CHAPTER IV
ANALYSIS AND INTERPRETATION OF DATA

4.1 INTRODUCTION

The statistical analysis of data collected pertaining to experimental study on the effect of three methods of training namely explosive strength based circuit with yogic practices, strength endurance based circuit with yogic practices and combined explosive strength and strength endurance based circuit training with yogic practices on selected motor fitness attributes and physiological variables of school girls students was presented in this chapter.The selected subjects were initially tested on criterion variables used in this study and this was considered as the pre-test. After assessing the pre-test, the subjects in the experimental groups 1, 2 and 3 were treated with their respective treatments for three alternate days a week and for a duration of ten weeks. The statistical tool of Analysis of covariance (ANCOVA) was applied to determine whether the three programmes of training produced significantly different improvements in selected variables after ten weeks of training. If the mean difference was significant the pairs of adjusted final group mean was tested for significance by applying Scheffe's post hoc test. To test the obtained results, 0.05 level of significance was chosen, which was considered as an appropriate for the purpose of the study.The influence of explosive strength based circuit with yogic practices (group 1,ESBC-YP), strength endurance based circuit with yogic practices (group 2,SEBCYP) and combined explosive strength and strength endurance based circuit with yogic practices (group 3,CES&SEBCYP) on selected variables of school girls students was analyzed separately for each variable and presented in table I - table VII.

4.2 COMPARISON OF SPEED IN THE EXPERIMENTAL GROUPS AND CONTROL GROUP

The data on scores of speed were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis table was given in table I.

TABLE – I

ANALYSIS OF COVARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON SPEED

(Scores in Seconds)

Test	G1 ESBCYP	G2 SEBCYP	G3 CES& SECYP	G 4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	8.28	8.27	8.29	8.29	Between	0.0040	3	0.0013	0.27
S.D.	0.08	0.06	0.08	0.05	Within	0.2720	56	0.0049	
Post Test									
Mean	8.03	8.19	8.14	8.27	Between	0.4753	3	0.1584	58.37*
S.D.	0.05	0.05	0.05	0.06	Within	0.1520	56	0.0027	
Adjusted Post Test									
Mean	8.03	8.19	8.14	8.27	Between	0.4723	3	0.1574	100.71*
					Within	0.0860	55	0.0016	

* Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.2.1 Results on Speed

Pre - Test: The mean and Standard deviation of the pre-test speed scores of G1, G2, G3 and G4 were 8.28 ± 0.08, 8.27 ± 0.06, 8.29 ± 0.08 and 8.29 ± 0.05 respectively. The obtained pre test F value of 0.27 was lesser than the required table F value of 2.68. Hence the pre test mean value of explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined

explosive strength and strength endurance based circuit with yogic practices training and control group on speed before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful.

Post - Test: The mean and Standard deviation of the post- test speed scores of G1, G2, G3 and G4 are 8.03 ± 0.05, 8.19 ± 0.05, 8.14 ± 0.05 and 8.27 ± 0.06 respectively. The obtained post test F value of 58.37 was greater than the required table F value of 2.68. Hence the post- test means value of speed show significant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on speed produced significantly different improvements among the three groups.

Adjusted Post - Test: The mean value of the adjusted post - test speed scores of G1, G2, G3 and G4 were 8.03, 8.19, 8.14 and 8.27, respectively. The obtained adjusted post - test F value of 100.71 was greater than the required table F value of 2.77. Hence the adjusted post - test mean value of speed show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F value on adjusted post test mean among the groups on speed produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table-I (A)

TABLE - I (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON SPEED OF DIFFERENT GROUPS

(Scores in Seconds)

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
8.03	8.19	-	-	0.17*	0.05
8.03	-	8.14	-	0.11*	0.05
8.03	-	-	8.27	0.24*	0.05
-	8.19	8.14	-	0.06*	0.05
-	8.19	-	8.27	0.08*	0.05
-	-	8.14	8.27	0.13*	0.05

* Significant at .05 level of confidence.

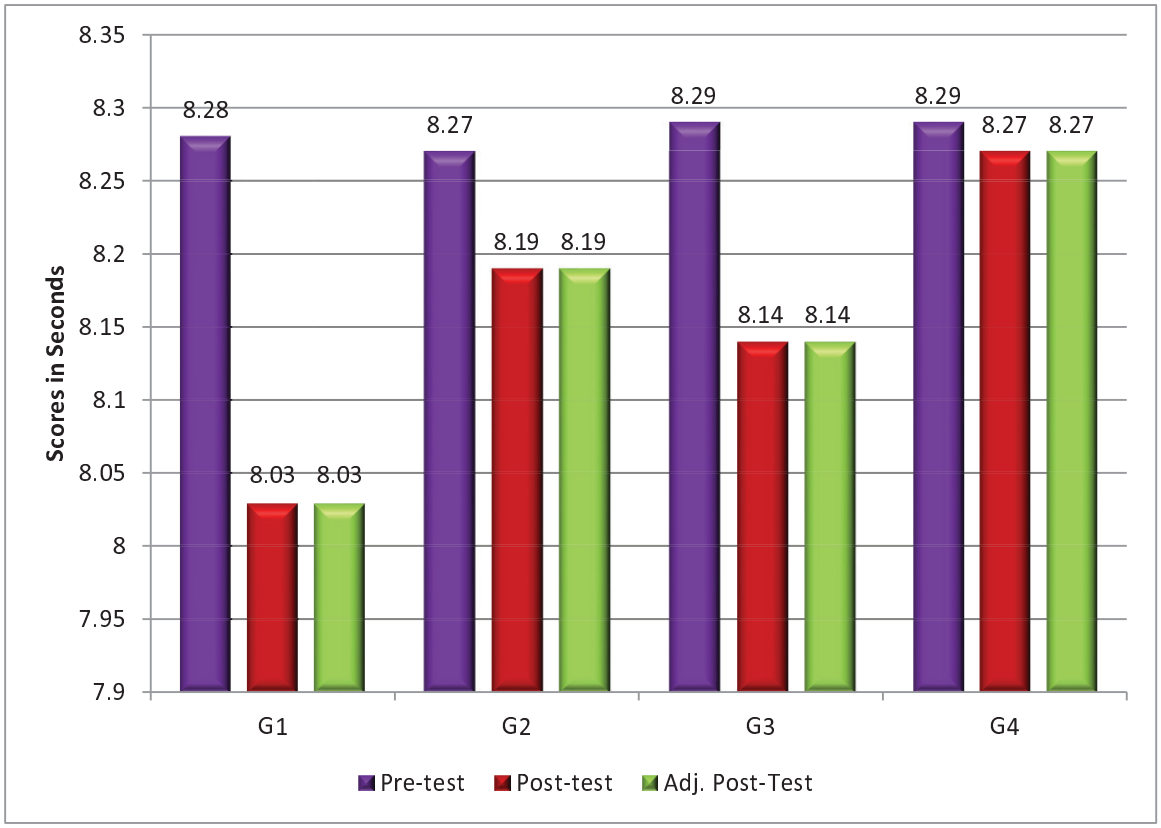
4.2.2 Results of Post-hoc test on Speed:

The above all comparisons show significant improvement on the speed parameter, because they obtained mean differences values of all the comparisons were 0.17, 0.11 ,0.24, 0.06, 0.08 and 0.13 higher than the confidential interval value of 0.05. Hence the above all comparisons were significant at 0.05 levels. The results indicate that the explosive strength based circuit training with yogic practices dominated in the speed performance better than the combined explosive strength and strength endurance based circuit with yogic practices training. Further the combined explosive strength and strength endurance based circuit with yogic practices training improved speed performance than the strength endurance based circuit with yogic practices training. The less improvement was observed in strength endurance based circuit with yogic practices training.

