CHAPTER – IV

RESULTS AND DISCUSSIONS

4.1 OVER VIEW

This chapter deals with the test of significance, level of significance, discussion on finding and discussion on hypothesis were presented. The three groups namely plyometric training, SAQ training and control group were analysed for the differences in their measures of selected physiological, bio-chemical and performance variables in relation to pre test, post test and adjusted post test scores.

The purpose of the study was to find out the effect of plyometric and SAQ training on selected physiological, bio-chemical and performance variables among football players. To achieve the purpose of the present study, forty five men Football players from Selvam Group of Institutions, Namakkal, Tamilnadu, India was selected as subjects at random and their ages ranged from 18 to 25 years. The subjects (N=45) were randomly assigned to three equal groups of fifteen subjects each. The requirement of the experiment procedures, testing as well as exercise schedule was explained to the subjects so as to get full co-operation of the effort required on their part and prior to the administration of the study. Pre test was conducted for all the subjects on selected physiological, bio-chemical and performance variables. This initial test scores formed as pre test scores of the subjects. The groups were assigned as

Experimental Group I, Experimental Group II and Control Group in an equivalent manner.

Experimental Group I was exposed to plyometric training, Experimental Group II was exposed to SAQ training and Control Group was not exposed to any experimental training other than their regular daily activities. The duration of experimental period was 12 weeks. After the experimental treatment, all the forty five subjects were tested on their physiological, bio-chemical and performance variables. This final test scores formed as post test scores of the subjects. The pre test and post test scores were subjected to statistical analysis using Analysis of Covariance (ANCOVA) to find out the significance among the mean differences, whenever the 'F' ratio for adjusted test was found to be significant, Scheffe's post hoc test was used. In all cases 0.05 level of significance was fixed to test hypotheses.

4.2 TEST OF SIGNIFICANCE

This is the crucial portion of the thesis, that of arriving at the conclusion by examining the hypothesis. The procedure of testing the hypothesis in accordance with the results obtained in relation to the level of confidence which was fixed at 0.05 level, was considered necessary for this study.

The tests are usually called as the test of significance, since we test whether the difference between the pre-test and post-test scores of the samples are significant or not. In the present study, if the obtained F-ratio was greater than the table F-ratio at 0.05 level, the hypothesis was accepted to the effect

that there existed significant difference between the means of groups compared. And if the obtained, F-ratio was lesser than the table F-ratio at 0.05 level, then the hypothesis was rejected to the effect that there existed significant difference between the means of groups under study.

4.3 LEVEL OF SIGNIFICANCE

To test the obtained results on all the variables, level of significance 0.05 was chosen and considered as sufficient for the study.

4.4 COMPUTATION OF t TEST

The primary objective of the paired 't' ratio was to describe the differences between the pre-test and post-test mean of football players.

Thus the obtained results were interpreted with earlier studies and presented in this chapter well along with graphical presentations.

TABLE – VI

DESCRIPTIVE ANALYSIS OF INITIAL, FINAL AND ADJUSTED MEANS OF PLYOMETRIC TRAINING SAQ TRAINING AND CONTROL GROUP ON CRITERION MEASURES

S.No	Variables	Plyometric Training Group			SAQ Training Group			Control Group		
		Initial Mean	Final Mean	Adjusted Mean	Initial Mean	Final Mean	Adjusted Mean	Initial Mean	Final Mean	Adjusted Mean
1	Vital Capacity	2.65	3.25	3.24	2.62	3.20	3.20	2.60	2.61	2.62
2	Forced Vital Capacity	3.42	4.72	4.73	3.40	4.69	4.69	3.38	3.42	3.41
3	Peak Expiratory Flow Rate	269.86	464.60	464.49	267.86	465.13	465.15	266.73	267.33	267.42
4	RBC	4.38	5.10	5.15	4.53	5.18	5.16	4.58	4.55	4.52
5	WBC	6353.33	7970.00	8026.75	6790.00	7544.66	7508.86	6720.00	6762.00	6741.04
6	Platelets	2.95	3.60	3.58	2.66	3.64	3.69	2.99	2.94	2.90
7	Shooting	87.06	118.40	118.36	86.86	119.60	119.57	83.80	84.26	84.32
8	Dribbling	18.96	18.23	18.24	18.87	18.13	18.14	19.22	19.18	19.17
9	Passing	7.20	9.86	9.85	7.13	10.00	9.99	6.80	7.00	7.01

TABLE - VII

SIGNIFICANCE OF MEAN GAINS/LOSSES BETWEEN

PRE AND POST TEST OF PLYOMETRIC TRAINING GROUP (PTG)

Sl.No	Variables	Pre test (Mean and S.D)	Post test (Mean and S.D)	MD	SEM	't' ratio
1	Vital Capacity	2.65 ± 0.08	3.25 ± 0.02	0.59	0.02	28.12*
2	Forced Vital Capacity	3.42 ± 0.07	4.72 ± 0.11	1.29	0.03	35.55*
3	Peak Expiratory Flow Rate	269.86 ± 6.58	464.60 ± 7.40	194.73	2.75	70.75*
4	RBC	4.38 ± 0.17	5.10 ± 0.08	0.72	0.05	13.79*
5	WBC	6353.33 ± 562.35	7970.00 ± 508.42	1616.66	223.85	7.22*
6	Platelets	2.95 ± 0.53	3.60 ± 0.08	0.65	0.13	4.77*
7	Shooting	87.06 ± 6.75	118.40 ± 7.71	31.33	2.24	13.93*
8	Dribbling	18.96 ± 0.60	18.23 ± 0.30	0.73	0.18	3.88*
9	Passing	7.20 ± 0.77	9.86 ± 1.06	2.66	0.37	7.13*

*Significant at 0.05 level (2.14)

Table VII indicates the obtained 't' values on variables for the Plyometric Group are: 28.12 for vital capacity, 35.55 for forced vital capacity, 70.75 for peak expiratory flow rate, 13.79 for RBC, 7.22 for WBC, 4.77 for platelets, 13.93 for shooting, 3.88 for dribbling and 7.13 for passing. The obtained t- values to be

significant at 0.05 level for degree of freedom 14 the required critical value was 2.14. Thus the observed t-values on variables are found to be higher than the required critical value (2.14). It was inferred that the obtained 't'-ratio on physiological, bio-chemical and performance variables were statistically significant. Significant improvement on physiological, bio-chemical and performance variables from the baseline to post treatment were as follows with respect to changes and level of significant. From the baseline vital capacity, forced vital capacity, peak expiratory flow rate, RBC, WBC, platelets, shooting, and passing was increased and for dribbling it was decreased.

Fig - 5 Graph showing the pre test and post test mean values of Plyometric Group on Vital Capacity
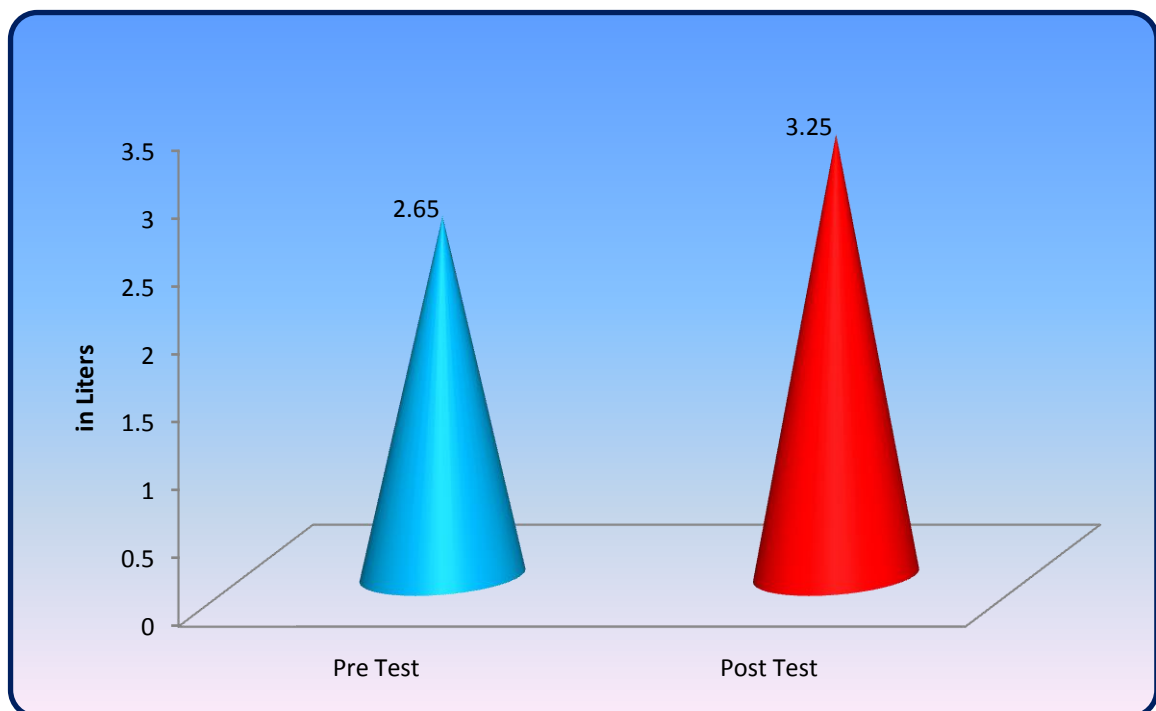
Fig - 6 Graph showing the pre test and post test mean values of Plyometric Group on Forced Vital Capacity
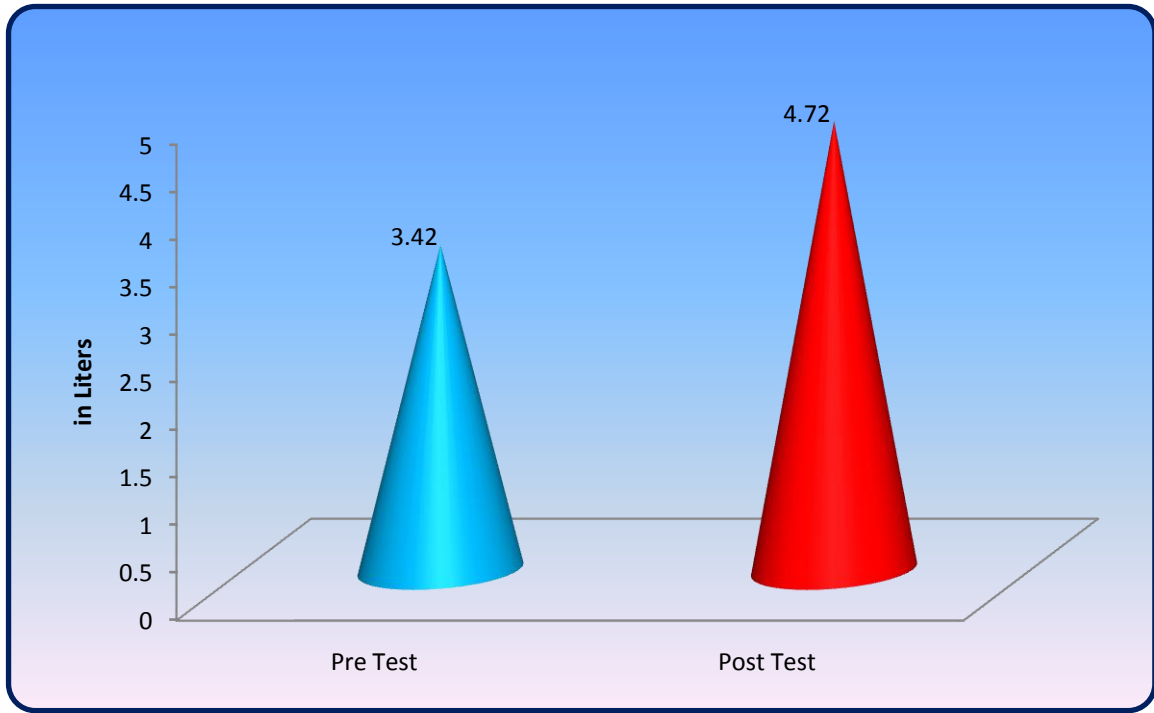
Fig - 7 Graph showing the pre test and post test mean values of Plyometric Group on Peak Expiratory Flow Rate
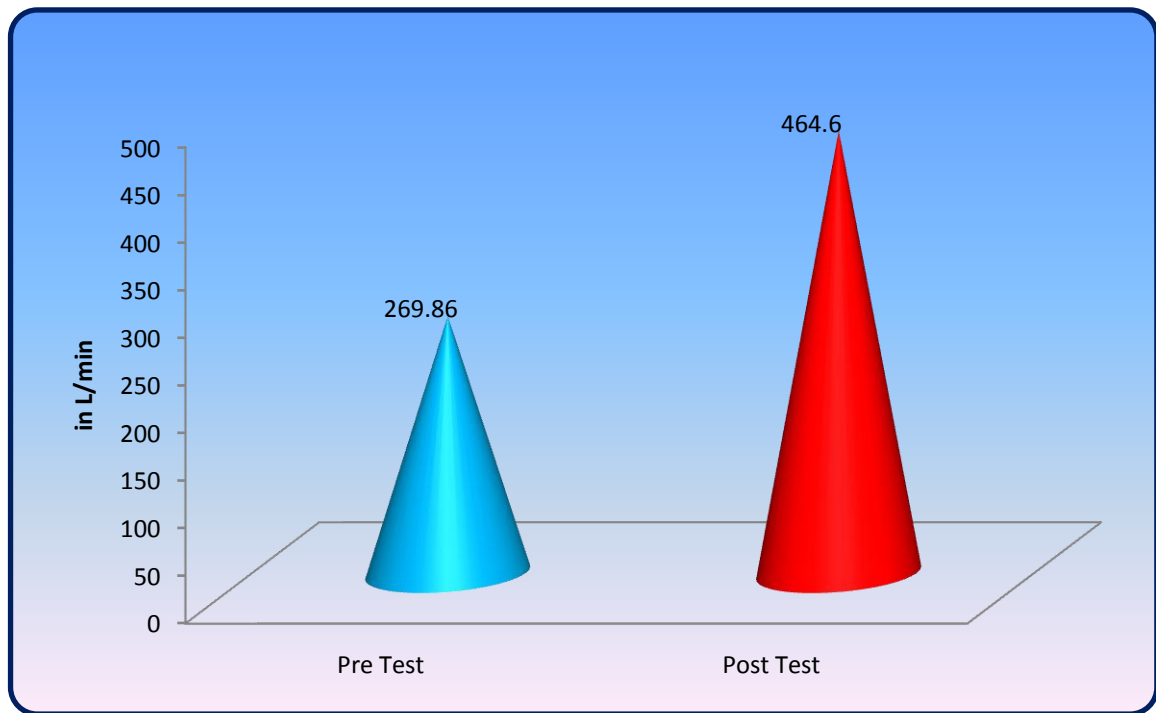

