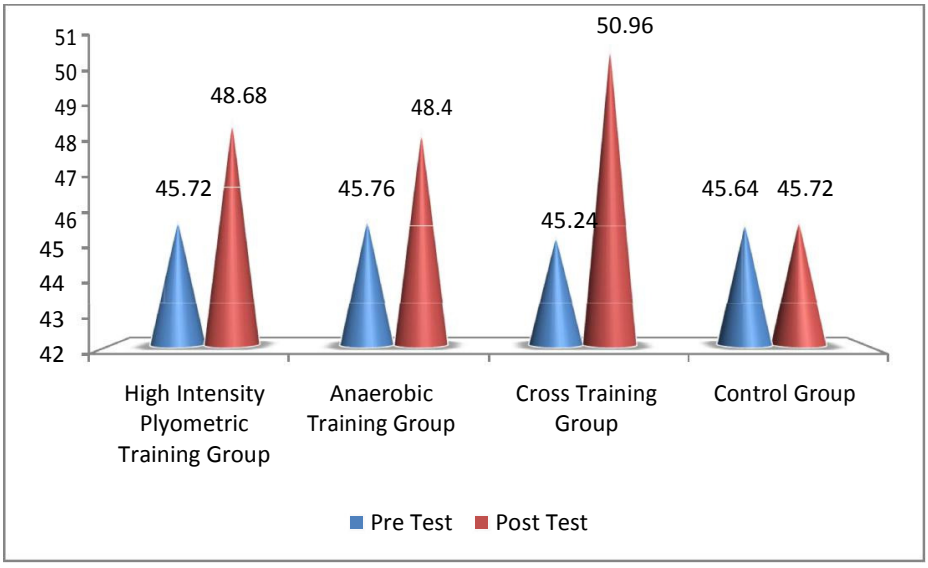

FIGURE-XXX: MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SERVE

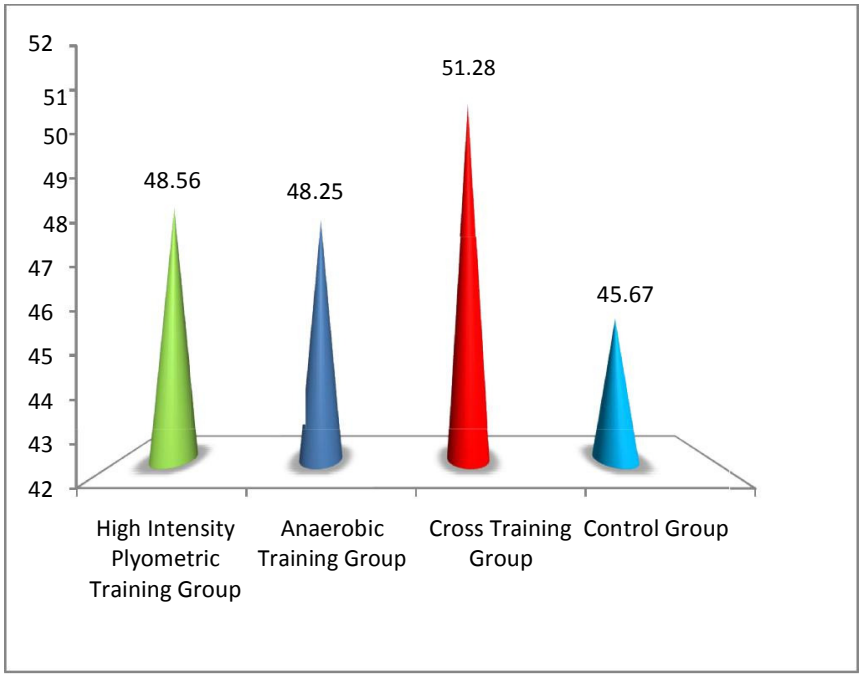

FIGURE-XXXI: THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SERVE

4.2 DISCUSSION ON FINDINGS

The results of the study indicate that all the experimental groups namely high intensity plyometric training, anaerobic training, and cross training have significantly improved in the selected dependent components namely agility, speed, explosive power, flexibility, co-ordination, resting pulse rate, respiratory rate, VO2 max , breath holding time, anaerobic power, set, attack, block, pass and serve.