FIGURE - 1

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON SPEED

(Scores in Seconds)



G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.3 COMPARISON OF EXPLOSIVE POWER IN THE EXPERIMENTAL GROUPS AND CONTROL GROUP

The data on scores of explosive power were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis table was given in table II.

TABLE – II

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

(Scores in Meters)

Test	G1 ESBCYP	G2 SEBCYP	G3 CES& SECYP	G 4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	1.45	1.43	1.44	1.44	Between	0.0021	3	0.0007	1.70
S.D.	0.02	0.02	0.02	0.02	Within	1.97	56	0.0004	
Post Test									
Mean	1.50	1.47	1.49	1.45	Between	0.0297	3	0.0099	30.88*
S.D.	0.02	0.02	0.02	0.02	Within	0.0179	56	0.0003	
Adjusted Post Test									
Mean	1.50	1.47	1.49	1.45	Between	0.0202	3	0.0067	96.31*
					Within	0.0038	55	0.0001	

* Significant at .05 level of confidence
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.3.1 Results on Explosive power

Pre - Test: The mean and Standard deviation of the pre-test explosive power scores of G1, G2, G3 and G4 were 1.45 ± 0.02, 1.43 ± 0.02, 1.44 ±0.02 and 1.44 ± 0.02 respectively. The obtained pre test F value of 1.70 was lesser than the required table F value of 2.68. Hence the pre test mean value of explosive strength based circuit with

yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on explosive power before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful.

Post - Test: The mean and Standard deviation of the post- test explosive power scores of G1, G2, G3 and G4 are 1.50 ± 0.02, 1.47 ± 0.02, 1.49 ± 0.02 and 1.45 ± 0.02 respectively. The obtained post test F value of 30.88 was greater than the required table F value of 2.68. Hence the post- test means value of explosive power show significant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on explosive power produced significantly different improvements among the three groups.

Adjusted Post - Test: The mean value of the adjusted post - test explosive power scores of G1, G2, G3 and G4 are 1.50, 1.47, 1.49 and 1.45 respectively. The obtained adjusted post – test F value of 96.31 was greater than the required Table F value of 2.77. Hence the adjusted post - test mean value of explosive power show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F value on adjusted post test mean among the groups on explosive power produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table- II (A)

TABLE – II (A)
SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON EXPLOSIVE POWER AMONG DIFFERENT GROUPS
(Scores in Meters)

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
1.50	1.47	-	-	0.03*	0.01
1.50	-	1.49	-	0.01*	0.01
1.50	-	-	1.45	0.05*	0.01
-	1.47	1.49	-	0.01*	0.01
-	1.47	-	1.45	0.02*	0.01
-	-	1.49	1.45	0.04*	0.01

* Significant at .05 level of confidence.

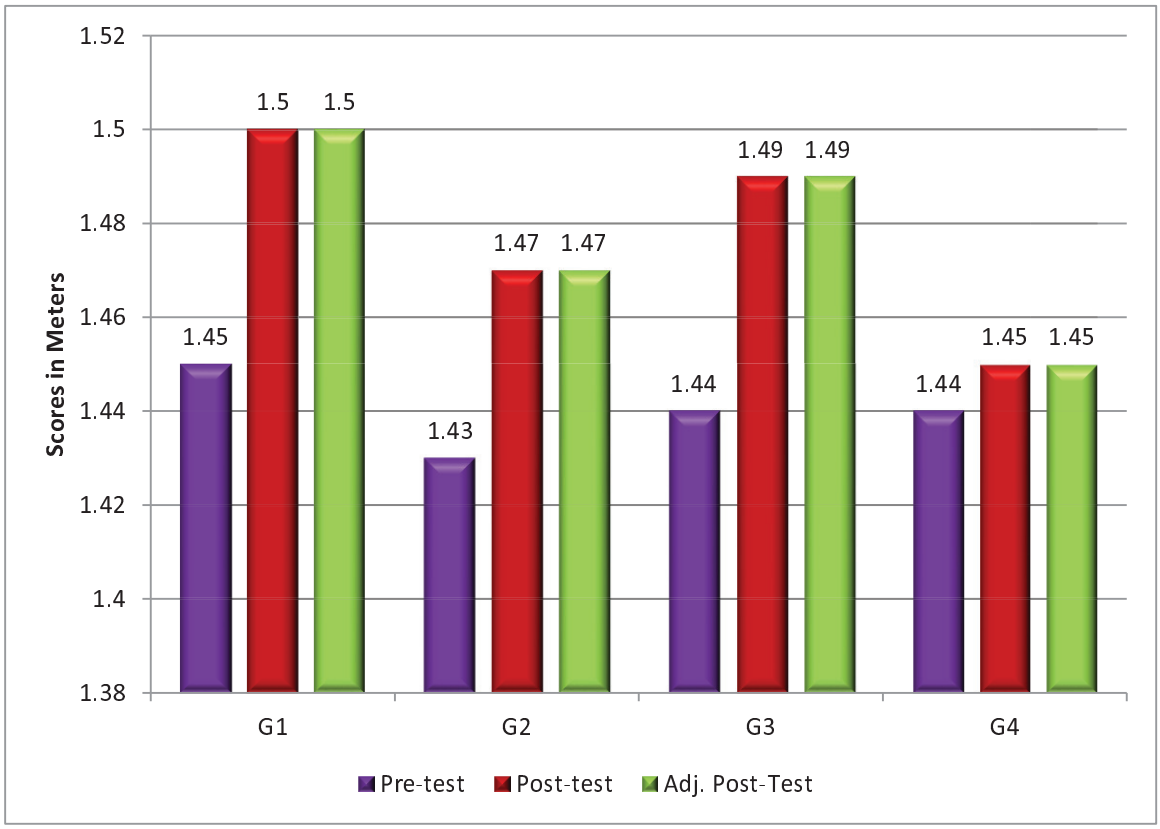
4.3.2 Results of Post-Hoc Test on explosive power:

All comparisons show significant improvement on the explosive power parameter, because they obtained mean differences values of the comparisons were 0.03, 0.01, 0.05, 0.01, 0.02 and 0.04 higher than the confidential interval value of 0.01. Hence the above all comparisons were significant at 0.05 levels The results indicate that the explosive strength based circuit with yogic practices training dominated in the explosive power performance better than the combined explosive strength and strength endurance based circuit with yogic practices training. Further the combined explosive strength and strength endurance based circuit with yogic practices training improved explosive power performance than the strength endurance based circuit with yogic practices training. The less improvement was observed in strength endurance based circuit with yogic practices training.

FIGURE - 2

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON EXPLOSIVE POWER

(Scores in Meters)



G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.4 COMPARISON OF MUSCULAR STRENGTH ENDURANCE IN THE EXPERIMENTAL AND CONTROL GROUP

The data on scores of muscular strength endurance were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis table was given in table III.

TABLE - III

ANALYSIS OF COVARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON MUSCULAR STRENGTH ENDURANCE

(Scores in Numbers)

Test	G1 ESBC YP	G2 SEBC YP	G3 CES& SECYP	G4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	17.33	17.40	17.47	17.53	Between	0.3333	3	0.1111	0.18
S.D.	0.90	0.83	0.74	0.64	Within	34.4000	56	0.6143	
Post Test									
Mean	18.07	19.47	21.33	17.60	Between	126.5833	3	42.1944	70.32*
S.D.	0.88	0.92	0.62	0.63	Within	33.60000	56	0.6000	
Adjusted Post Test									
Mean	18.15	19.49	21.31	17.52	Between Within	126.4260 9.5999	3 55	42.1420 0.1745	241.44*

* Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.4.1 Results on Muscular strength endurance

Pre - Test: The mean and Standard deviation of the pretest muscular strength endurance scores of G1, G2, G3 and G4 were 17.33 ± 0.90, 17.40 ± 0.83, 17.47 ± 0.74 and 17.53 ±0.64 respectively. The obtained pre test F value of 0.18 was lesser than the required table F value of 2.68. Hence the pre test mean value of explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic

practices training and control group on muscular strength endurance before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful. Post - Test: The mean and Standard deviation of the post- test muscular strength endurance scores of G1, G2, G3 and G4 are 18.07 ± 0.88, 19.47 ± 0.92, 21.33 ± 0.62 and 17.60 ± 0.63 respectively. The obtained post test F value of 70.32 was greater than the required table F value of 2.68. Hence the post- test means value of muscular strength endurance show significant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on muscular strength endurance produced significantly different improvements among the three groups.