Fig - 8 Graph showing the pre test and post test mean values of Plyometric Group on RBC
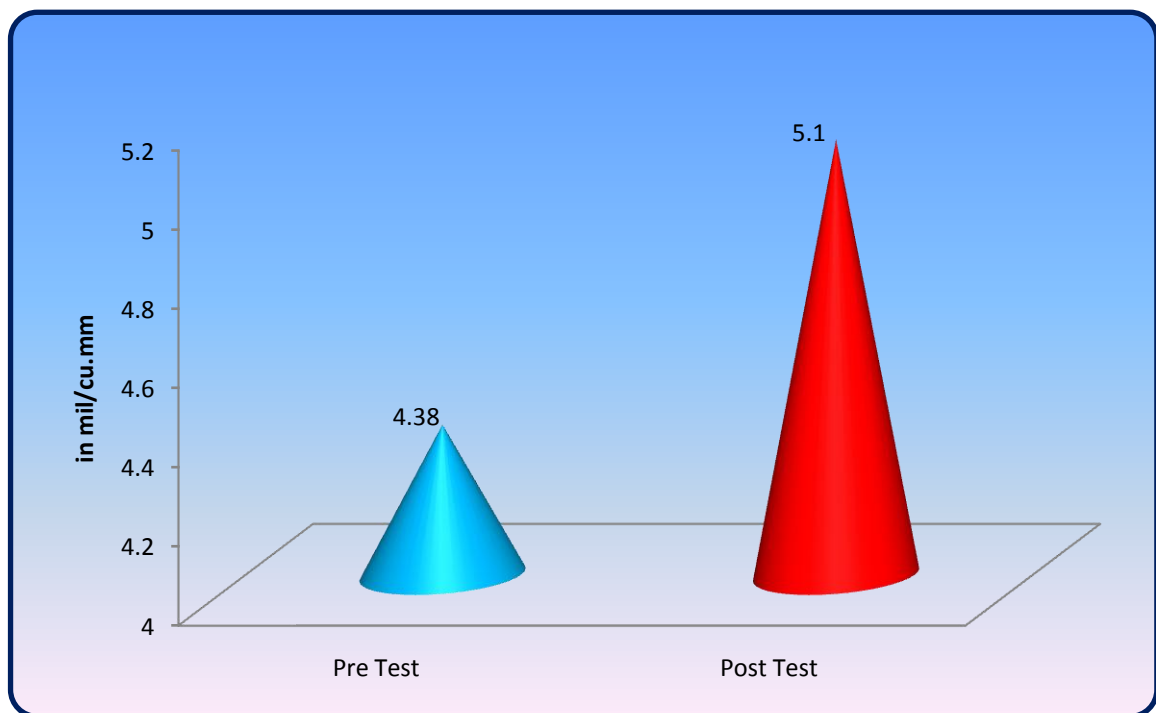
Fig - 9 Graph showing the pre test and post test mean values of Plyometric Group on WBC
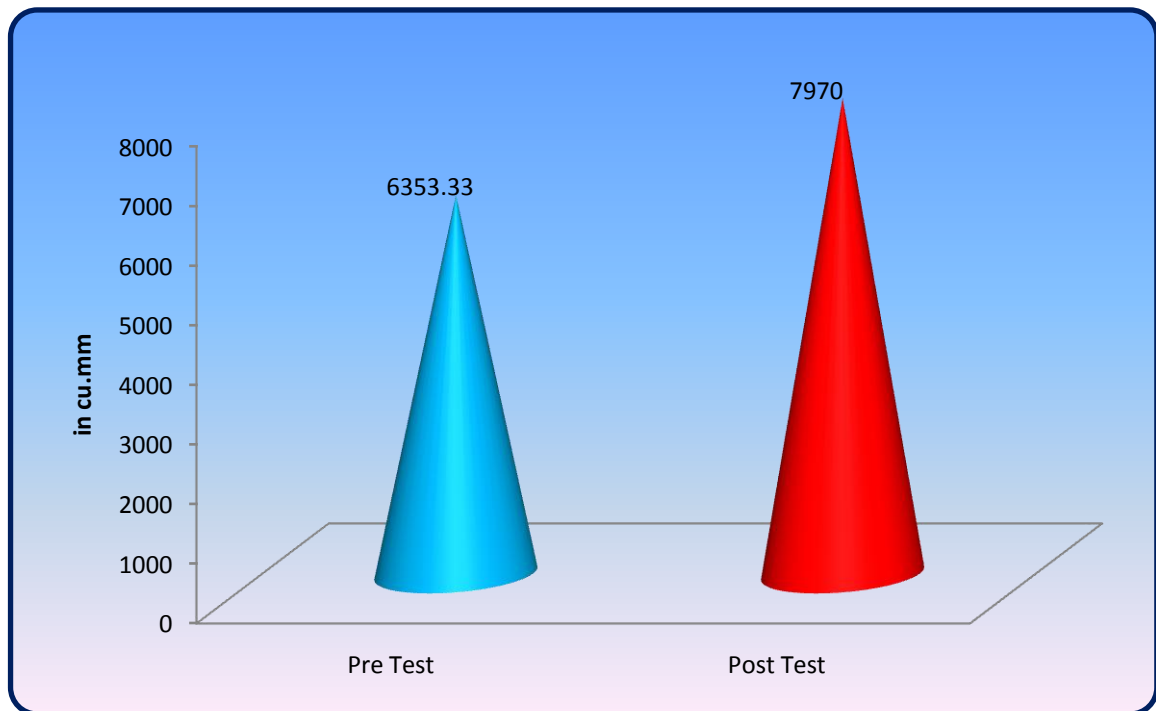

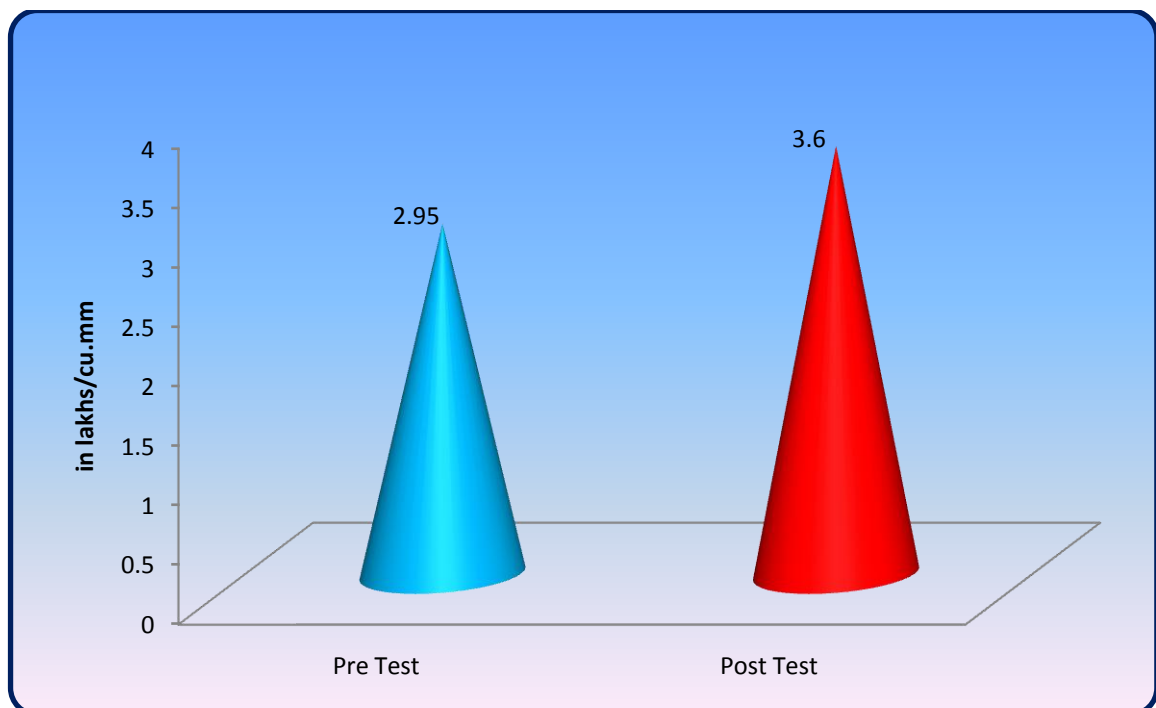**Fig - 10 Graph showing the pre test and post test mean values of Plyometric Group on Platelets**

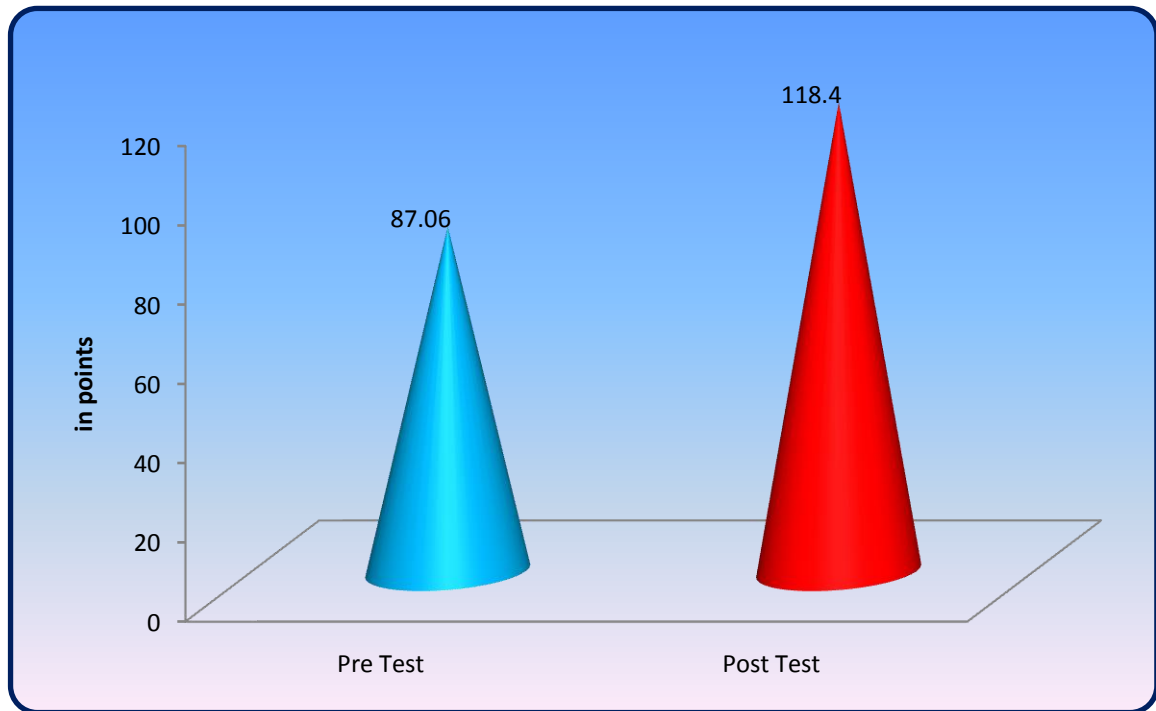**Fig - 11 Graph showing the pre test and post test mean values of Plyometric Group on Shooting**

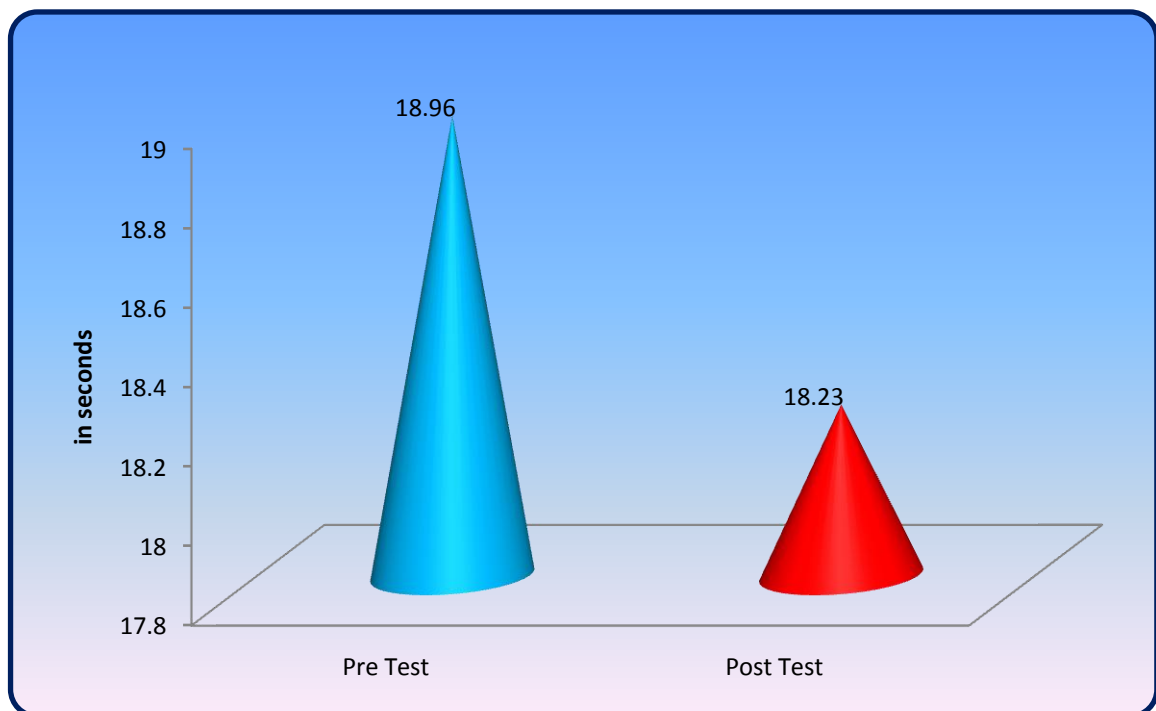**Fig - 12 Graph showing the pre test and post test mean values of Plyometric Group on Dribbling**

Fig – 13 Graph showing the pre test and post test mean values of Plyometric Group on Passing
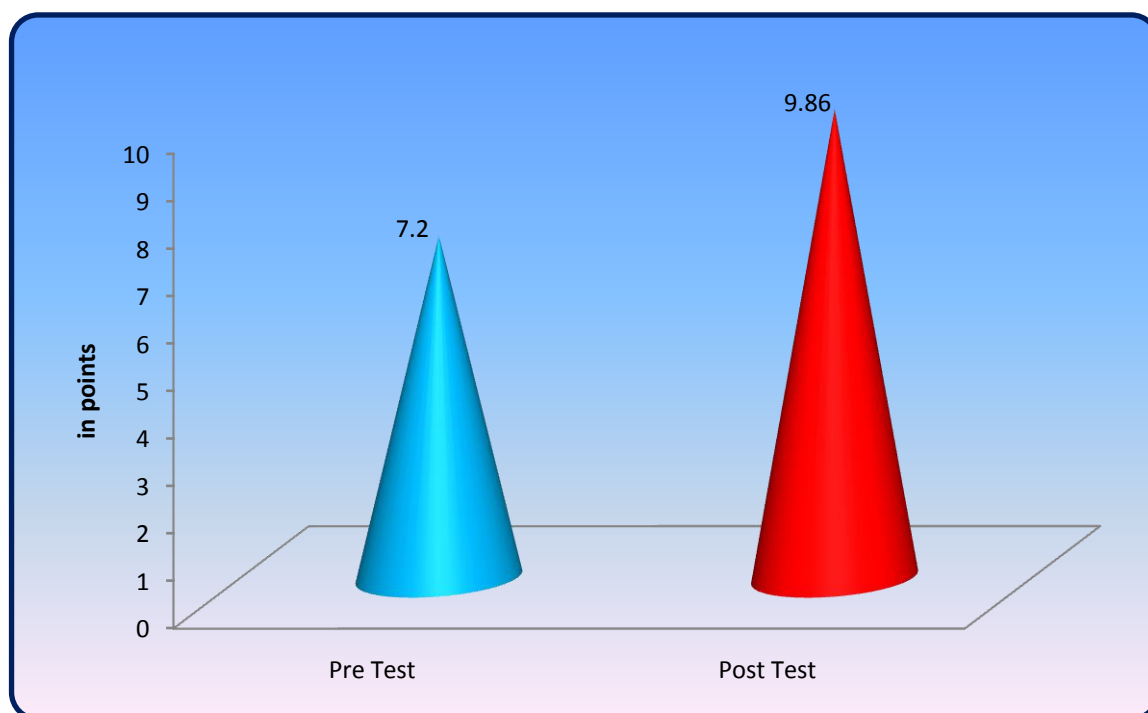

TABLE - VIII

SIGNIFICANCE OF MEAN GAINS/ LOSSES BETWEEN

PRE AND POST TEST OF SAQ TRAINING GROUP (SAQTG)

Sl.No	Variables	Pre test (Mean and S.D)	Post test (Mean and S.D)	MD	SEM	't' ratio
1	Vital Capacity	2.62 ± 0.06	3.20 ± 0.12	0.57	0.02	21.10*
2	Forced Vital Capacity	3.40 ± 0.08	4.69 ± 0.09	1.28	0.04	29.98*
3	Peak Expiratory Flow Rate	267.86 ± 4.40	465.13 ± 7.96	197.26	2.39	82.35*
4	RBC	4.53 ± 0.41	5.18 ± 0.07	0.64	0.11	5.85*
5	WBC	6790.00 ±	7544.66 ±	754.66	209.46	3.60*

		707.91	685.51			
6	Platelets	2.66 ± 0.40	3.64 ± 0.10	0.98	0.11	8.88*
7	Shooting	86.86 ± 8.95	119.60 ± 9.62	32.73	3.67	8.91*
8	Dribbling	18.87 ± 0.46	18.13 ± 0.37	0.74	0.16	4.45*
9	Passing	7.13 ± 0.83	10.00 ± 0.75	2.86	0.25	11.21*

*Significant at 0.05 level (2.09)

Table VIII indicates the obtained 't' values on variables for the SAQ Group are: 21.10 for vital capacity, 29.98 for forced vital capacity, 82.35 for peak expiratory flow rate, 5.85 for RBC, 3.60 for WBC, 8.88 for platelets, 8.91 for shooting, 4.45 for dribbling and 11.21 for passing. The obtained t- values to be significant at 0.05 level for degree of freedom 14 the required critical value was 2.14. Thus the observed t-values on variables are found to be higher than the required critical value (2.14). It was inferred that the obtained 't'-ratio on physiological, bio-chemical and performance variables were statistically significant. Significant improvement on physiological, bio-chemical and performance variables from the baseline to post treatment were as follows with respect to changes and level of significant. From the baseline vital capacity, forced vital capacity, peak expiratory flow rate, RBC, WBC, platelets, shooting, and passing was increased and for dribbling the time was decreased.