It is also found that the improvement agility, speed, explosive power, flexibility, co-ordination, resting pulse rate, respiratory rate, VO2 max , breath holding time, anaerobic power, set, attack, block, pass and serve by cross training group is greater when compared to the effects of other experimental groups.

The results are in conformity with the following findings:

Rahimi and Nasar (2005) supported for the use of combination of traditional weight training and plyometric drills to improve the vertical jump ability, explosive performance in general and leg strength.

According to *Jensen et al., (1999)* complex training is useful training strategy because of the organizational advantages of performing weight and plyometric exercises in the same training session.

Evans et al., (2000) examined the complex training effect of combined bench press and medicine ball throws demonstrating improved plyometric performance in the complex condition

Young et al., (1998) have supported that for complex training, a high load weight training exercise performed four minutes before a power exercise increased the performance of the power exercise, especially for stronger individuals.

Complex training programme was effective in eliciting statistically significant improvement on the 300-meter shuttle *(Zepeda and Gonzalez, 2000).*

The combination of plyometric exercises and weight training increased *(Adams, et al.1992;Bauer, et al., 1990, Behm, & Sale, 1993; Ioannis, et al., 2000)* or maintained unaffected vertical jumping performance (*Stone, &O'Bryant, 1986). Adams et al. (Adams, et al. 1992)* suggested that this combination may provide a more powerful training stimulus for the vertical jumping performance than either weight training or plyometric training alone.

Chreif et al., (2012) supported additional combined training program between sprint repetition and vertical jump in the same training session positively influence the jumping ability and the sprint ability of handball players.

Results from several investigations involving adults suggest that combining plyometric training with resistance training may be useful for enhancing muscular performance *(Adams et al., 1992;*

Fatouros et al., 2000). Fatouros and colleagues (2000) reported that after 12 weeks of training adult subjects who combined plyometric training with resistance training increased vertical jump performance by 15% whereas gains of 11% and 9% were reported for subjects who performed only resistance training or plyometric training, respectively. Similar findings were recently reported by *Myer and colleagues (2005)* who observed that a six week, multi-component training program which included resistance training, plyometric training and speed training significantly enhanced strength, jumping ability and speed in female adolescent athletes as compared to a non exercising control group. In the aforementioned study *(Myer et al, 2005).*

The studies of *Fleck & Kraemer, (2004)* also suggest that changes in motor performance skill resulting from the performance of combined resistance training and plyometric training were greater than with either types of training alone.

This result is in accordance with previous studies *(Adams, et al. 1992; Bauer, et al., 1990; Blakey, &Southard, 1979; Ioannis, et al., 2000).* Improved muscle performance due to a plyometric training program may also be due in part to increased motor unit functioning. Previous studies have indicated that neuromuscular adaptations such as an increased inhibition of antagonist muscles as well as better activation and co-contraction of synergistic muscles may account for the improvements in power output *(Komi, 1984; Lyttle, 1996).*

Based on the above literature and from the results of the present study showedthat systematically and scientifically designed cross training develops the performance standard. Hence such a training should be given due recognitions and implemented in all disciplines of sports and games. Its implementations are very essential for volleyball players to achieve maximum performance in their respective disciplines.

From the results of the present investigation, it is also concluded that significant differences exist, between high intensity plyometric training group, anaerobic training group, and cross training group in all dependent variables such as agility, speed, explosive power, flexibility, co-ordination, resting pulse rate, respiratory rate, VO2 max , breath holding time, anaerobic power, set, attack, block, pass and serve.

4.3 DISCUSSION ON HYPOTHESIS

It was hypothesized that there would be significant improvement on selected motor fitness variables due to the effect of high intensity plyometric training, anaerobic training and cross training. The present study produced similar results. Hence the first research hypothesis of the investigator has been proved true.

In the second hypothesis, it was mentioned that there would be significant improvement on selected physiological variables due to the effect of high intensity plyometric training, anaerobic training and

cross training. The present study produced similar results. Hence the second research hypothesis of the investigator has been proved true.

In the third hypothesis, it was mentioned that there would be significant improvement on selected volleyball skill variables due to the effect of high intensity plyometric training, anaerobic training and cross training. The present study produced similar results. Hence the third research hypothesis of the investigator has been proved true.

In the fourth and last hypothesis, it was mentioned that there would be significant differences on the selected motor fitness, physiological and skill variables of volleyball players among the experimental group. Hence the fourth and last research hypothesis of the investigator has been proved true.