Adjusted Post - Test: The mean value of the adjusted post - test muscular strength endurance scores of G1, G2, G3 and G4 are 18.15, 19.49, 21.31 and 17.52respectively. The obtained adjusted post - test F value of 241.44 was greater than the required Table F value of 2.77. Hence the adjusted post - test mean value of muscular strength endurance show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F value on adjusted post test mean among the groups on muscular strength endurance produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table-III (A)

TABLE - III (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON MUSCULAR STRENGTH ENDURANCE AMONG DIFFERENT GROUPS

(Scores in Numbers)

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
18.15	19.49	-	-	1.34*	0.54
18.15	-	21.31	-	3.16*	0.54
18.15	-	-	17.52	0.63*	0.54
-	19.49	21.31	-	1.81*	0.54
-	19.49	-	17.52	1.98*	0.54
-	-	21.31	17.52	3.79*	0.54

* Significant at .05 level of confidence.

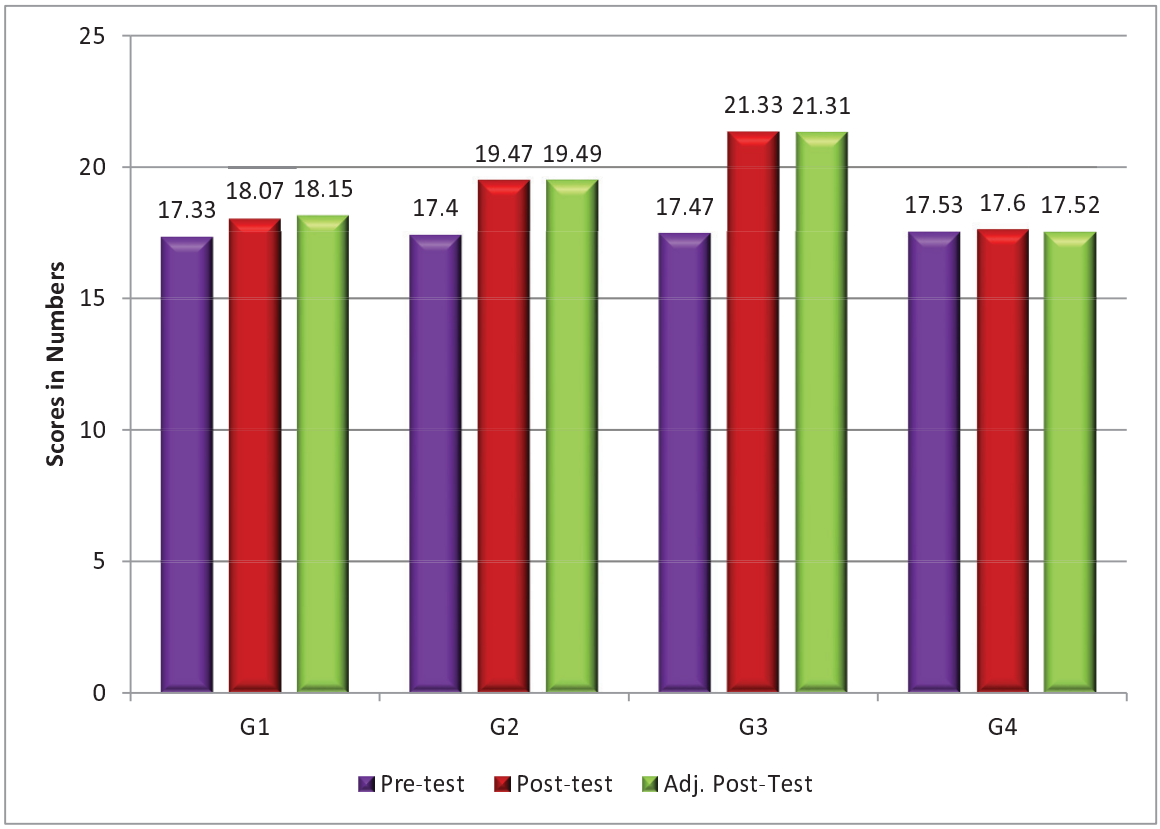
4.4.2 Results of Post-Hoc Test on muscular strength endurance:

The all comparisons show significant improvement on the muscular strength endurance parameter, because they obtained mean differences values of the comparisons were 1.34, 3.16, 0.63, 1.81, 1.98 and 3.79 higher than the confidential interval value of 0.54. Hence the above all comparisons were significant at 0.05 levels. The results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the muscular strength endurance performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training improved muscular strength endurance performance than the explosive strength based circuit with yogic practices training. The less improvement was observed in explosive strength based circuit with yogic practices training.

FIGURE - 3

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON MUSCULAR STRENGTH ENDURANCE

(Scores in Numbers)



G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.5 COMPARISON OF FLEXIBILITY IN THE EXPERIMENTAL GROUPS AND CONTROL GROUP

The data on scores of flexibility were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis table was given in table IV.

TABLE – IV

ANALYSIS OF COVARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON FLEXIBILITY

(Scores in Centimetres)

Test	G1 ESBCYP	G2 SEBCYP	G3 CES& SECYP	G4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	24.00	24.07	24.93	24.33	Between	8.13	3.00	2.71	0.61
S.D.	1.69	1.49	3.33	1.23	Within	247.20	56.00	4.41	
Post Test									
Mean	29.53	27.00	33.67	20.00	Between	1479.78	3.00	493.26	140.17*
S.D.	1.77	1.56	2.64	1.25	Within	197.07	56.00	3.42	
Adjusted Post Test									
Mean	29.70	27.14	33.36	20.00	Between	1426.45	3.00	475.48	196.36*
					Within	133.18	55.00	2.42	

* Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.5.1 Results on Flexibility

Pre - Test: The mean and Standard deviation of the pretest flexibility scores of G1, G2, G3 and G4 were 24.00 ± 1.69, 24.07 ± 1.49, 24.93 ± 3.33 and 24.33 ± 1.23 respectively. The obtained pre test F value of 0.61 was lesser than the required table F value of 2.68. Hence the pre test mean value of explosive strength based circuit with yogic

practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on flexibility before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful.

Post - Test: The mean and Standard deviation of the post- test flexibility scores of G1, G2, G3 and G4 are, 29.53 ± 1.77, 27.00 ± 1.56, 33.67 ± 2.64 and 20.00 ± 1.25 respectively. The obtained post test F value of 140.17 was greater than the required table F value of 2.68. Hence the post- test means value of flexibility show significant at 0.05 level of confidence for the degrees of freedom 3 and 36. Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on flexibility produced significantly different improvements among the three groups.

Adjusted Post - Test: The mean value of the adjusted post - test flexibility scores of G1, G2, G3 and G4 are 29.70, 27.14, 33.36 and 20.00 respectively. The obtained adjusted post - test F value of 196.36 was greater than the required table F value of 2.77. Hence the adjusted post - test mean value of flexibility show significant at 0.05 level of confidence for the degrees of freedom 3 and 35. Since the observed F value on adjusted post test mean among the groups on flexibility produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table-IV (A)

TABLE - IV (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON FLEXIBILITY AMONG DIFFERENT GROUPS

(Scores in Centimetres)

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
29.70	27.14			2.57*	2.01
29.70		33.36		3.66*	2.01
29.70			20.00	9.70*	2.01
	27.14	33.36		6.23*	2.01
	27.14		20.00	7.14*	2.01
		33.36	20.00	13.36*	2.01

* Significant at .05 level of confidence.