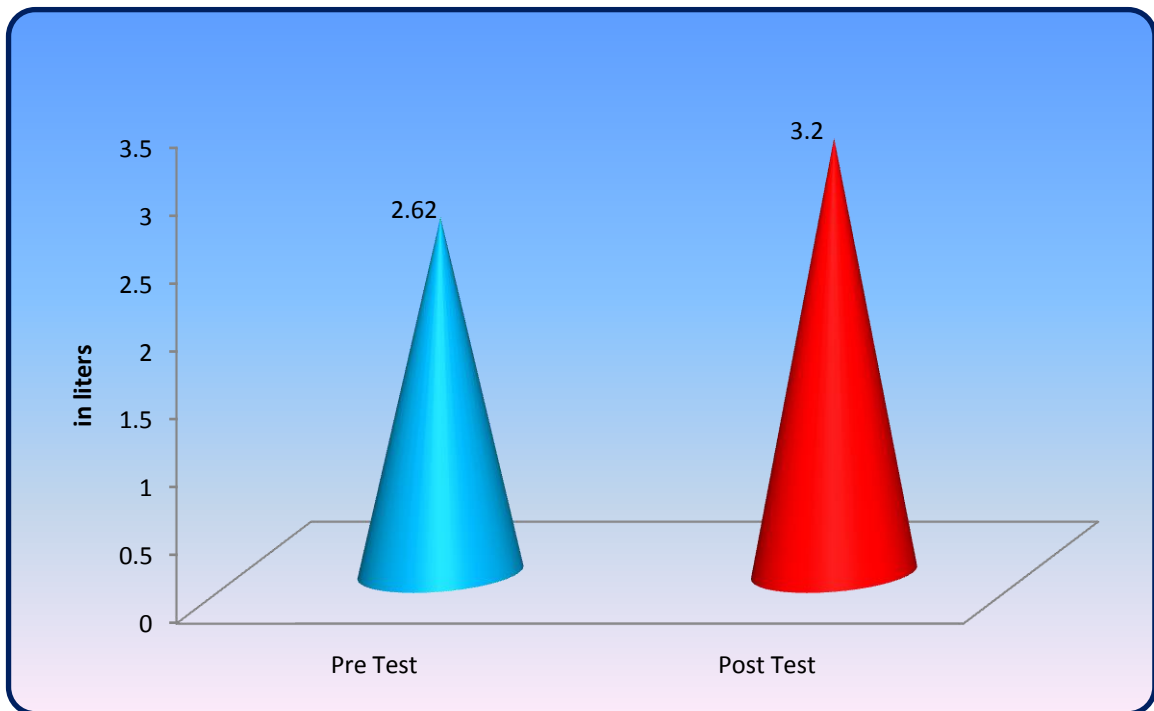**Fig - 14 Graph showing the pre test and post test mean values of SAQ Training Group on Vital Capacity**

Fig - 15 Graph showing the pre test and post test mean values of SAQ Training Group on Forced Vital Capacity
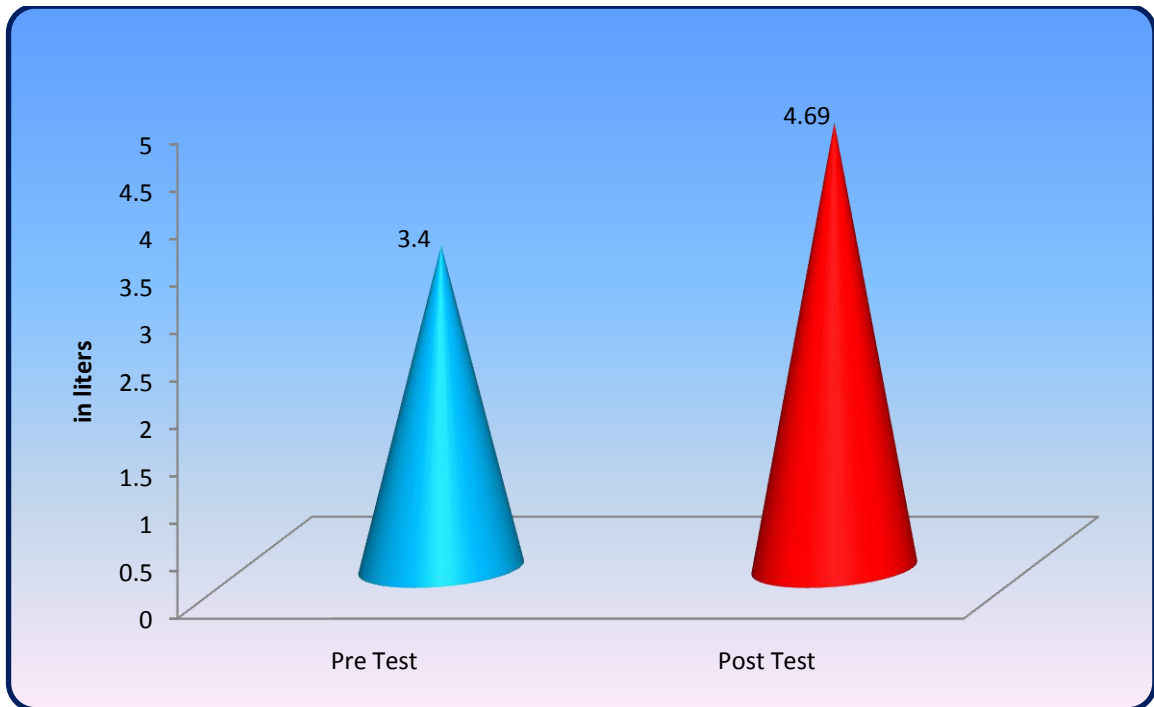
Fig - 16 Graph showing the pre test and post test mean values of SAQ Training Group on Peak Expiratory Flow Rate
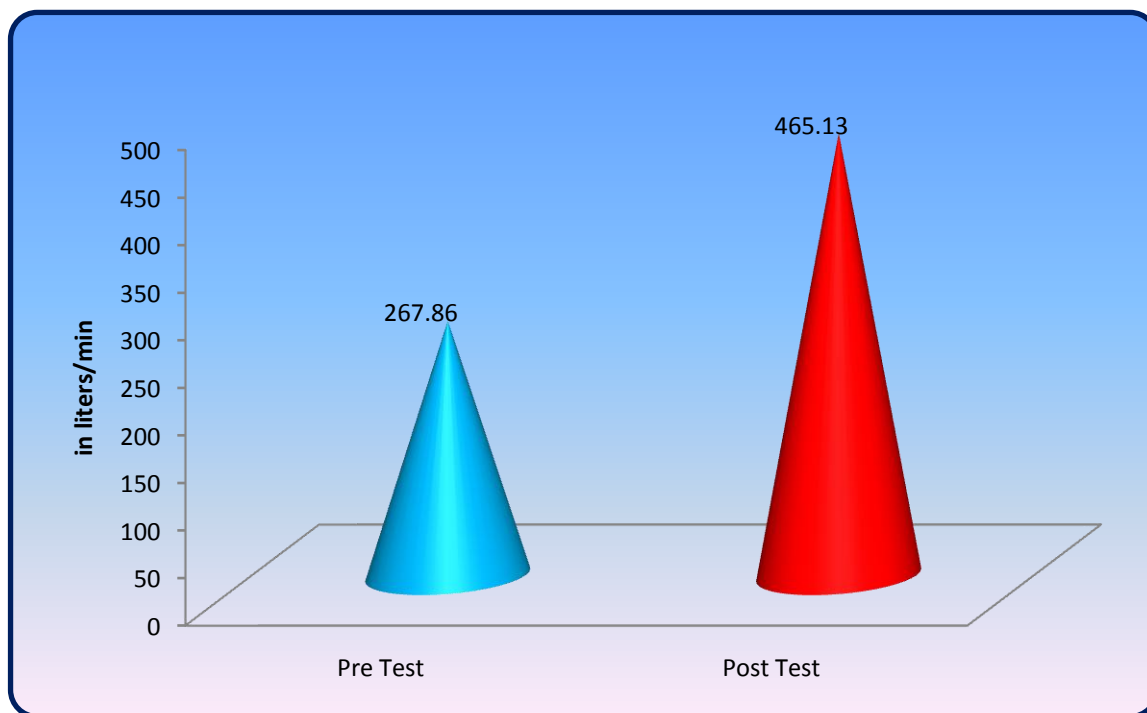

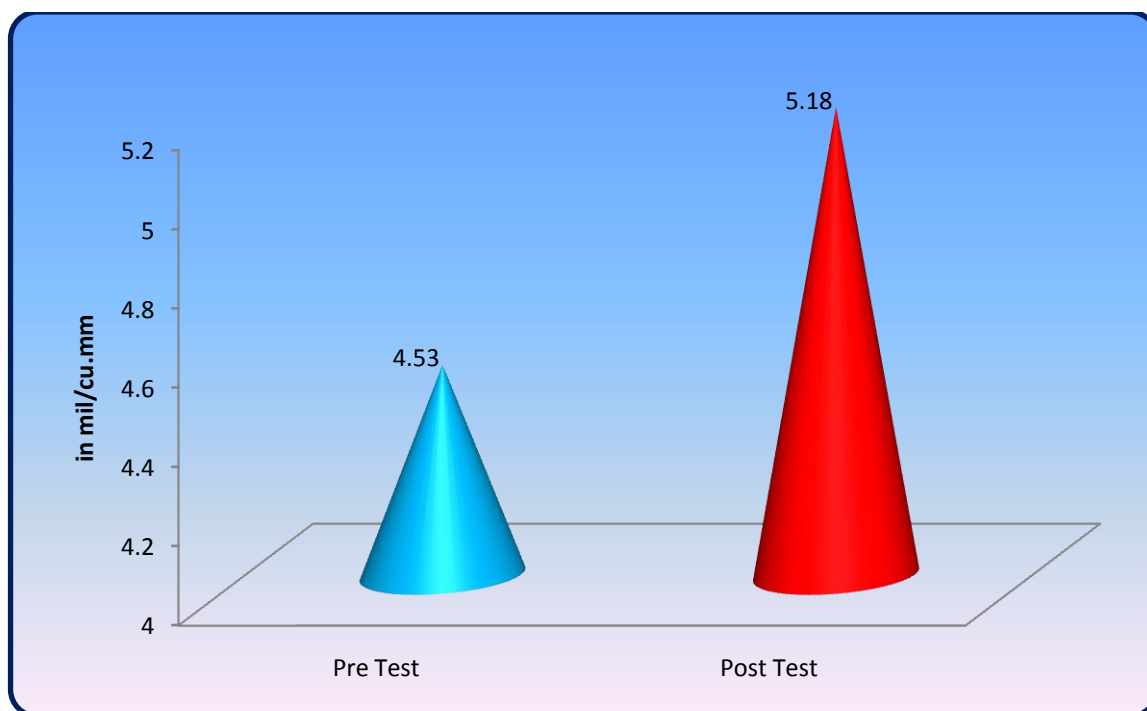**Fig - 17 Graph showing the pre test and post test mean values of SAQ Training Group on RBC**

Fig - 18 Graph showing the pre test and post test mean values of SAQ Training Group on WBC
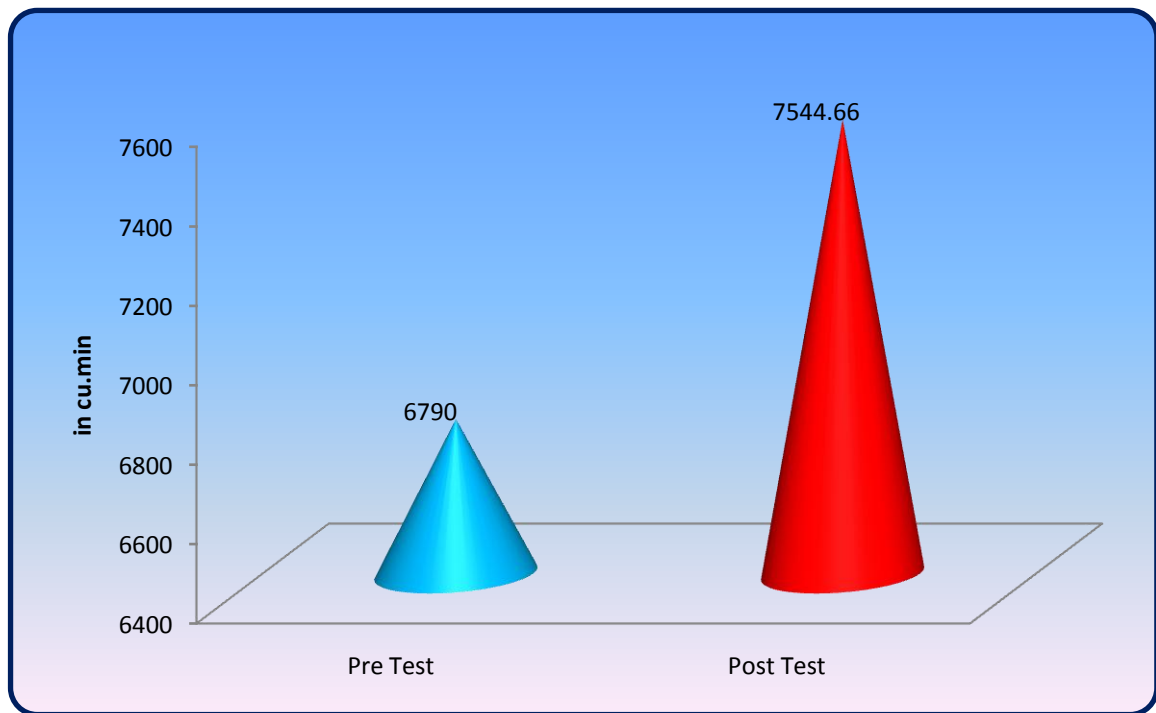

Fig - 19 Graph showing the pre test and post test mean values of SAQ Training Group on Platelets
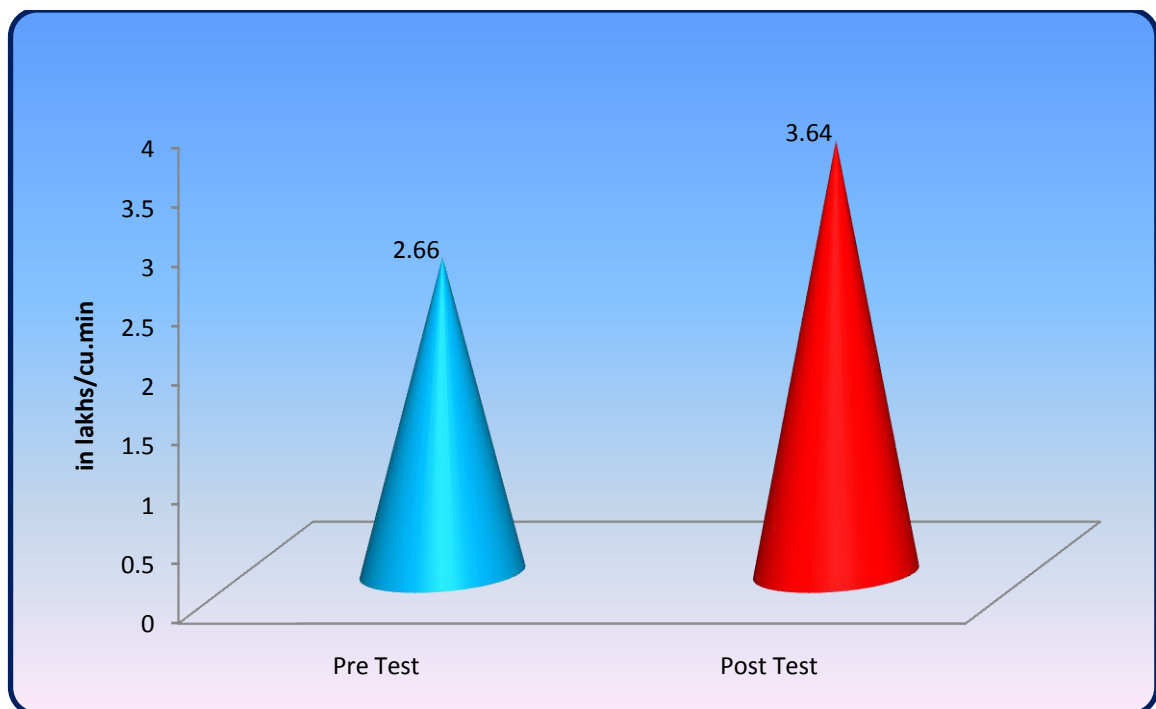
Fig - 20 Graph showing the pre test and post test mean values of SAQ Training Group on Shooting
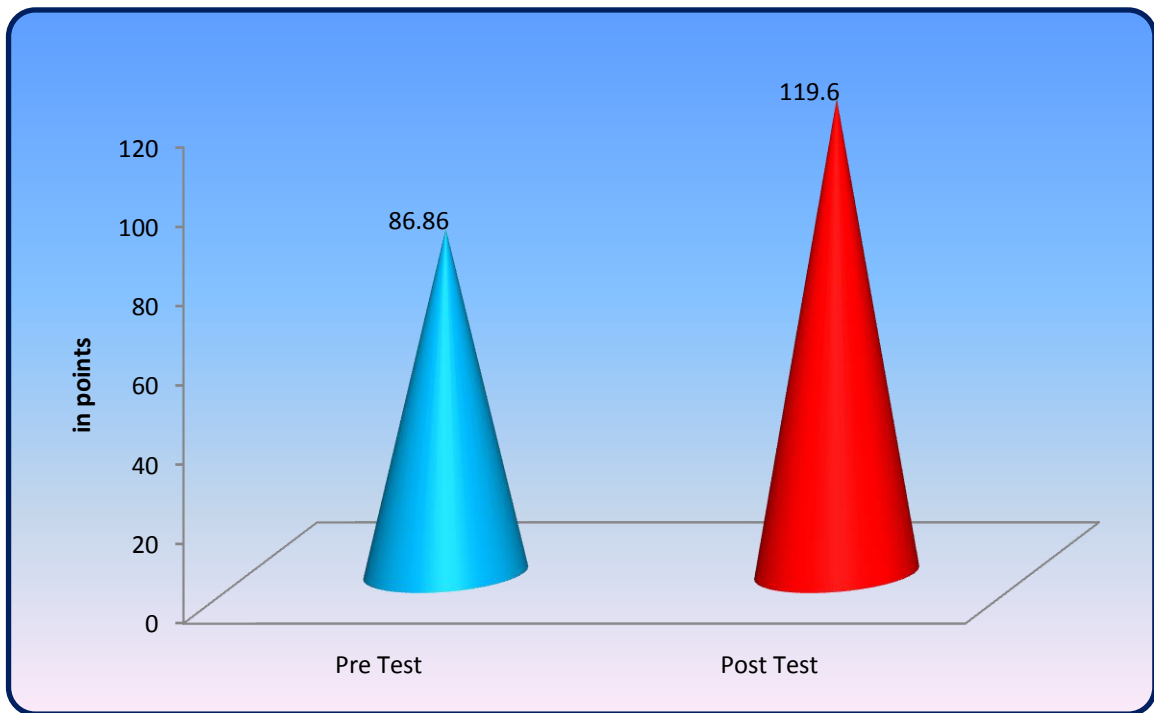

Fig - 21 Graph showing the pre test and post test mean values of SAQ Training Group on Dribbling
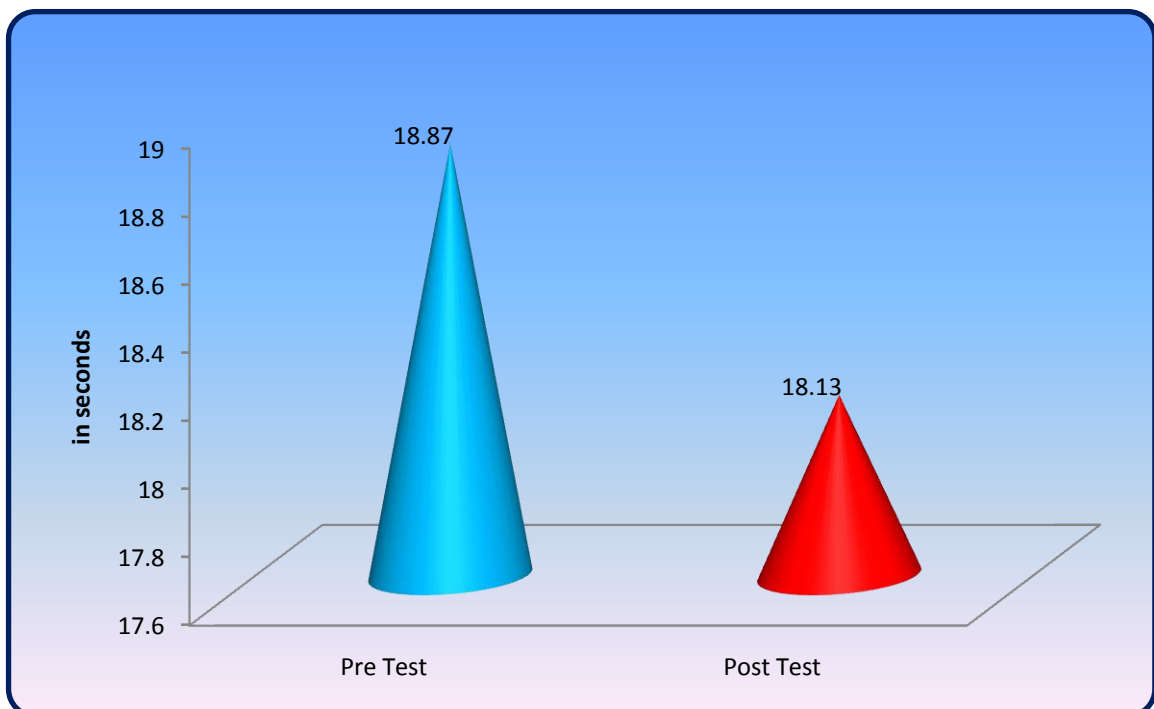
Fig - 22 Graph showing the pre test and post test mean values of SAQ Training Group on Passing
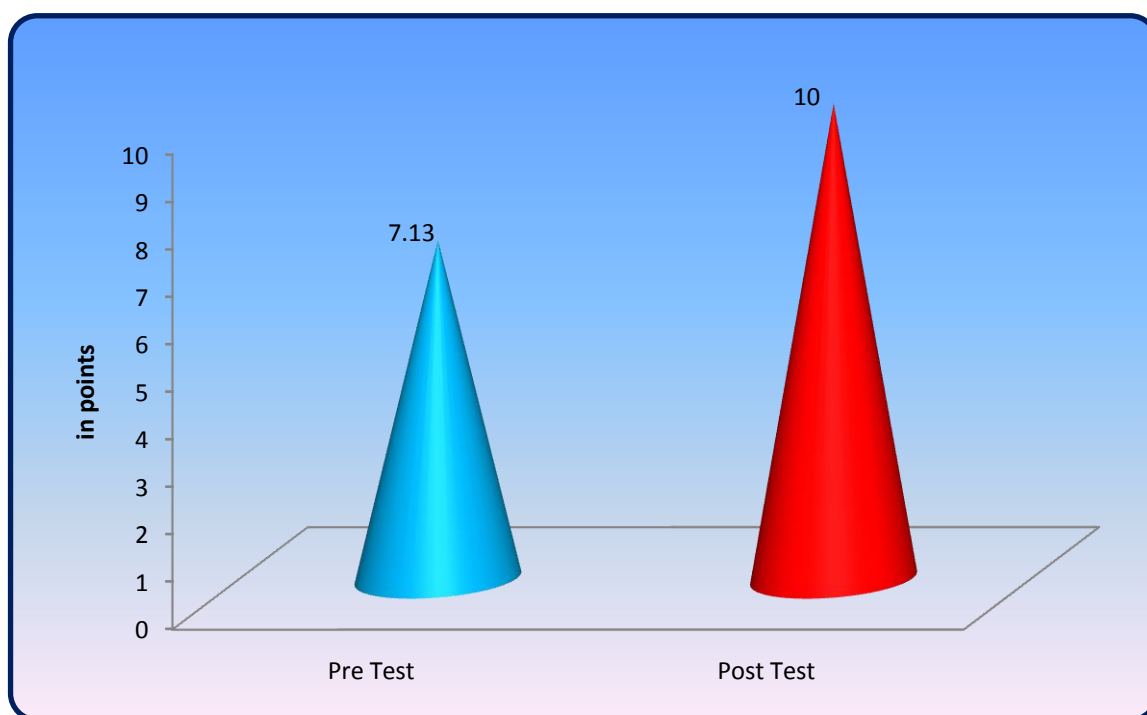
TABLE - IX

SIGNIFICANCE OF MEAN GAINS/ LOSSES BETWEEN

PRE AND POST TEST OF CONTROL GROUP (CG)

Sl.No	Variables	Pre test (Mean and S.D)	Post test (Mean and S.D)	MD	SEM	't' ratio
1	Vital Capacity	2.60 ± 0.09	2.61 ± 0.08	0.004	0.11	0.15
2	Forced Vital Capacity	3.38 ± 0.04	3.42 ± 0.08	0.03	0.07	1.87
3	Peak Expiratory Flow Rate	266.73 ± 4.84	267.33 ± 6.06	0.60	5.52	0.42
4	RBC	4.58 ± 0.36	4.55 ± 0.37	0.02	0.07	1.46
5	WBC	6720.00 ±	6762.00 ±	42.00	234.47	0.17

		820.88	804.34			
6	Platelets	2.99 ± 0.66	2.94 ± 0.42	0.05	0.10	0.48
7	Shooting	83.80 ± 2.04	84.26 ± 3.84	0.46	3.37	0.53
8	Dribbling	19.22 ± 0.45	19.18 ± 0.54	0.03	0.50	0.26
9	Passing	6.80 ± 0.77	7.00 ± 0.84	0.20	1.01	0.76

*Significant at 0.05 level (2.09)

Table IX indicates the obtained 't' values on variables for the Control Group are: 0.15 for vital capacity, 1.87 for forced vital capacity, 0.42 for peak expiratory flow rate, 1.46 for RBC, 0.17 for WBC, 0.48 for platelets, 0.53 for shooting, 0.26 for dribbling and 0.76 for passing. The obtained t- values to be significant at 0.05 level for degree of freedom 14 the required critical value was 2.14. Thus the observed t-values on variables are found to be lesser than the required critical value (2.14). Hence the obtained t-values on the variables were failed to reach the significant level. It was concluded that the changes made from pre-test to post test is statistically not significant.

Fig - 23 Graph showing the pre test and post test mean values of control group on Vital Capacity

Fig - 24 Graph showing the pre test and post test mean values of control group on Forced Vital Capacity