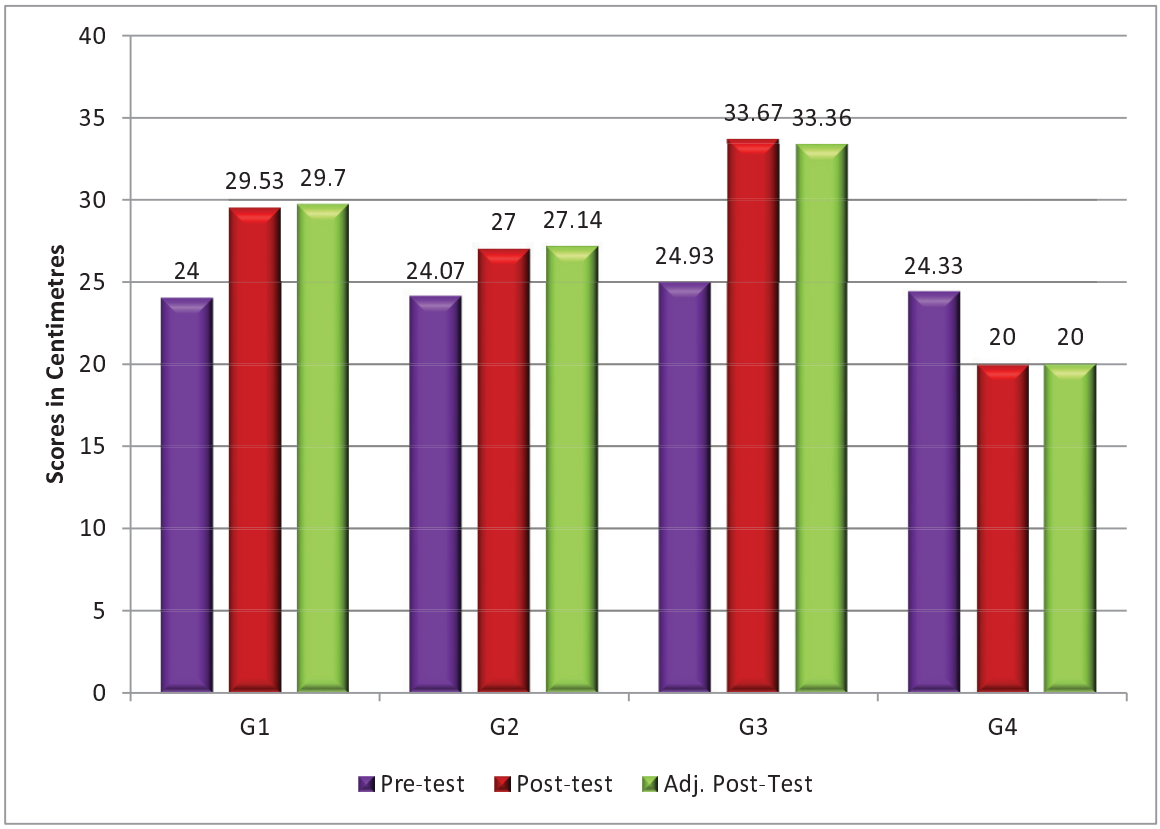
4.5.2 Results of Post-Hoc Test on Flexibility:

The above all comparisons show significant improvement on the flexibility parameter, because they obtained mean differences values of all the comparisons were 2.57, 3.66 ,9.70, 6.23, 7.14 and 13.36 higher than the confidential interval value of 2.01. Hence the above all comparisons were significant at 0.05 levels. The results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the flexibility performance better than the explosive strength based circuit with yogic practices training. Further the explosive strength based circuit with yogic practices training improved flexibility performance than the strength endurance based circuit with yogic practices training. The less improvement was observed in strength endurance based circuit with yogic practices training.

FIGURE - 4

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON FLEXIBILITY

(Scores in Centimetres)



G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.6 COMPARISON OF RESTING PULSE RATE IN THE EXPERIMENTAL GROUPS AND CONTROL GROUP

The data on scores of resting pulse rate were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis along with respective ANCOVA table is given in table V.

TABLE – V

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

(Scores in Beats /Minute)

Test	G1 ESBCYP	G2 SEBCYP	G3 CES&S ECYP	G4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	83.47	83.60	83.53	83.40	Between	0.33	3	0.11	0.08
S.D.	1.19	1.06	1.19	1.30	Within	78.67	56	1.40	
Post Test									
Mean	82.47	81.73	80.60	83.27	Between	57.78	3	19.26	15.59*
S.D.	1.30	1.10	0.74	1.22	Within	69.20	56	1.24	
Adjusted Post Test									
Mean	82.49	81.65	80.57	83.35	Between	63.26	3	21.09	81.26*
					Within	14.27	55	0.26	

* Significant at .05 level of confidence
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.6.1 Results on Resting Pulse Rate

Pre - Test: The mean and standard deviation of the pretest Resting pulse rate scores of G1, G2, G3 and G4 were 83.47 ± 1.19, 83.60 ± 1.06, 83.53 ± 1.19 and 83.40 ± 1.30 respectively. The obtained pre test F value of 0.08 was lesser than the required table F value of 2.68.Hence the pre test mean value of explosive strength based circuit with yogic

practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on resting pulse rate before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful.

Post - Test: The mean and standard deviation of the post- test resting pulse rate scores of G1, G2, G3 and G4 are 82.47 ± 1.30, 81.73 ± 1.10, 80.60 ± 0.74 and 83.27 ± 1.22 respectively. The obtained post test F value of 15.59 was greater than the required table F value of 2.68.Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on resting pulse rate produced significantly different improvements among the three groups.

Adjusted Post - Test: The mean value of the adjusted post - test resting pulse rate of G1, G2, G3 and G4 are 82.49, 81.65, 80.57 and 83.35 respectively. The obtained adjusted post - test F value of 81.26 was greater than the required Table F value of 2.77. Hence the adjusted post - test mean value of resting pulse rate show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F value on adjusted post test mean among the groups on resting pulse rate produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table-V (A)

TABLE - V (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON RESTING PULSE RATE AMONG FOUR GROUPS

(Scores in Beats/Minutes)

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
82.49	81.65	-	-	0.84*	0.66
82.49	-	80.57	-	1.92*	0.66
82.49	-	-	83.35	0.86*	0.66
-	81.65	80.57	-	1.08*	0.66
-	81.65	-	83.35	1.70*	0.66
-	-	80.57	83.35	2.78*	0.66

* Significant at .05 level of confidence.