Fig - 25 Graph showing the pre test and post test mean values of control group on Peak Expiratory Flow Rate
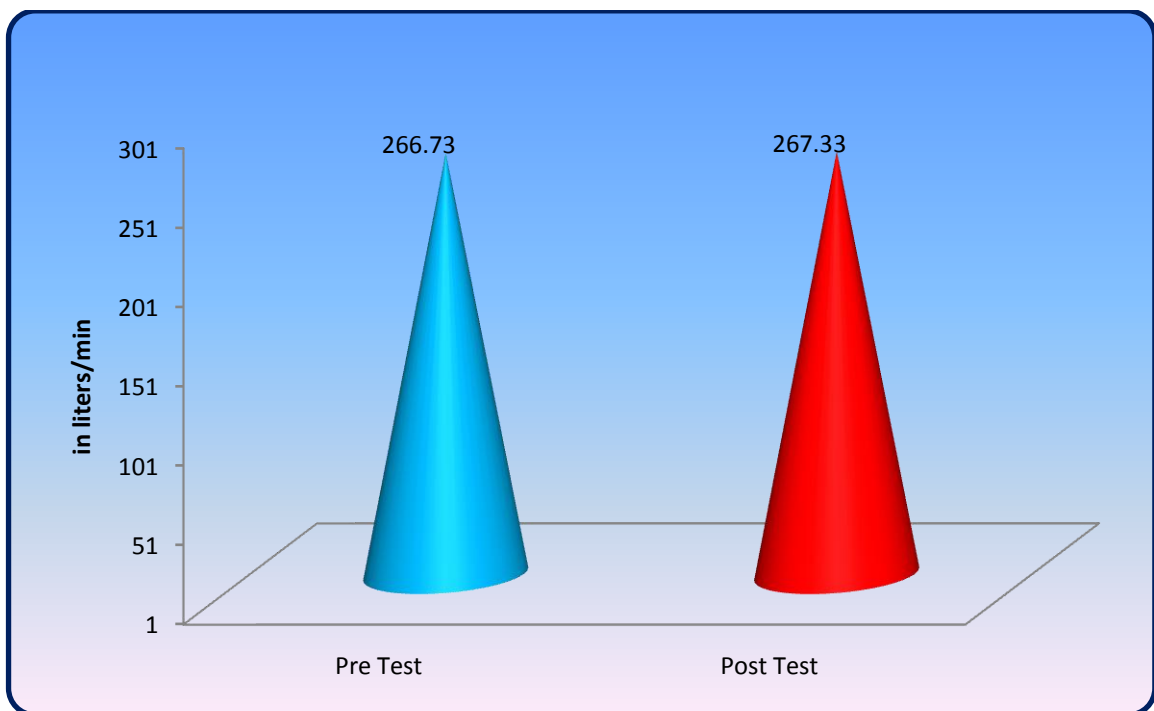
Fig - 26 Graph showing the pre test and post test mean values of control group on RBC
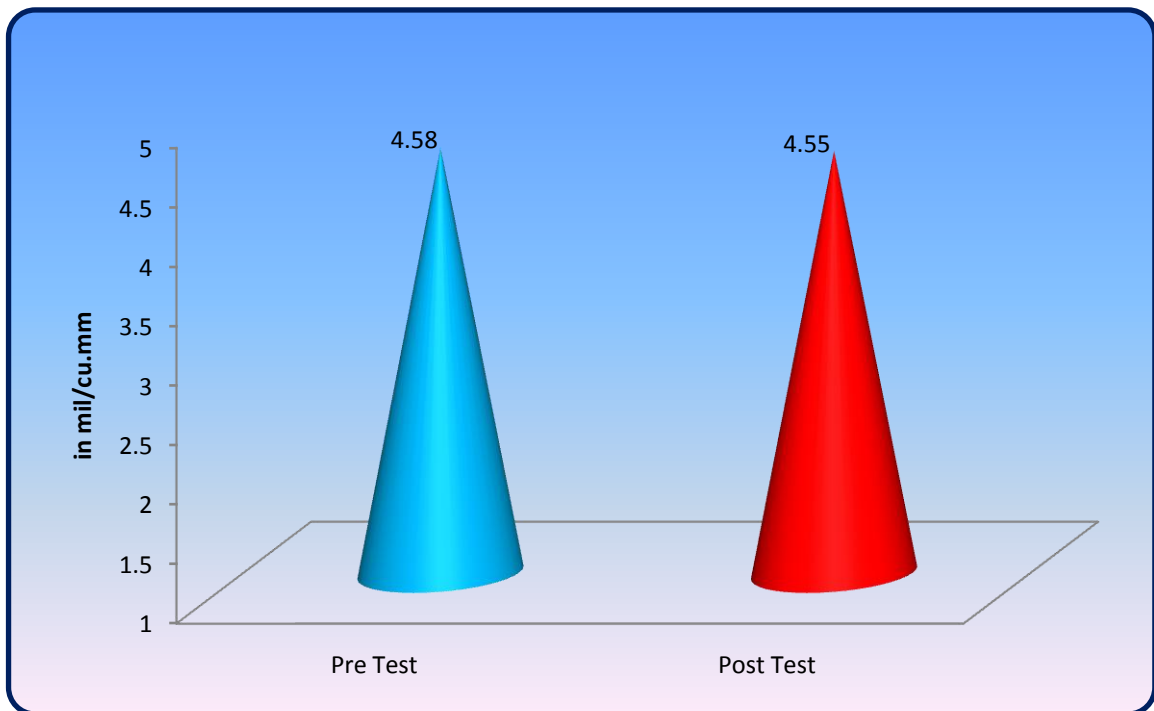
Fig - 27 Graph showing the pre test and post test mean values of control group on WBC
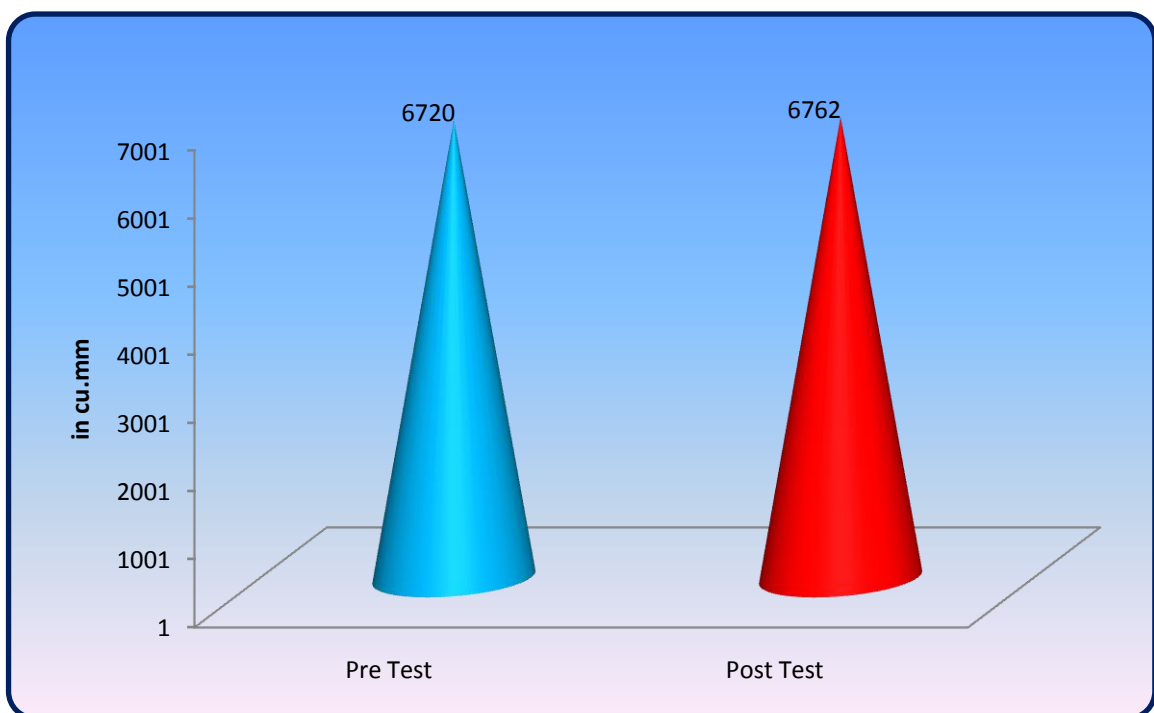
Fig - 28 Graph showing the pre test and post test mean values of control group on Platelets
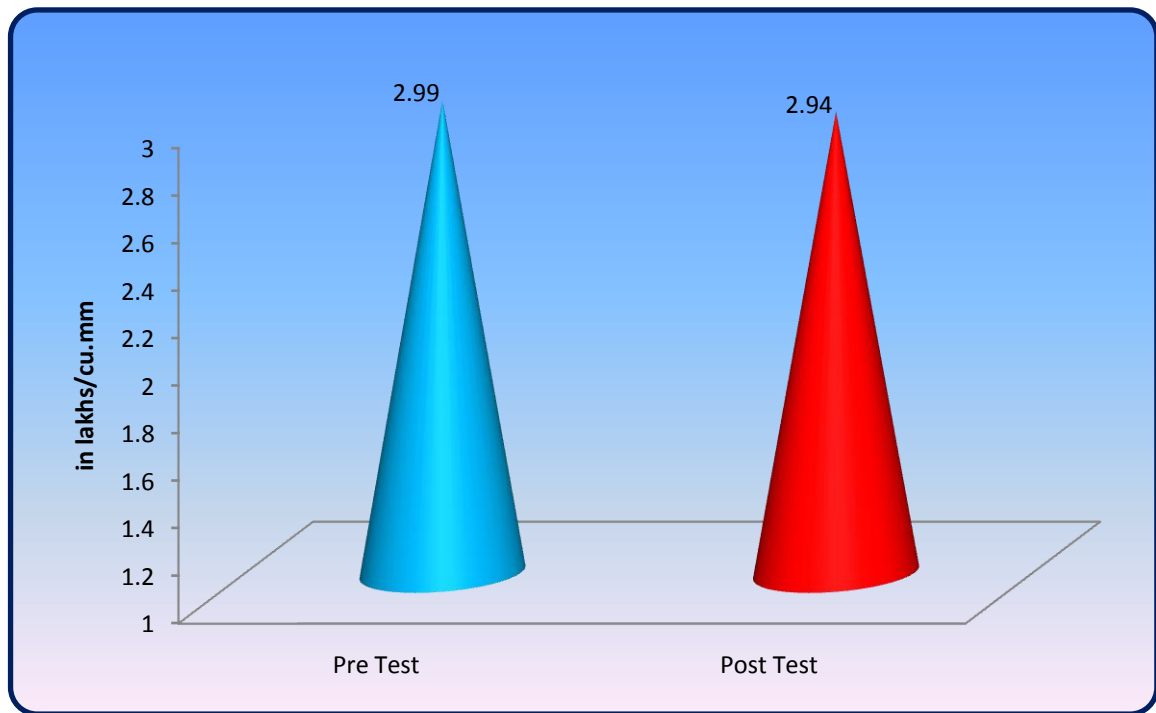
Fig - 29 Graph showing the pre test and post test mean values of control group on Shooting

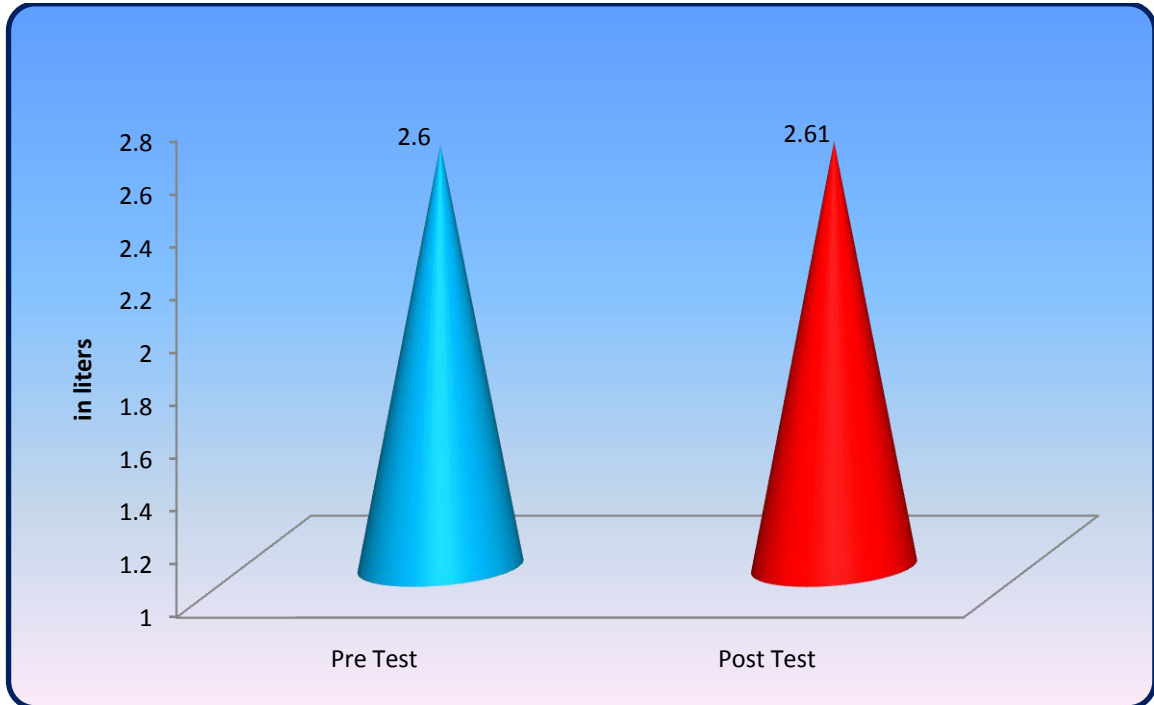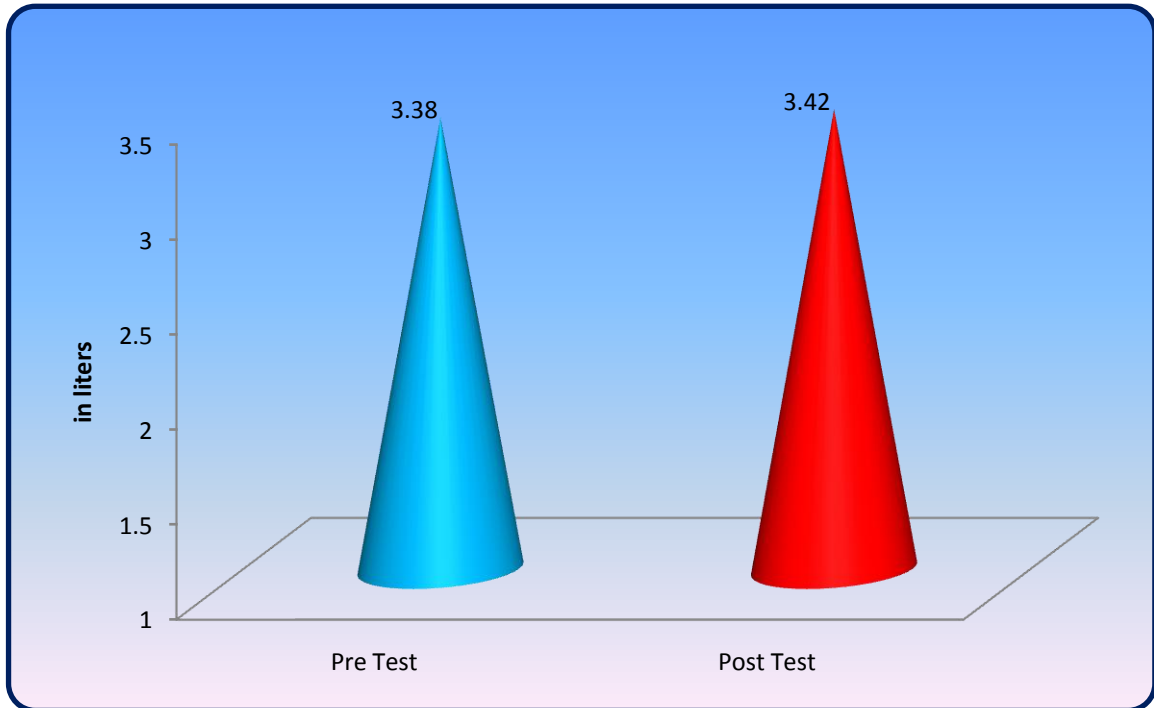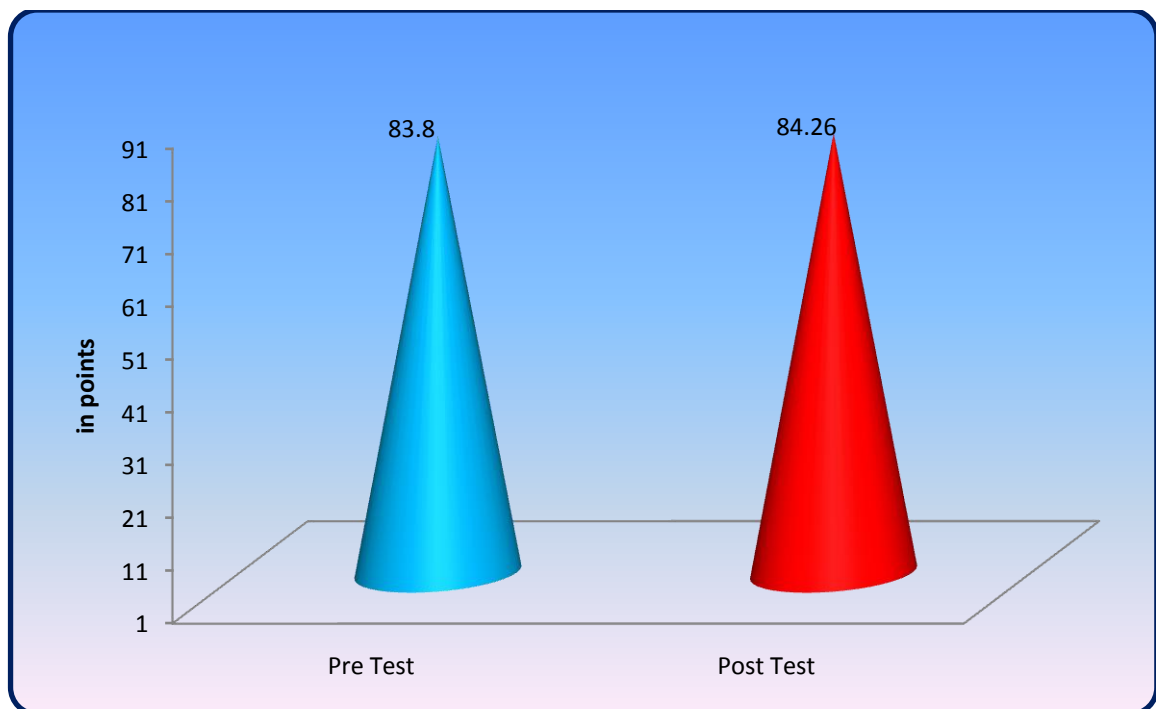**Fig - 30 Graph showing the pre test and post test mean values of control group on Dribbling**
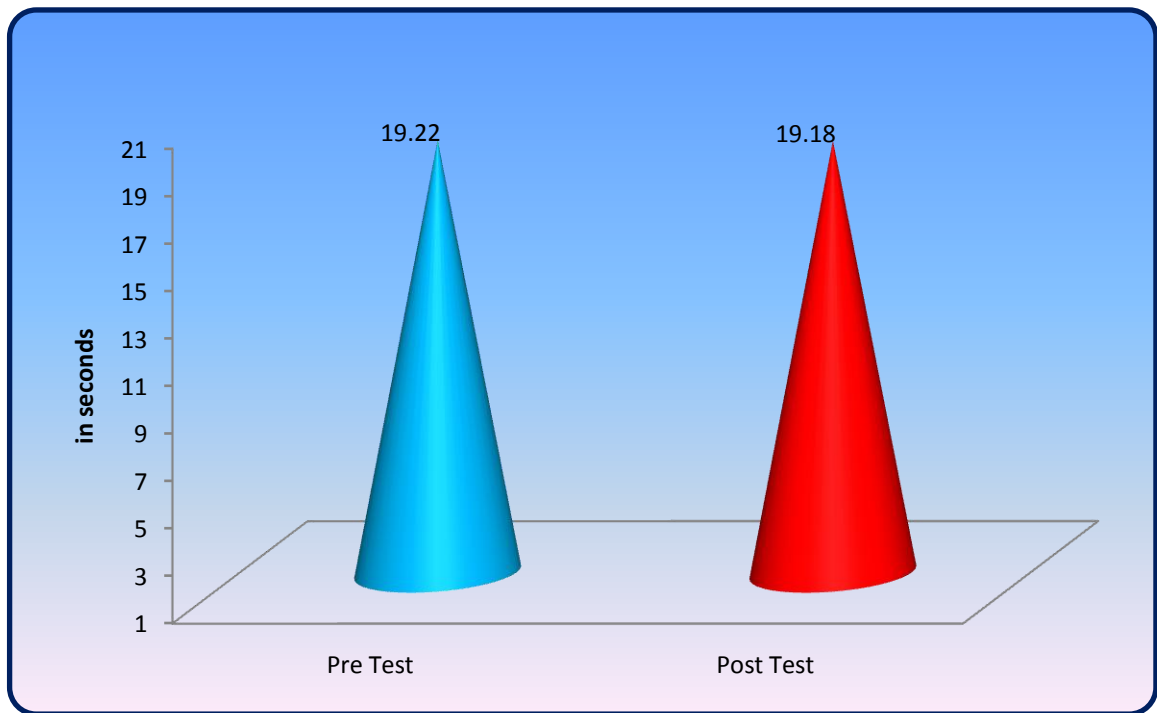
Fig - 31 Graph showing the pre test and post test mean values of control group on Passing
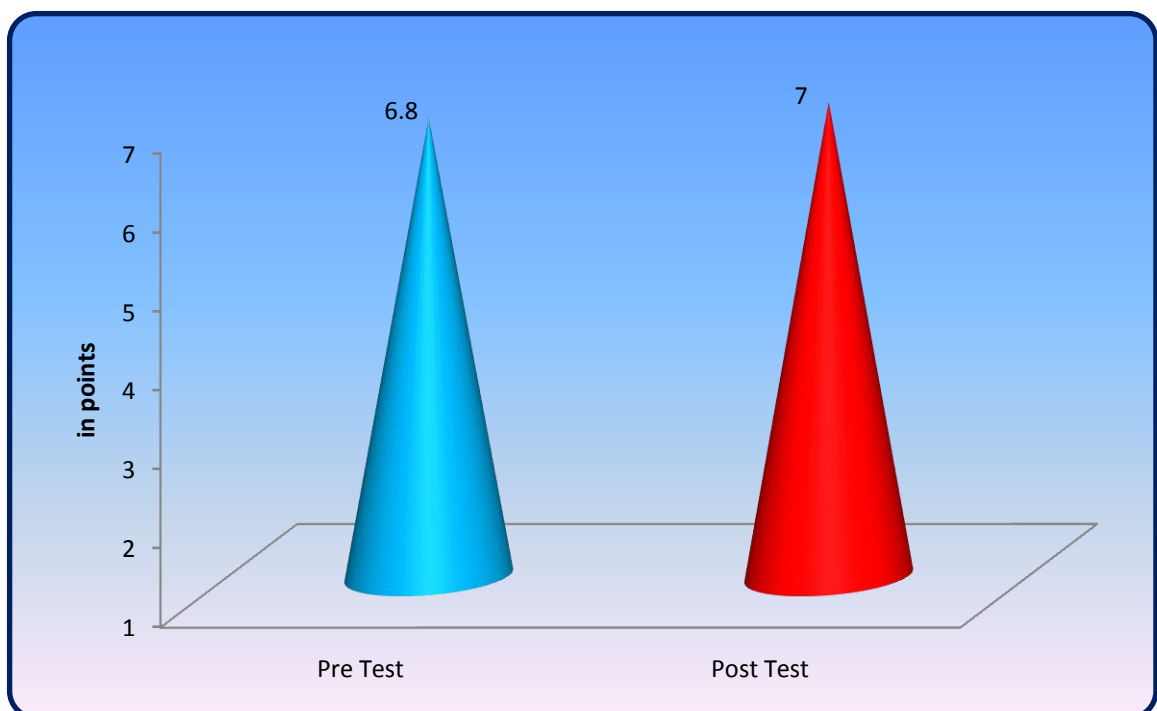
4.5 RESULTS

In the analysis of covariance, analyzing the data on pre test means and post test means among the plyometric training group, SAQ training group and control group on criterion variables is the preliminary process. As the final step of analysis of covariance, the post test means are adjusted for differences in the pre test means, and the adjusted means are tested for significance. Thus, the data were analyzed and the results on pre test, post test and adjusted post test are given below.

TABLE – X

ANALYSIS OF VARIANCE ON PRE-TEST MEANS ON

PHYSIOLOGICAL VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Vital Capacity	BG	0.02	2	0.01	1.49
	WG	0.28	42	0.007	
Forced Vital Capacity	BG	0.01	2	0.006	1.10
	WG	0.22	42	0.005	
Peak Expiratory Flow Rate	BG	75.51	2	37.75	1.31
	WG	1208.40	42	28.77	

 * Significant at 0.05 level (3.21)

4.6 Results of Pre test means on Physiological Variables

In testing the pre test means among the plyometric training group, SAQ training group and control group on physiological variables, the obtained f-ratios are: 1.49 for vital capacity, 1.10 for forced vital capacity, 1.31 for peak expiratory flow rate. The obtained F- ratios are statistically not significant as they failed to reach the critical value (3.21) at 0.05 levels. The observed F ratio explained that the significant mean difference is not exist on pre-test means among the three groups of PTG, SAQT and CG. The obtained f-ratio was statistically not significant since it failed to reach the required critical value of 3.21.

Thus, the obtained results on pre test mean confirm the random assignment of subjects into different groups was successful.

TABLE – XI

ANALYSIS OF VARIANCE ON PRE-TEST MEANS ON BIO-CHEMICAL VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
RBC	BG	0.30	2	0.15	1.34
	WG	4.75	42	0.11	
WBC	BG	1650111.11	2	825055.55	1.66
	WG	20877333.33	42	497079.36	
Platelets	BG	0.99	2	0.49	1.65
	WG	12.60	42	0.30	

 * Significant at 0.05 level (3.21)

4.7 Results of Pre test means on bio-chemical Variables

In testing the pre test means among the plyometric training group, SAQ training group and control group on bio-chemical variables, the obtained f-ratios are: 1.34 for RBC, 1.66 for WBC and 1.65 for platelets. The obtained F- ratios are statistically not significant as they failed to reach the critical value (3.21) at 0.05 levels. The observed F ratio explained that the significant mean difference is not exist on pre-test means among the three groups of PTG, SAQT and CG. The obtained f-ratio was statistically not significant since it failed to reach the required critical value of 3.21.

Thus, the obtained results on pre test mean confirm the random assignment of subjects into different groups was successful.

TABLE – XII

ANALYSIS OF VARIANCE ON PRE-TEST MEANS ON
PERFORMANCE VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Shooting	BG	100.57	2	50.28	1.16
	WG	1819.06	42	43.31	
Dribbling	BG	0.98	2	0.49	1.85
	WG	11.07	42	0.26	
Passing	BG	1.37	2	0.68	1.09
	WG	26.53	42	0.63	

* Significant at 0.05 level (3.21)

4.8 Results of Pre test means on Performance Variables

In testing the pre test means among the plyometric training group, SAQ training group and control group on performance variables, the obtained f-ratios are: 1.16 for shooting, 1.85 for dribbling, 1.09 for passing. The obtained F- ratios are statistically not significant as they failed to reach the critical value (3.21) at 0.05 levels. The observed F ratio explained that the significant mean difference is not exist on pre-test means among the three groups of PTG, SAQT and CG. The obtained f-ratio was statistically not significant since it failed to reach the required critical value of 3.21.

Thus, the obtained results on pre test mean confirm the random assignment of subjects into different groups was successful.

TABLE – XIII

ANALYSIS OF VARIANCE ON POST-TEST MEANS OF

PHYSIOLOGICAL VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Vital Capacity	BG	3.82	2	1.91	235.65*
	WG	0.34	42	0.008	
Forced Vital Capacity	BG	16.52	2	8.26	865.09*
	WG	0.40	42	0.01	
Peak Expiratory Flow Rate	BG	390196.31	2	195098.15	3774.93*
	WG	2170.66	42	51.68	

* Significant at 0.05 level (3.15)

4.9 Results of Post test means on Physiological Variables

In testing the post test means among the plyometric group, SAQ training group and control group on physiological variables, the obtained f-ratios are: 235.65 for vital capacity, 865.09 for forced vital capacity and 3774.93 for peak expiratory flow rate. The obtained F- ratios explained that after completion of treatment period of 12 weeks, the mean difference among the three groups of PTG, SAQTG and CG was statistically significant on physiological variables. From the baseline vital capacity, forced vital capacity and peak expiratory flow rate was increased.

TABLE – XIV

ANALYSIS OF VARIANCE ON POST-TEST MEANS OF

BIO-CHEMICAL VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
RBC	BG	3.53	2	1.76	34.38*
	WG	2.16	42	0.05	
WBC	BG	11263697.77	2	5631848.88	12.28*
	WG	19255613.33	42	458466.98	
Platelets	BG	4.67	2	2.33	35.18*
	WG	2.78	42	0.06	

* Significant at 0.05 level (3.15)

4.10 Results of Post test means on Bio-Chemical Variables

In testing the post test means among the plyometric group, SAQ training group and control group on bio-chemical variables, the obtained f-ratios are: 34.38 for RBC, 12.28 for WBC and 35.18 for platelets. The obtained F- ratios explained that after completion of treatment period of 12 weeks, the mean difference among the three groups of PTG, SAQTG and CG was statistically significant on bio-chemical variables. From the baseline RBC, WBC and platelets was increased.

TABLE – XV

ANALYSIS OF VARIANCE ON POST-TEST MEANS OF PERFORMANCE VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Shooting	BG	12074.84	2	6037.42	108.45*
	WG	2338.13	42	55.67	
Dribbling	BG	10.19	2	5.09	28.76*
	WG	7.44	42	0.17	
Passing	BG	86.17	2	43.08	53.64*
	WG	33.73	42	0.80	

* Significant at 0.05 level (3.15)

4.11 Results of Post test means on Performance Variables

In testing the post test means among the plyometric group, SAQ training group and control group on performance variables, the obtained f-ratios are: 108.45 for shooting, 28.76 for dribbling and 53.64 for passing. The obtained F-ratios explained that after completion of treatment period of 12 weeks, the mean difference among the three groups of PTG, SAQTG and CG was statistically significant on performance variables. From the baseline shooting and passing was increased and dribbling was decreased.

TABLE - XVI

ANALYSIS OF CO-VARIANCE ON ADJUSTED POST TEST MEANS OF PHYSIOLOGICAL VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Vital Capacity	BG	3.48	2	1.74	232.05*
	WG	0.30	41	0.008	
Forced Vital Capacity	BG	16.07	2	8.03	857.22*
	WG	0.38	41	0.009	
Peak Expiratory Flow Rate	BG	375908.02	2	187954.01	3558.32*
	WG	2165.65	41	52.82	

* Significant at 0.05 level (3.16)

4.12 Results of Adjusted means on Physiological Variables

In testing the adjusted post test means among the plyometric training group, SAQ training group and control group on physiological variables, the obtained f-ratios are: 232.05 for vital capacity, 857.22 for forced vital capacity and 3558.32 for peak expiratory flow rate. The obtained F- ratios explained that after completion of treatment period of 12 weeks, the mean difference among the three groups of PTG, SAQTG and CG was statistically significant on physiological variables. From the baseline vital capacity, forced vital capacity and peak expiratory flow rate was increased.

Based on the result of the comparative effect of PTG, SAQTG and CG the formulated hypothesis No.1 related to this, was accepted.

TABLE - XVII

ANALYSIS OF CO-VARIANCE ON ADJUSTED POST TEST MEANS OF BIO-CHEMICAL VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
RBC	BG	3.84	2	1.92	52.60*
	WG	1.50	41	0.03	
WBC	BG	12094192.76	2	6047096.38	13.53*
	WG	18317681.76	41	446772.72	
Platelets	BG	5.23	2	2.61	54.26*
	WG	1.97	41	0.04	

* Significant at 0.05 level (3.16)

4.13 Results of Adjusted means o Bio-Chemical Variables

In testing the adjusted post test means among the plyometric training group, SAQ training group and control group on bio-chemical variables, the obtained f-ratios are: 52.60 for RBC, 13.53 for WBC and 54.26 for platelets. The obtained F- ratios explained that after completion of treatment period of 12 weeks, the mean difference among the three groups of PTG, SAQTG and CG was statistically significant on bio-chemical variables. From the baseline RBC, WBC and platelets was increased.

Based on the result of the comparative effect of PTG, SAQTG and CG the formulated hypothesis No.2 related to this, was accepted.

TABLE - XVIII

ANALYSIS OF CO-VARIANCE ON ADJUSTED POST TEST MEANS OF PERFORMANCE VARIABLES

Variables	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio
Shooting	BG	11387.75	2	5693.87	99.90*
	WG	2336.67	41	56.99	
Dribbling	BG	8.95	2	4.47	24.89*
	WG	7.37	41	0.18	
Passing	BG	81.01	2	40.50	49.34*
	WG	33.65	41	0.82	

* Significant at 0.05 level (3.16)

4.14 Results of Adjusted means on Performance Variables

In testing the adjusted post test means among the plyometric training group, SAQ training group and control group on performance variables, the obtained f-ratios are: 99.90 for shooting, 24.89 for dribbling and 49.34 for passing. The obtained F- ratios explained that after completion of treatment period of 12 weeks, the mean difference among the three groups of PTG, SAQTG and CG was statistically significant on performance variables. From the baseline shooting, dribbling and passing was increased.

Based on the result of the comparative effect of PTG, SAQTG and CG the formulated hypothesis No.3 related to this, was accepted.

Further, to identify the specific differences among the three groups as a post-hoc test, schefee's test was performed. The results of post-hoc tests are presented in the table – XIX to XXI.

4.15 RESULTS OF SCHEFFE'S TEST

Significant F ratios were obtained in all the selected variables. In order to find out the significance of the difference of all possible pairs of adjusted final group means scheffe's post hoc test was applied. The results of the scheffe's post hoc test were presented in the following tables.

TABLE – XIX

SCHEFEE'S POST HOC TEST OF PLYOMETRIC TRAINING

SAQ TRAINING AND CONTROL GROUPS

PHYSIOLOGICAL VARIABLES

Sl.No	Variables	Adjusted Means			Mean Difference	CI Value
		PTG	SAQTG	CG		
1	Vital Capacity	3.24	3.20	------	0.04	0.08
		3.24	------	2.62	0.62*	
		------	3.20	2.62	0.58*	
2	Forced Vital Capacity	4.73	4.69	------	0.04	0.08
		4.73	------	3.41	1.32*	
		------	4.69	3.41	1.28*	
3	Peak Expiratory Flow Rate	464.49	465.15	------	0.66	6.74
		464.49	------	267.42	197.07*	
		------	465.15	267.42	197.70*	

As per the results of the table – XIX, since the mean difference for vital capacity, forced vital capacity and peak expiratory flow rate between plyometric training group and control group were 0.62, 1.32 and 197.07 respectively, SAQ training group and control group were 0.58, 1.28 and 197.70 respectively are higher than the CI value of 0.08, 0.08 and 6.74 respectively. It was concluded that the observed adjusted mean difference is statistically significant. Since the mean difference for vital capacity, forced vital capacity and peak expiratory flow rate between plyometric training group and SAQ training group were 0.04, 0.04 and 0.66 are lesser than the CI value 0.08, 0.08 and 6.74 respectively. It was

concluded that the observed adjusted mean difference is statistically not significant. The mean scores are displayed in figures 32 to 34.