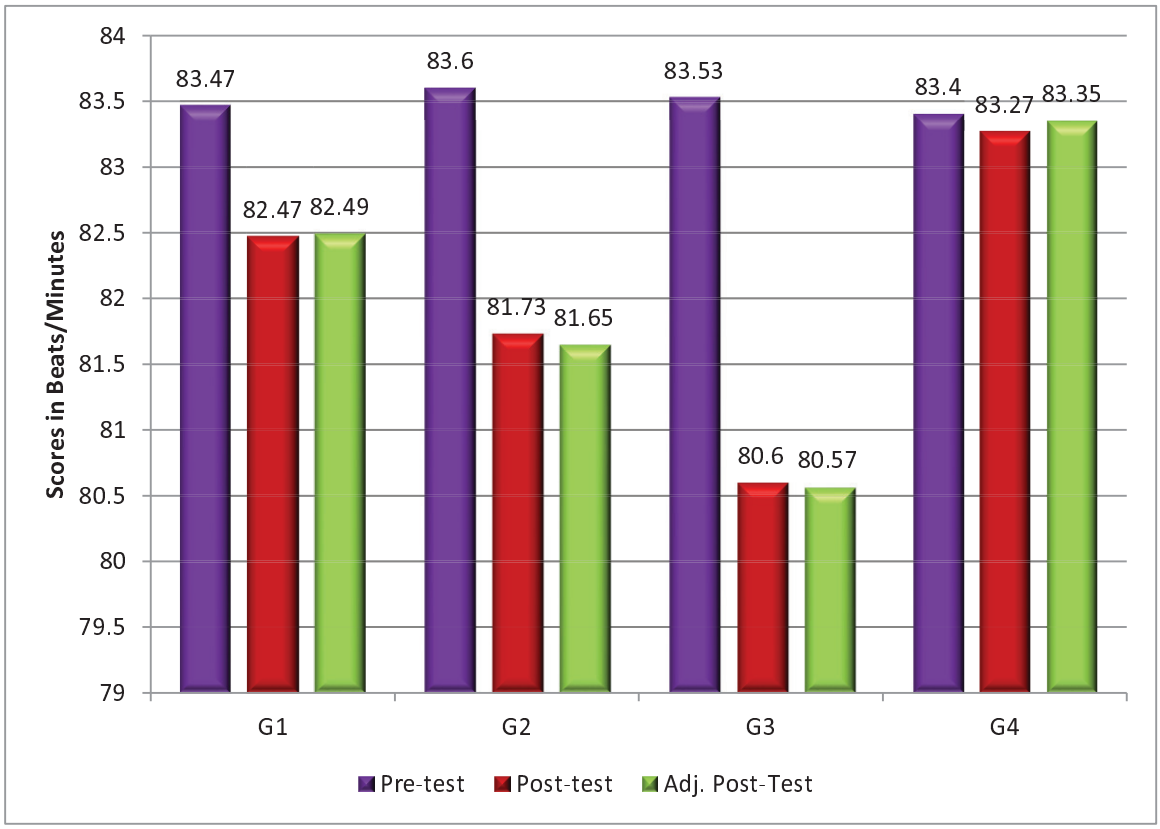
4.6.2 Results of Post-Hoc Test on Resting pulse rate:

All comparisons show significant improvement on the resting pulse rate parameter, because they obtained mean differences values of the comparisons were 0.84, 1.92, 0.86, 1.08, 1.70 and 2.78 higher than the confidential interval value0.66. Hence the above all comparisons were significant at 0.05 levels. The results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the resting pulse rate performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training improved resting pulse rate performance than the explosive strength based circuit with yogic practices training. The less improvement was observed in explosive strength based circuit with yogic practices training.

FIGURE - 5

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON RESTING PULSE RATE

(Scores in Beats/Minutes)



G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.7 COMPARISON OF VO_2max IN THE EXPERIMENTAL GROUPS AND CONTROL GROUP

The data on scores of VO_2 max were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis table was given in table VI.

TABLE –VI

ANALYSIS OF COVARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON VO_2max

(Scores in Ml/Kg/Min^{-1})

Test	G1 ESBC YP	G2 SEBC YP	G3 CES&S ECYP	G4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	37.00	37.07	36.80	36.73	Between	1.13	3	0.38	0.19
S.D.	1.56	1.44	1.52	1.10	Within	112.27	56	2.00	
Post Test									
Mean	38	39	39.73	36.80	Between	72.85	3	24.28	12.67*
S.D.	1.41	1.41	1.62	1.01	Within	107.33	56	1.92	
Adjusted Post Test									
Mean	37.92	38.86	39.82	36.94	Between	68.74	3	22.91	45.08*
					Within	27.96	55	0.51	

* Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.7.1 Results on VO_2 max

Pre - Test: The mean and Standard deviation of the pre test VO_2max scores of G1, G2, G3 and G4 were 37 ± 1.56, 37.07 ± 1.44, 36.80 ± 1.52 and 36.73 ± 1.10 respectively. The obtained pre test F value of 0.19 was lesser than the required table F value of 2.68.Hence the pre test mean value of explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and

combined explosive strength and strength endurance based circuit with yogic practices training and control group on VO_2 max before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful.

Post - Test: The mean and Standard deviation of the post- test VO_2 max scores of G1, G2, G3 and G4 are 38 ± 1.41, 39 ± 1.41, 39.73 ± 1.62 and 36.80 ± 1.01 respectively. The obtained post test F value of 12.67 was greater than the required table F value of 2.68. Hence the post- test means value of VO_2 max show significant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on VO_2 max produced significantly different improvements among the three groups.

Adjusted Post - Test: The mean value of the adjusted post - test VO_2 max scores of G1, G2, G3 and G4 are 37.92, 38.86, 39.82 and 36.94 respectively. The obtained adjusted post - test F value of 45.08 was greater than the required table F value of 2.77. Hence the adjusted post - test mean value of VO_2 max show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F value on adjusted post test mean among the groups on VO_2 max produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table-VI (A)

TABLE - VI (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON VO_2max AMONG DIFFERENT GROUPS

(Scores in ml/kg/min^{-1})

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
37.92	38.86	-	-	0.94*	0.92
37.92	-	39.82	-	1.90*	0.92
37.92	-	-	36.94	0.98*	0.92
-	38.86	39.82	-	0.96*	0.92
-	38.86	-	36.94	1.92*	0.92
-	-	39.82	36.94	2.88*	0.92

* Significant at .05 level of confidence.

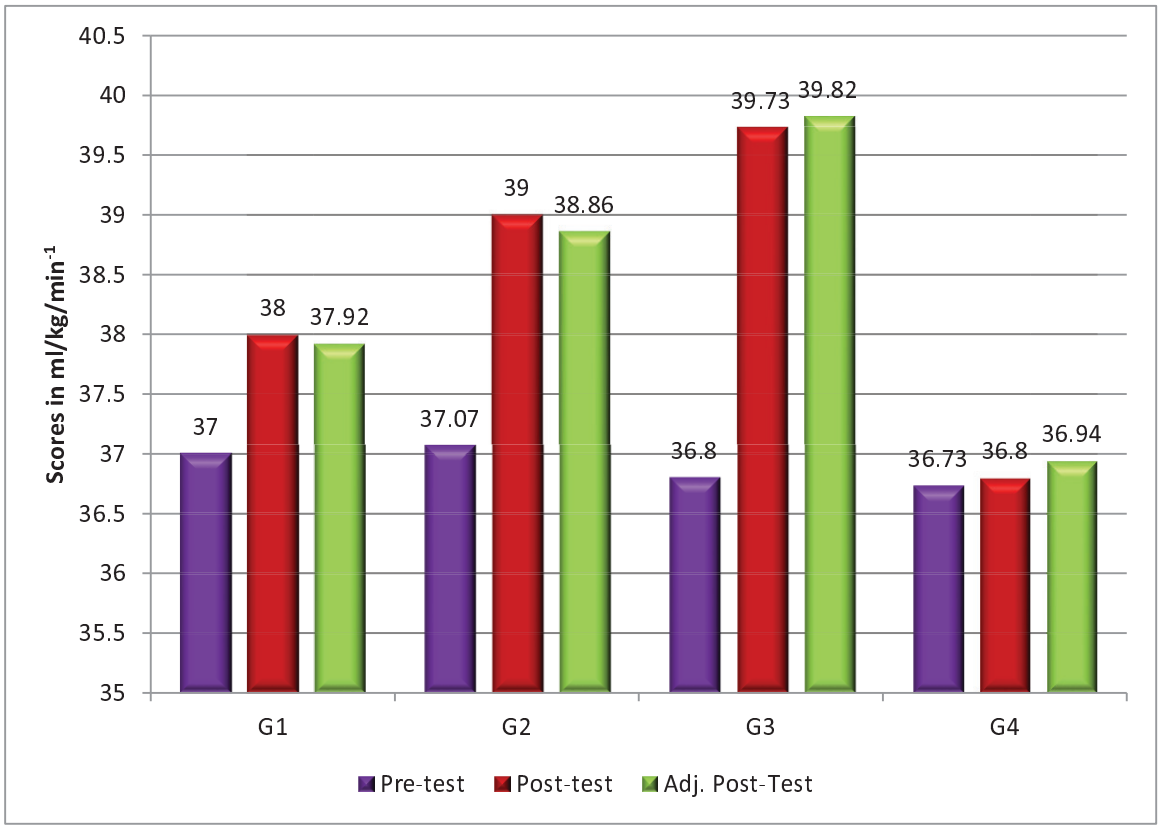
4.7.2 Results of Post-Hoc Test on $VO2_{MAX}$