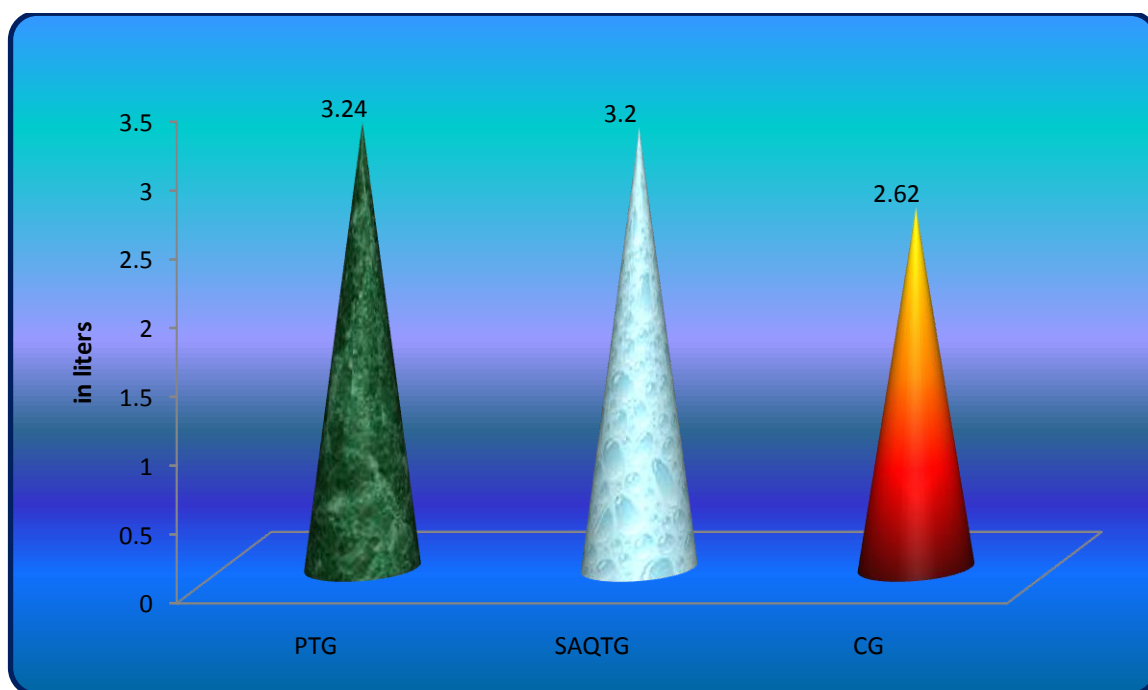**Fig - 32 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on Vital Capacity**

Fig - 33 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on Forced Vital Capacity
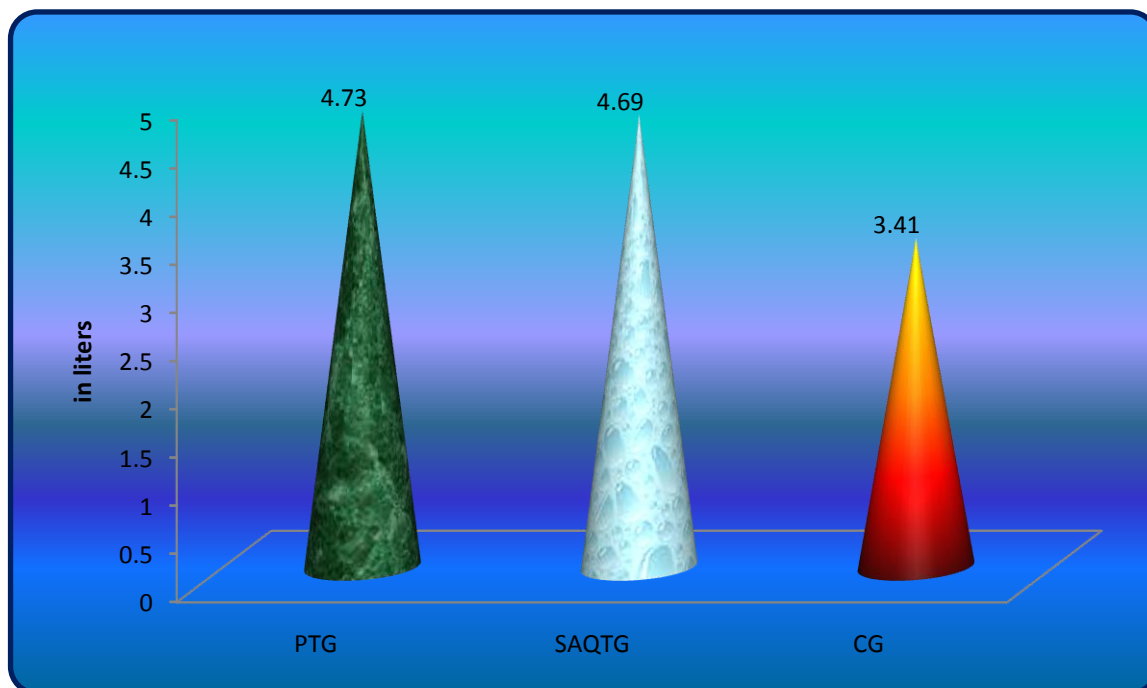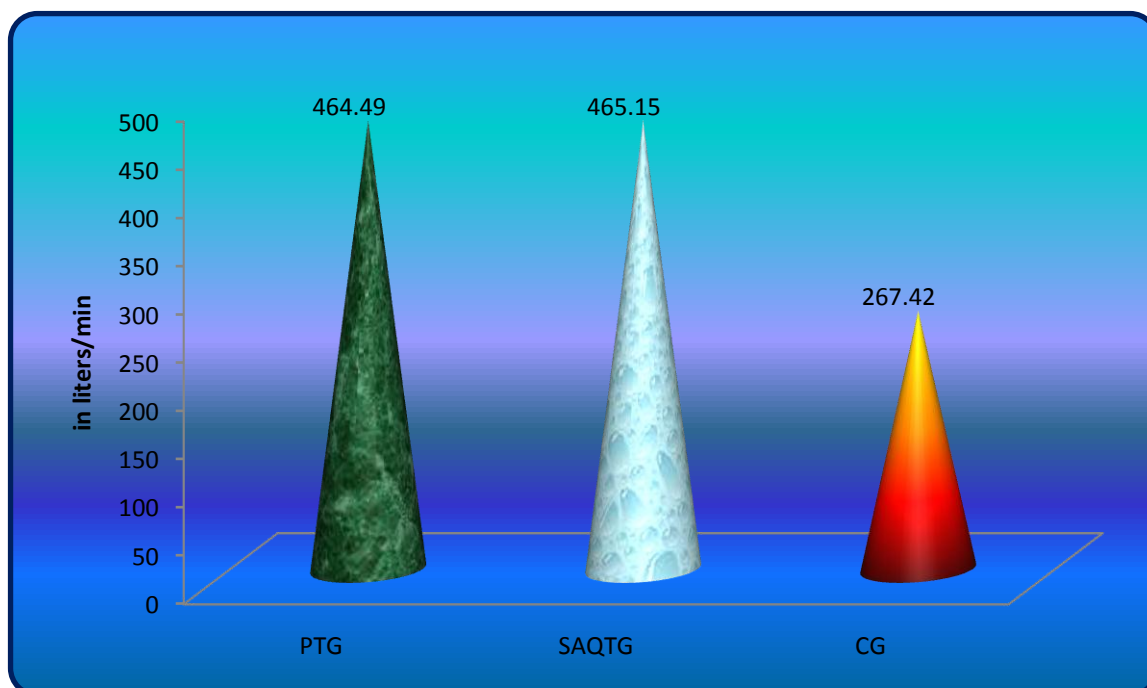

Fig - 34 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on Peak Expiratory Flow Rate

4.16 DISCUSSION ON FINDINGS ON PHYSIOLOGICAL VARIABLES

The results presented in table XIX showed that obtained adjusted means on physiological variables namely for vital capacity, plyometric training group was 3.24 followed by SAQ training group with mean value of 3.20, and control group with mean value of 2.62. For forced vital capacity plyometric training group was 4.73 followed by SAQ training group with mean value of 4.69, and control group with mean value of 3.41. For peak expiratory flow rate SAQ training group was 465.15 followed by plyometric training group with mean value of 464.49, and control group with mean value of 267.42.

The differences among pretest scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and the obtained F values for vital capacity (1.49, 235.65 and 232.05) forced vital capacity (1.10, 865.09 and 857.22) and peak expiratory flow rate (1.31, 3774.93 and 3558.32) respectively. It was found that obtained F value on pre test scores were not significant and the obtained F values on post test and adjusted means were significant at 0.05 level of confidence as these were greater than the required table F value of 3.22 and 3.23. The post hoc analysis through Scheffe's Confidence test proved that due to twelve weeks training of plyometric training and SAQ training has improved physiological variables namely vital capacity, forced vital capacity and peak expiratory flow rate than the control group and the differences were significant at 0.05 level. Further, the post hoc analysis showed that there was significant differences exist between the experimental groups, clearly indicating

that both plyometric training was better in vital capacity, forced vital capacity and
SAQ training was better in peak expiratory flow rate among the football players.

TABLE – XX

**SCHEFEE'S POST HOC TEST OF PLYOMETRIC TRAINING
SAQ TRAINING AND CONTROL GROUPS AND
BIO-CHEMICAL VARIABLES**

Sl.No	Variables	Adjusted Means			Mean Difference	CI Value
		PTG	SAQTG	CG		
1	RBC	5.15	5.16	------	0.01	0.16
		5.15	------	4.52	0.63*	
		------	5.16	4.52	0.64*	
2	WBC	8026.8	7508.9	------	517.89	620.33
		80226.8	------	6741	1285.71*	
		------	7508.9	6741	767.80*	
3	Platelets	3.58	3.69	------	0.11	0.18
		3.58	------	2.90	0.68*	
		------	3.69	2.90	0.79*	

As per the results of the table – XX, since the mean difference for RBC,
WBC and platelets between plyometric training group and control group were
0.63, 1285.71 and 0.68 respectively. SAQ training group and control group were
0.64, 767.80 and 0.79 respectively are higher than the CI value of 0.16, 620.33
and 0.18 respectively. It was concluded that the observed adjusted mean
difference is statistically significant. Since the mean difference for RBC, WBC

and platelets between plyometric training group and SAQ training group were 0.01, 517.89 and 0.11 are lesser than the CI value 0.16, 620.33 and 0.18 respectively. It was concluded that the observed adjusted mean difference is statistically not significant. The mean scores are displayed in figures 35 to 37.

Fig - 35 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on RBC
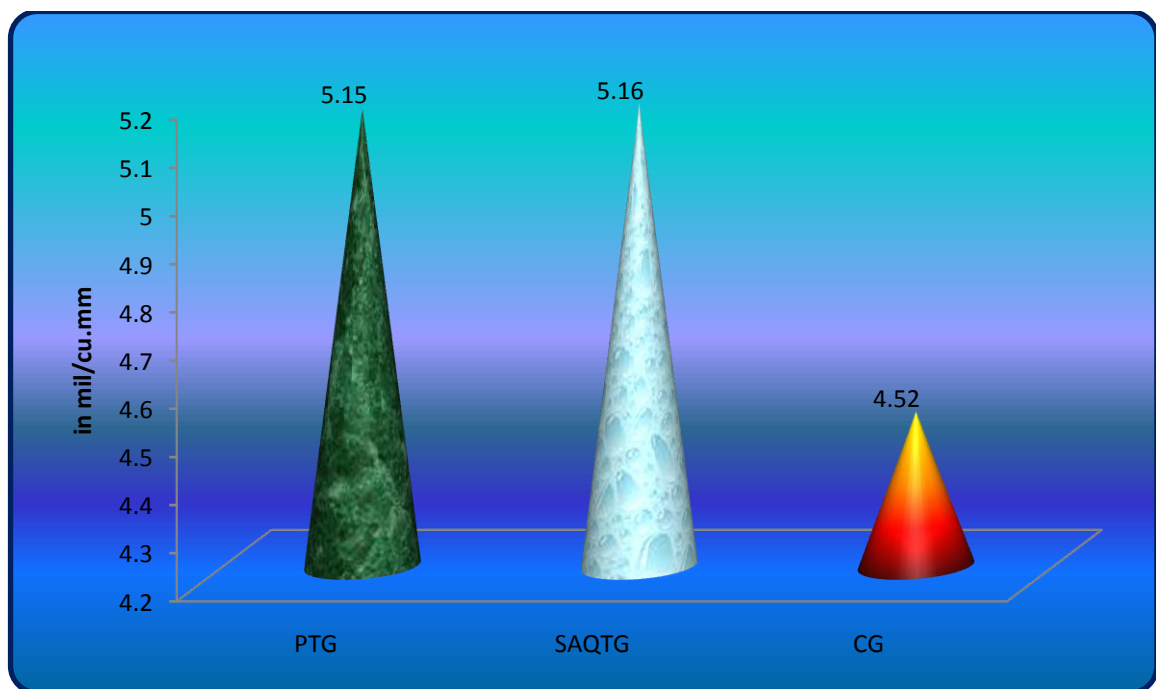
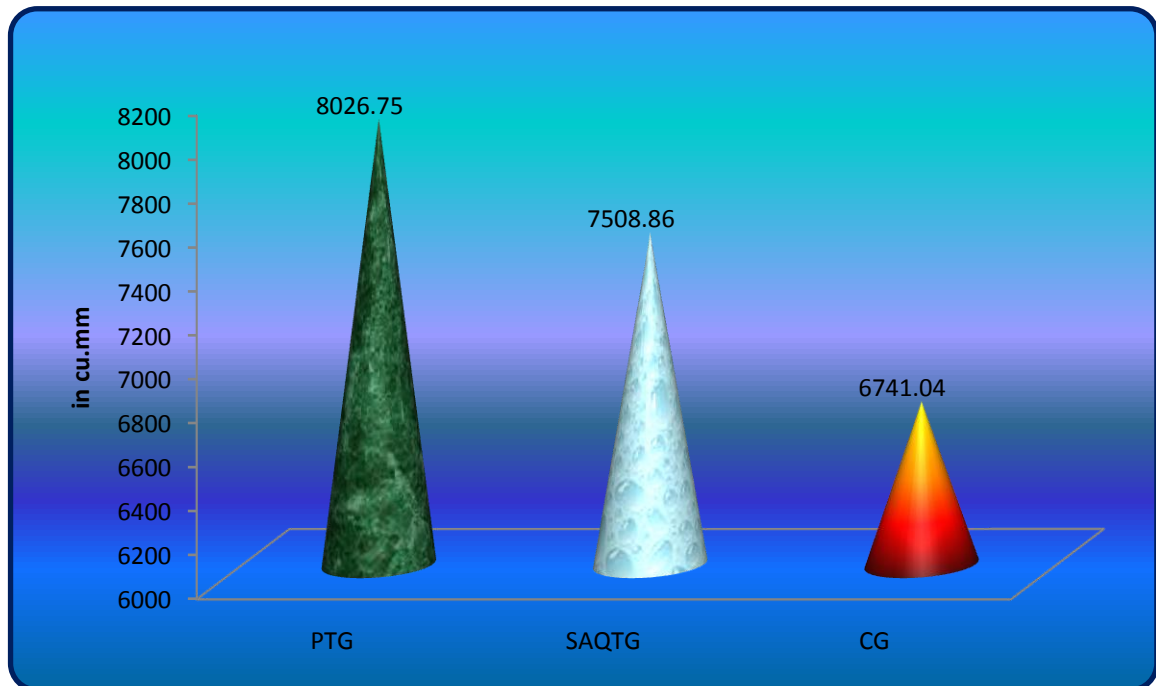**Fig - 36 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on WBC**
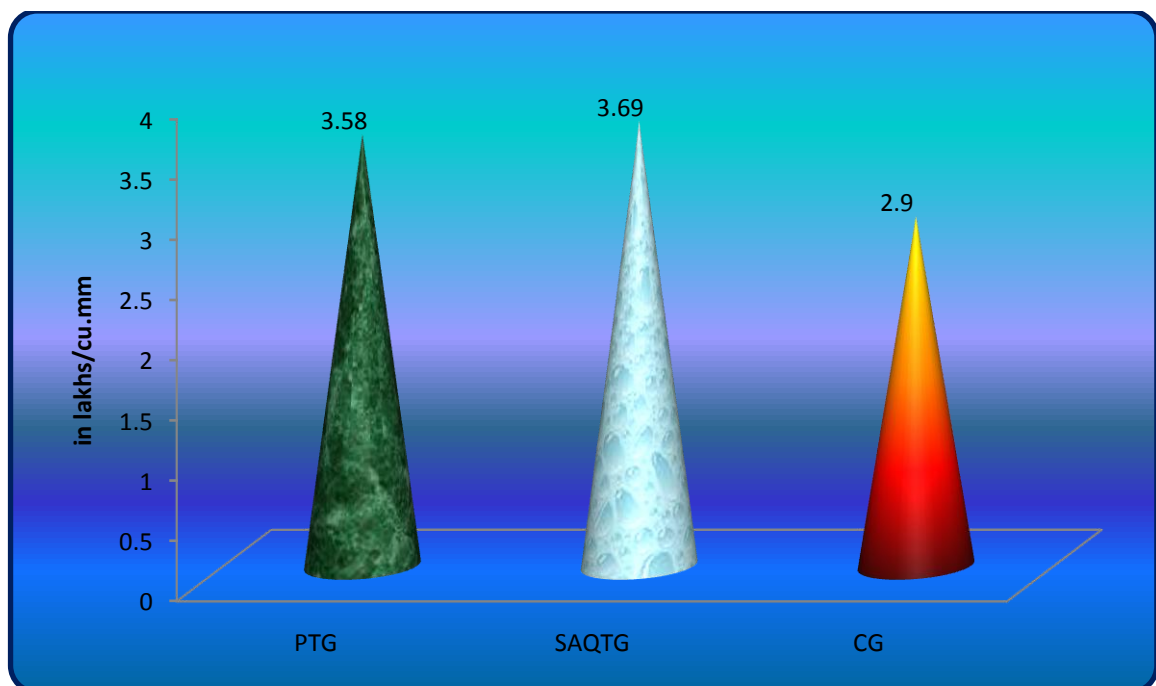