The above all comparisons show significant improvement on the VO_2 max, because they obtained mean differences values of all the comparisons were 0.94, 1.90, 0.98, 0.96, 1.92 and 2.88 higher than the confidential interval value of 0.92. Hence the above all comparisons were significant at 0.05 levels. The results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the VO_2 max performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training improved VO_2 max performance than the explosive strength based circuit with yogic practices training. The less improvement was observed in explosive strength based circuit with yogic practices training.

FIGURE - 6

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON VO_2max

(Scores in ml/kg/min^{-1})



G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.8 COMPARISON OF BREATH HOLDING TIME IN THE EXPERIMENTAL AND CONTROL GROUP

The data on scores of breath holding time were collected from the experimental groups and control group. The pre-test, post-test, and adjusted post-test analysis table was given in table VII.

TABLE –VII

ANALYSIS OF COVARIANCE OF EXPERIMENTAL GROUPS AND CONTROL GROUP ON BREAH HOLDING TIME

(Scores in Numbers)

Test	G1 ESBC YP	G2 SEBC YP	G3 CES& SECYP	G4 CG	SV	SS	Df	MS	'F' Ratio
Pre Test									
Mean	25.20	25.13	25.07	25.40	Between	0.93	3	30.3111	0.12
S.D.	1.78	1.46	1.79	1.50	Within	150.67	56	2.6905	
Post Test									
Mean	27.33	26.27	30.93	25.53	Between	258.05	3	86.0167	35.70*
S.D.	1.72	1.53	1.53	1.41	Within	134.93	56	2.4095	
Adjusted Post Test									
Mean	27.33	26.33	31.05	25.36	Between	278.02	3	92.6744	272.54*
					Within	18.70	55	0.3400	

* Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for 3 and 56 and 3 and 55 are 2.776 and 2.78 respectively).

4.8.1 Results on Breath Holding Time

Pre - Test: The mean and Standard deviation of the pre test breath holding time scores of G1, G2, G3 and G4 were 25.20 ± 1.78, 25.13 ± 1.46, 25.07 ± 1.79 and 25.40 ± 1.50 respectively. The obtained pre test F value of 0.12 was lesser than the required table F value of 2.68.Hence the pre test mean value of explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices

training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on breath holding time before start of the respective treatments was found to be insignificant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus this analysis confirms that the random assignment of subjects into four groups were successful.

Post - Test: The mean and Standard deviation of the post- test breath holding time scores of G1, G2, G3 and G4 are 27.33 ± 1.72, 26.27 ± 1.53, 30.93 ± 1.53 and 25.53 ± 1.41 respectively. The obtained post test F value of 35.70 was greater than the required table F value of 2.68. Hence the post- test means value of breath holding time show significant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus the results obtained proved that the interventions namely explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training on breath holding time produced significantly different improvements among the three groups. Adjusted Post - Test: The mean value of the adjusted post - test breath holding time scores of G1, G2, G3 and G4 are 27.33, 26.33, 31.05 and 25.36 respectively. The obtained adjusted post - test F value of 272.54 was greater than the required table F value of 2.77. Hence the adjusted post - test mean value of breath holding time show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F value on adjusted post test mean among the groups on breath holding time produced significantly different improvements.

In order to find out which intervention programme used in the present study was the source for the significance of adjusted mean was tested by Scheffe's post hoc test. The results of the same are presented in the table-VII (A)

TABLE - VII (A)

SCHEFFE'S POST HOC TEST MEAN DIFFERENCES

ON BREATH HOLDING TIME AMONG DIFFERENT GROUPS

(Scores in Numbers)

G1 ESBCYP	G2 SEBCYP	G3 CES&SECYP	G4 CG	Mean Differences	Confidence Interval Value
27.33	26.33	-	-	1.01*	0.75
27.33	-	31.05	-	3.72*	0.75
27.33	-	-	25.36	1.98*	0.75
-	26.33	31.05	-	4.73*	0.75
-	26.33	-	25.36	0.97*	0.75
-	-	31.05	25.36	5.69*	0.75

* Significant at .05 level of confidence.

4.8.2 Results of Post-Hoc Test on Breath Holding Time

The above all comparisons show significant improvement on the breath holding time , because they obtained mean differences values of all the comparisons were 1.01, 3.72, 1.98, 4.73, 0.97 and 5.69 higher than the confidential interval value of 0.75. Hence the above all comparisons were significant at 0.05 levels. The results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the breath holding time performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training improved breath holding time performance than the explosive strength based circuit with yogic practices training. The less improvement was observed in explosive strength based circuit with yogic practices training.

FIGURE - 7

COMPARATIVE BAR CHART OF PRE-TEST, POST-TEST AND ADJUSTED POST TEST OF DIFFERENT GROUPS ON BREATH HOLDING TIME

(Scores in Numbers)

G1 - ESBCYP (Explosive strength based circuit with yogic practices)

G2 - SEBEYP (Strength endurance based circuit with yogic practices)

G3 - CES & SECYP (Combined explosive strength and strength endurance based circuit with yogic practices)

G4 - CG (Control Group)

4.9 DISCUSSION OF FINDINGS:

The findings of the study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on selected motor fitness attributes and physiological variables owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on selected motor fitness attributes and physiological variables between the experimental groups 1, group 2 and group 3.

4.9.1 Motor Fitness Attributes

Circuit training is a method of physical conditioning that employed both apparatus resistance training and calisthenics conditioning exercise. It provides a means of achieving optimal fitness in a systematized controlled fashion. The intensity and vigor of circuit training are indeed challenging and enjoyable to the performer. This system produces positive changes in motor performance, general fitness, muscular power endurance and speed. Circuit training program consists of a number of ‘stations’ where a given exercise is performed usually within a specified time. Once the exercise is completed at one station, the subjects moves rapidly to the next station, performing another exercise also within a prescribed time period. The circuit is completed once the exercises at all stations are performed. The exercises at the various stations consist mainly of weight resistance exercises, but running, swimming, cycling, calisthenics and stretching exercises may also be included. Circuit training therefore may be designed to increase muscular endurance, flexibility, and if running, swimming or cycling is involved to increase some cardio respiratory endurance as well. Circuits are designed to consist of

between 6 and 15 stations, requiring a total time of between 5 and 20 minutes to complete. Usually, each circuit is performed several times in one training session. Only 15 to 20 seconds rest load should be adjusted so that the working muscular are noticeably fatigued after performing as many repetitions as possible within a designated time period (30 seconds). The load should be increased periodically to ensure progressive over load. In addition, the sequence of exercise should be arranged so that no two consecutive stations consist of exercise involving the same muscle group. Training frequency should be 3 days per week, with duration of at least 6 weeks.