Fig - 37 Graph showing the adjusted mean values of Plyometric Training, SAQ and control groups on Platelets

4.17 DISCUSSION ON FINDINGS ON BIO-CHEMICAL VARIABLES

The results presented in table XX showed that obtained adjusted means on physiological variables namely for RBC, SAQ training group was 5.16 followed by plyometric training group with mean value of 5.15, and control group with mean value of 4.52. For WBC plyometric training group was 8026.80 followed by SAQ training group with mean value of 7508.90, and control group with mean value of 6741.00. For platelets SAQ training group was 3.69 followed by plyometric training group with mean value of 3.58, and control group with mean value of 2.90.

The differences among pretest scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and the obtained F values for RBC (1.34, 34.38 and 52.60) WBC (1.66, 12.28 and 13.53) and platelets (1.65, 35.18 and 54.26) respectively. It was found that obtained F value on pre test scores were not significant and the obtained F values on post test and adjusted means were significant at 0.05 level of confidence as these were greater than the required table F value of 3.22 and 3.23. The post hoc analysis through Scheffe's Confidence test proved that due to twelve weeks training of plyometric training and SAQ training has improved bio-chemical variables namely RBC, WBC and platelets than the control group and the differences were significant at 0.05 level. Further, the post hoc analysis showed that there was significant differences exist between the experimental groups, clearly indicating that

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plyometric training was better in WBC and SAQ training was better in RBC and

platelets among the football players.

TABLE - XXI

SCHEFEE'S POST HOC TEST OF PLYOMETRIC TRAINING

SAQ TRAINING AND CONTROL GROUPS AND

PERFORMANCE VARIABLES

Sl.No	Variables	Adjusted Means			Mean	CI
		PTG	SAQTG	CG	Difference	Value
1	Shooting	118.36	119.57	------	1.21	7.00
		118.36	------	84.32	34.04*	
		------	119.57	84.32	35.25*	
2	Dribbling	18.24	18.14	------	0.10	0.39
		18.24	------	19.17	0.93*	
		------	18.14	19.17	1.03*	
3	Passing	9.85	9.99	------	0.14	0.84
		9.85	------	7.01	2.84*	
		------	9.99	7.01	2.98*	

As per the results of the table – XXI, since the mean difference for

shooting, dribbling and passing between plyometric training group and control

group were 34.05, 0.93 and 2.84 respectively, SAQ training group and control

group were 35.25, 1.03 and 2.98 respectively are higher than the CI value of 7.00,

0.39 and 0.84 respectively. It was concluded that the observed adjusted mean

difference is statistically significant. Since the mean difference for shooting, dribbling and passing between plyometric training group and SAQ training group were 1.21, 0.10 and 0.14 are lesser than the CI value 7.00, 0.39 and 0.84 respectively. It was concluded that the observed adjusted mean difference is statistically not significant. The mean scores are displayed in figures 38 to 40.

Fig - 38 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on Shooting
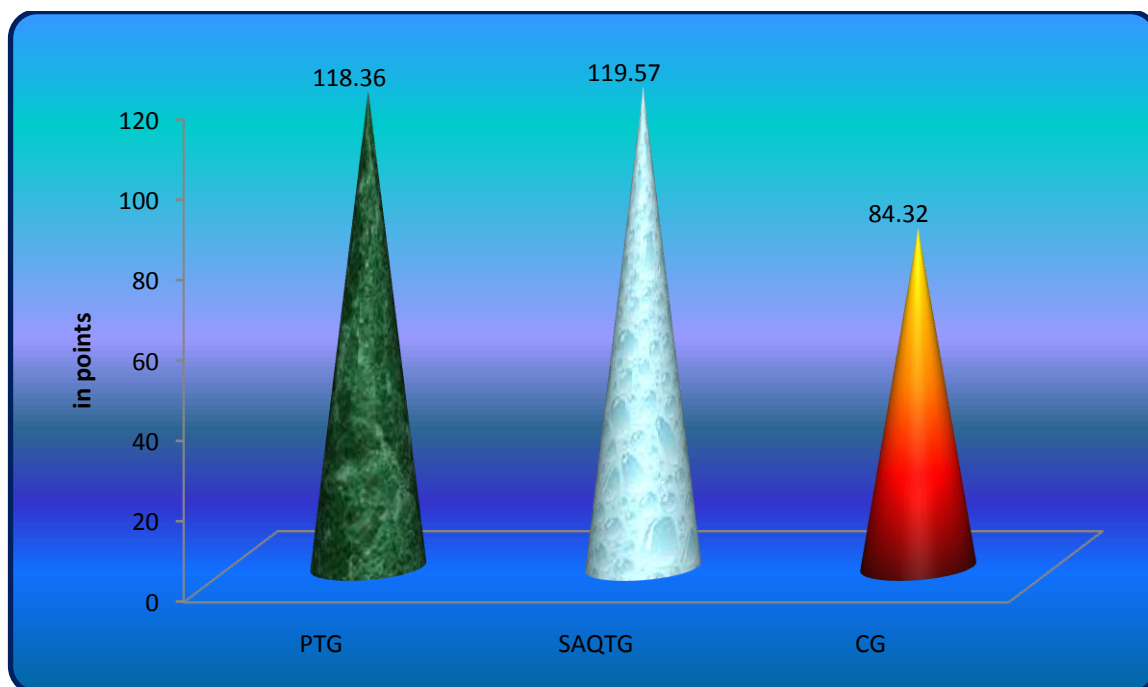
Fig - 39 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on Dribbling
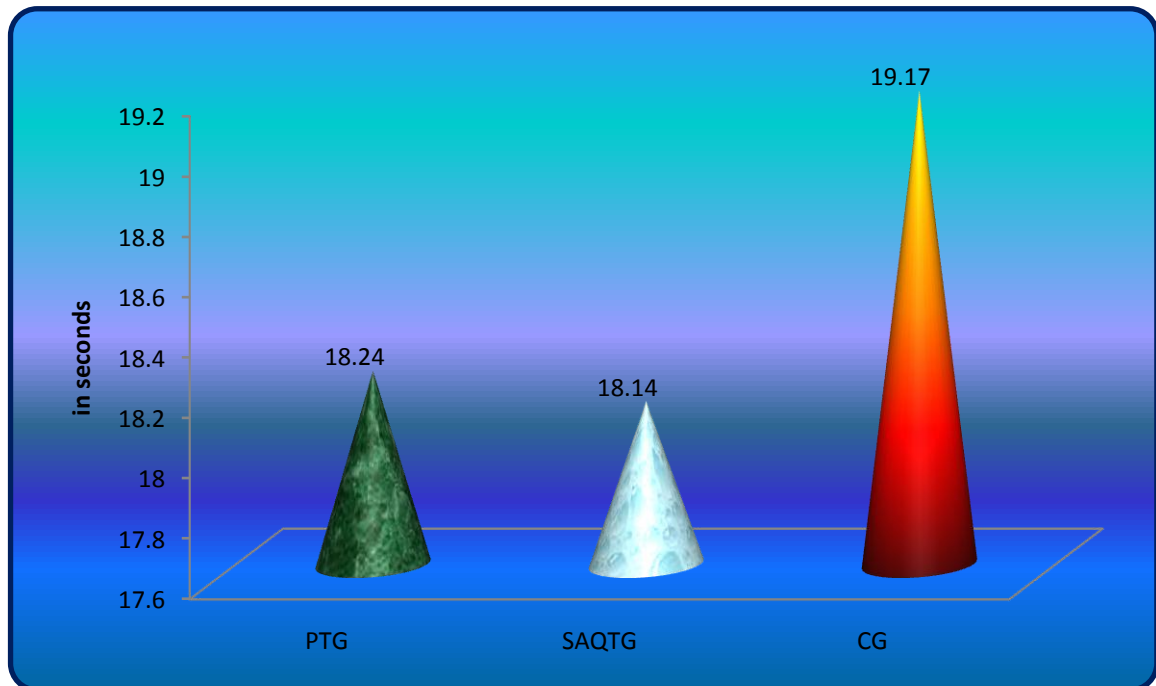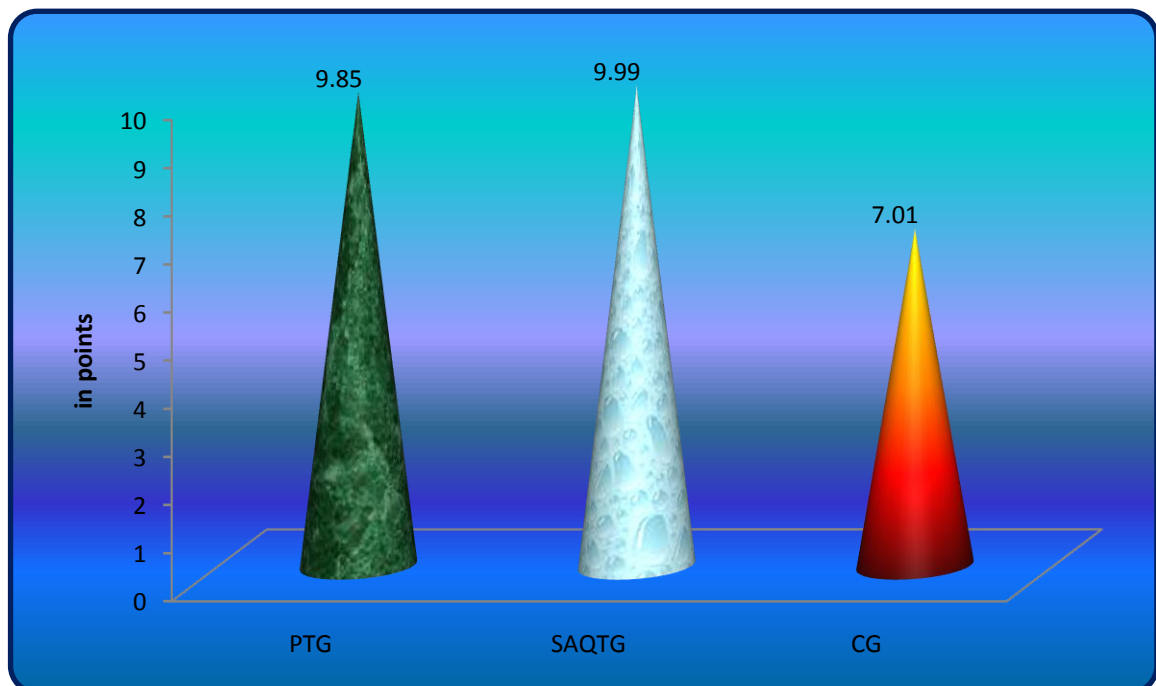

Fig - 40 Graph showing the adjusted mean values of Plyometric Training, SAQ Training and control groups on Passing

4.18 DISCUSSION ON FINDINGS ON PERFORMANCE VARIABLES

The results presented in table XXI showed that obtained adjusted means on physiological variables namely for shooting, SAQ training group was 119.57 followed by plyometric training group with mean value of 118.36, and control group with mean value of 84.32. For dribbling SAQ training group was 18.14 followed by plyometric training group with mean value of 18.24, and control group with mean value of 19.17. For passing plyometric training group was 9.85 followed by SAQ training group with mean value of 9.99, and control group with mean value of 7.01.

The differences among pretest scores, post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and the obtained F values for shooting (1.16, 108.45 and 99.90), dribbling (1.85, 28.76 and 24.89) and passing (1.09, 53.64 and 49.34) respectively. It was found that obtained F value on pre test scores were not significant and the obtained F values on post test and adjusted means were significant at 0.05 level of confidence as these were greater than the required table F value of 3.22 and 3.23. The post hoc analysis through Scheffe's Confidence test proved that due to twelve weeks training of plyometric training and SAQ training has improved performance variables namely shooting, dribbling and passing than the control group and the differences were significant at 0.05 level. Further, the post hoc analysis showed that there was significant differences exist between the experimental groups, clearly indicating

that plyometric training was better in passing and SAQ training was better in shooting and dribbling among the football players.

4.19 DISCUSSION ON THE HYPOTHESES

1. First hypothesis that there would be a significant improvement in selected physiological variables. From the base line to post training due to the influence of plyometric training and SAQ training group among the football players.

    The findings of the study showed that there were significant improvement in selected physiological variables of football players form their baseline to post training due to influence of plyometric and SAQ training among the football players. Hence the first hypothesis was accepted on the above said variables.

2. Second hypothesis that there would be a significant improvement in selected bio-chemical variables. From the base line to post training due to the influence of plyometric training and SAQ training group among the football players.

    The findings of the study showed that there were significant improvement in selected bio-chemical variables of football players form their baseline to post training due to influence of plyometric and SAQ training training

among the football players. Hence the second hypothesis was accepted on the above said variables.

3. Third hypothesis stated that there would be a significant improvement in selected performance variables. From the base line to post training due to the influence of plyometric training and SAQ training group among the football players.

The findings of the study showed that there were significant differences in selected performance variables of football players form their baseline to post training due to influence of plyometric training and SAQ training among the football players. Hence the third research hypothesis was accepted on the above said variables.

4. Fourth hypothesis stated that plyometric training group would show significant improvement on physiological and bio-chemical variables than the SAQ training group among the football players.

The findings of the study showed that the plyometric training showed better improvement only on vital capacity, forced vital capacity and WBC than the SAQ training group. Hence the fourth research hypothesis was accepted on the above said variable only.

5. Fifth hypothesis stated that SAQ training group would show significant improvement on performance variables than the plyometric training group among the football players.

   The findings of the study showed that the SAQ training showed better improvement only on shooting and dribbling. Hence the fifth research hypothesis was accepted on the above said variable only.