4.9.1.1 Speed

Circuit training is an efficient and challenging form of conditioning. It works well for developing strength, endurance (both aerobic and anaerobic), flexibility and coordination. Its versatility has made it popular with the general public right through to elite athletes. For sports men and women, it can be used during the closed season and early pre-season to help develop a solid base of fitness and prepare the body for more stressful subsequent training. A well-designed circuit can help to correct the imbalances that occur in any sport played to a high level. It can also be one of the best types of training for improving strength endurance be it for a sport such as soccer or a classic endurance event like the triathlon. Speed is the change in distance over time and maximal speed is a critical component to anaerobic sport performance. This is especially important for track and field athletes such sprinters. However, maximal speed may not be attained until the athlete has run at least 20-40 m in a linear path. In many cases, the athlete may not have the option of running optimally (or unimpeded) for 20-40 m but may have to move rapidly for shorter distances covering multiple directions. Thus, acceleration ability becomes a critical training component (ACSM 2012). Muscle strength training programme are designed to exercise the fast-twitch muscle fibres that derive most of their

energy from the ATP- PCr and glycolytic systems. Because these fibres are recruited during activities that require high –intensity, short-duration power surges, strength training protocols utilize high- resistance loads , such as heavy weights, to induce high-force, short duration muscle contractions. Strength training programme increase muscle strength and muscle cross- sectional area. The greater quantity of contractile protein results from an increase in the rate of protein synthesis and a decrease in the rate of protein degradation; these processes may involve compensatory responses to repeated muscle injury.

The findings of the present study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on speed variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on speed variable between the experimental groups 1, group 2 and group 3. The results of this study clearly indicated that there was significant improvement from pre-test to post - test among three group on speed, viz., explosive strength based circuit with yogic practices training, (pre-test 8.28 $\pm$ 0.08 post test 8.03 $\pm$ 0.05), strength endurance based circuit with yogic practices training (pre-test 8.27 $\pm$ 0.06 post test 8.19 $\pm$ 0.05), and combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 8.29 $\pm$ 0.08post test 8.27$\pm$ 0.06). Further the results indicate that the explosive strength based circuit training with yogic practices dominated in the speed performance better than the combined explosive strength and strength endurance based circuit with yogic practices training. Further the combined explosive strength and strength endurance based circuit with yogic practices training also improved speed performance than the strength endurance based circuit with yogic

practices training. The less improvement was observed in strength endurance based circuit with yogic practices training.Taşkin H. (2009) conducted study was to determine the effect of circuit training directed toward motion and action velocity over the sprint-agility and anaerobic endurance. A total of 32 healthy male physical education students with a mean age of 23.92 +/- 1.51 years were randomly allocated into a circuit training group (CTG; n = 16) and control group (CG; n = 16). A circuit training consisting of 8 stations was applied to the subjects 3 days a week for 10 weeks. Circuit training program was executed with 75% of maximal motion numbers in each station. In the conclusions of the study, circuit training, which is designed to be performed 3 days a week during 10 weeks of training, improves sprint-agility and anaerobic endurance.

Hence the above mentioned study lends support to the results of the present study.

4.9.1.2 Explosive Power

Power testing is critical to assessing anaerobic athletes. Power is the rate of performing work and is the product of force and velocity. Tests of peak power are explosive and short in duration (a few seconds) and predominantly stress the ATP-PC system. Some of these peak power tests include 1 RM Olympic lifts, jump tests, jump squats on force plate or transducer, medicine ball throws, Margaria-Kalamen test, and rate of force development (RFD) tests. Other tests measure power endurance, i.e., anaerobic capacity tests. Theses track power over time (Wingate test) or measure the amount of time it takes to complete a pattern of movement (300-yd shuttle and line drill). Because these tests are longer in duration (15-90 s), they stress the glycolytic energy system so the maintenance of power is most critical. Jump tests are predicated upon the correlation between power and jump height or distance. They are easy to administer and provide valuable information relating to athletic success (ACSM 2012).

The findings of the study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on explosive power variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on explosive power variable between the experimental groups 1, group 2 and group 3.The results of this study clearly indicated that there was significant improvement from pre-test to post test among three group on explosive power, viz., explosive strength based circuit with yogic practices training, (pre-test 1.45 $\pm$ 0.02 post test 1.50 $\pm$ 0.02), strength endurance based circuit with yogic practices training (pre-test 1.43 $\pm$ 0.02 post test 1.47 $\pm$ 0.02) and combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 1.44 $\pm$ 0.02post test 1.49$\pm$ 0.02).

Further the results indicate that the explosive strength based circuit with yogic practices training dominated in the explosive power performance better than the combined explosive strength and strength endurance based circuit with yogic practices training. Further the combined explosive strength and strength endurance based circuit with yogic practices training also improved explosive power performance than the strength endurance based circuit with yogic practices training. The less improvement was observed in strength endurance based circuit with yogic practices training.

Nobuo Takeshima, Michael E Rogers, Mohammod M.Islam, Tomoko Yamauchi, Eijiwatanabe, Akiyoshi okada (2004) studied the effect of concurrent aerobic and resistance circuit exercise training on fitness in older adults. Muscular strength was measured by using a hydraulic-resistance exercise machine. Prior to and after end of

practice period all subjects were tested. Finding of Muscular strength shows significant improvement due to the twelve weeks training. Tran, M.D., Holly, R.G., Iashbrook, J. Amsterdam, F.A., (2001) conducted the study on the effects of the yoga practice on the health-related aspects of physical fitness. For this they selected ten healthy, untrained volunteers (nine females and one male), ranging in age from 18-27 years. The health-related physical fitness variables are muscular strength and flexibility. These variables were criterion variables for that they were assessed with the help of standardized test items i.e., pushups for muscular strength and sit and reach test for flexibility.

The data was collected before and after a training period of minimum two yoga classes per week for a total of eight weeks. Finally they concluded that there was a significant improvement in muscular strength and flexibility after yoga practice.

The above findings make it evident that the changes in explosive power for the experimental groups were related to involvement in the training programme.

4.9.1.3 Muscular Strength Endurance

Local muscle endurance tests involve measuring the ability of selected muscles to perform repeated contractions over time. The contractions can be low to moderate in intensity (Sub maximal endurance) or high in intensity (high-intensity endurance). Muscle endurance tests typically come in three categories: (a) performing body weight exercises for a maximal number of repetitions or maximal number of repetitions in a specified time: (b) repetitions for a weight training exercise at an absolute percentage of 1 RM; and (c) sustained maximal duration trails. The most common exercises assessed are the partial curl-up, push-up, sit-up and pull-up. Other exercises such as dips and body weight squats have been used. For the partial curl-up test: A variation is to perform this test using conventional sit-ups. The athlete can perform as many sit-ups as possible in 1

minute (although some assessments allow 2 minutes). Here, the athlete gently keeps hands behind her head while a partner supports her ankles (ACSM 2012).

The finding of the present how that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on muscular strength endurance variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on muscular strength endurance variable between the experimental groups 1, group 2 and group 3. The results of this study clearly indicated that there was significant improvement from pre-test to post test among three group on muscular strength endurance, viz., explosive strength based circuit with yogic practices training, (pre-test 17.33 $\pm$ 0.90 post test 18.07 $\pm$ 0.08), strength endurance based circuit with yogic practices training (pre-test 17.40 $\pm$ 0.83 post test 19.47 $\pm$ 0.92), combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 17.47 $\pm$ 0.74post test 21.33$\pm$ 0.62).Further the results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the muscular strength endurance performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training also improved muscular strength endurance performance than the explosive strength based circuit with yogic practices training. The less improvement was observed in explosive strength based circuit with yogic practices training.Mayorga-Vega D, Viciana J, Cocca A. (2013) They conducted study was to evaluate the effects of a circuit training program along with a maintenance program on muscular and cardiovascular endurance in children in a physical education setting. Seventy two children 10-12 years old from four different classes were randomly grouped

into either an experimental group (n = 35) or a control group (n = 37) (two classes for each group). After an eight-week development program carried out twice a week and a four-week detraining period, the experimental group performed a four-week maintenance program once a week. The program included one circuit of eight stations of 15/45 to 35/25 seconds of work/rest performed twice. Abdominal muscular endurance (sit-ups in 30 seconds test), upper-limbs muscular endurance (bent arm hang test), and cardiovascular endurance (20-m endurance shuttle run test) were measured at the beginning and at the end of the development program, and at the end of the maintenance program. After the development program, muscular and cardiovascular endurance increased significantly in the experimental group ($p < 0.05$). The gains obtained remained after the maintenance program. The respective values did not change in the control group ($p > 0.05$). The results showed that the circuit training program was effective to increase and maintain both muscular and cardiovascular endurance among schoolchildren. This could help physical education teachers design programs that permit students to maintain fit muscular and cardiovascular endurance levels.

Hence the above mentioned study lends support to the results of the present study.

4.9.1.4 Flexibility

Flexibility is an important, yet often neglected, component of health-related fitness. Adequate levels of flexibility are needed for maintenance of functional independence and performance of activities of daily living such as bending to pick up a newspaper or getting out of the backseat of a two door car. Over the years, flexibility tests have been included in most health-related fitness test batteries, since it has been long thought that lack of flexibility is associated with musculoskeletal injuries and low back

pain. However, compared to research on other physical fitness components, there are not many studies substantiating the importance of flexibility to health-related fitness.

Research suggests that individuals with too little (ankylosis) or too much (hypermobility) flexibility are at higher risk than others for musculoskeletal injuries (Jones and Knapik 1999), but there is limited evidence that a greater than normal amount of flexibility actually decreases injury risk (Knudson, Magnusson, and McHugh 2000). Also, research fails to support an association between lumbar or hamstring flexibility and the occurrence of low back pain (Jackson et al. 1998; Plowman 1992). Still, flexibility should be included in health-related fitness test batteries to identify individuals at the extremes who may have a higher risk of musculotendinous injury. (Heyward 2010)

The results of the present study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on flexibility variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on flexibility variable between the experimental groups 1, group 2 and group 3.The results of this study clearly indicated that there was significant improvement from pre-test to post test among three group on flexibility, viz., explosive strength based circuit with yogic practices training, (pre-test 24.00 $\pm$ 1.69 post test 29.53 $\pm$ 1.77), strength endurance based circuit with yogic practices training (pre-test 24.07 $\pm$ 1.49 post test 27.00 $\pm$ 1.56), combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 24.93 $\pm$ 3.33post test 33.67$\pm$ 2.64).Further the results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the flexibility

performance better than the explosive strength based circuit with yogic practices training. Further the explosive strength based circuit with yogic practices training also improved flexibility performance than the strength endurance based circuit with yogic practices training. The less improvement was observed in strength endurance based circuit with yogic practices training.

. Chen TL, Maohc, Laich, Licy, Kuoch., (2009) conducted a study on the effect of yoga exercise intervention on health related physical fitness in school-age asthmatic children. For this they selected 31 voluntary children (exercise group 16; control group 15) aged 7 to 12 years. Those children were purposively sampled from one public elementary school in Taipei Country. The yoga exercise programme was practiced by the exercise group three times per week for a consecutive seven week period. The variables which were selected by them were muscular strength and flexibility. These variables served as criterion variables for that they assessed with the help of standardised test items i.e., push ups for muscular strength and sit and reach test. The data was collected before and after training period. A total of 31 subjects (exercise group 16; control group 14) completed follow-up. The GEE analysis showed that yoga exercise indeed improved muscular strength and flexibility after yoga practice.

The above findings make it evident that the changes in flexibility for the experimental groups were related to involvement in the training programme.

4.9.2 Physiological Variables

The findings of the study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on resting pulse

rate,VO2 max and breath holding time variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on resting pulse rate,VO2 max and breath holding time variable between the experimental groups 1, group 2 and group 3.

4.9.2.1 Resting Pulse Rate

The average resting heart rate for adults is 60 to 80 beats per minute (bpm), with the average resting heart rate of women typically 7 to 10 bpm higher than that of men. Heart rates as low as 28 to 40 bpm have been reported for highly conditioned endurance athletes, whereas poorly trained, sedentary individuals may have heart rates that exceed 100 bpm. (Heyward 2010)

The results of the present study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on resting pulse rate variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on resting pulse rate variable between the experimental groups 1, group 2 and group 3.The results of this study clearly indicated that there was significant improvement from pre-test to post test among three group on resting pulse rate, viz., explosive strength based circuit with yogic practices training, (pre-test 83.47 $\pm$ 1.19 post test 82.47 $\pm$ 1.30), strength endurance based circuit with yogic practices training (pre-test 83.60 $\pm$ 1.06 post test 81.73 $\pm$ 1.10), combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 83.53 $\pm$ 1.19post test 80.60$\pm$ 0.74).Further the results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the resting pulse rate

performance better than the endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training also improved resting pulse rate performance than the explosive strength based circuit with yogic practices training. The less improvement was observed in explosive strength based circuit with yogic practices training.

In general, higher the resting heart rate lesser the physical fitness, and the lower the heart rate, higher the physical fitness. (Some athletes have resting heart rates in the 40s). If the training workouts are effective, the resting heart rate will slowly decrease, or at least remain constant. Resting heart rates can also be affected by ensuing illness and overtraining. When the resting heart rate has increased, the players must decrease the workout frequency or intensity. Once a normal resting heart rate has been established it becomes easy to determine the subjects physiological state. The subjects get fitter once the resting heart rate decreases. Fox and Mathews (1981) viewed that training has very pronounced effect on heart rate even at rest. With endurance training, the thickness of the ventricular cavity of the heart becomes large. This means that it is able to hold more blood during the resting or diastolic period. The opposite is true for anaerobic training. The thickness of the ventricular wall increases while the size remains normal. Training increases the maximal oxygen uptake as well as the percentage of it that can be taxed during a workout. Consequently, the intensity of the load required to produce an efficient increases as the performance is improved in the course of training. The training load is therefore relative to the level of fitness of the individual. The fitter a person is, the more it will take to improve the fitness. Finally it becomes a matter of time and motivation to continue when the elite athlete has to devote several hours a day to training. The need to gradually increase training load with improved performance, in the case of effect of heart

rate, was demonstrated as early as in 1931 by Christensen(1931). He observed that regular training with a given standard exercise rate gradually lowered the heart rate.

Hence the above mentioned study lends support to the results of the present study. The above findings make it evident that the changes in resting pulse rate for the experimental groups were related to involvement in the training programme.

4.9.2.2 VO_2 max

It is desirable to directly determine the functional cardio respiratory capacity of the individual for classifying the aerobic fitness level and prescribing an aerobic exercise program. However, this is not always practical to do. The actual measurement of VO2 max requires expensive laboratory equipment, a considerable amount of time to researcher, and a high level of motivation on the part of the subjects.

Sub maximal exercise tests assume that a steady-state HR is achieved and is consistent for each exercise work rate. Steady-state HR usually is achieved in 3 to 4 min at a constant, sub maximal work rate. Also, it is assumed that a linear relationship exists between VO2 and HR within the range of 110 to 150 bpm. The HR and work rate from two sub maximal work outputs can be plotted (i.e., HR-VO2 relationship) and extrapolated to HR max to estimate VO2 max from sub maximal data. Although the linear relationship between HR and VO2 holds for light-to-moderate workloads, the relationship between oxygen uptake and work rate becomes curvilinear at heavier workloads. In a step test to predict VO2 max devised by McArdle and colleagues (1972), the subject steps at a rate of 22 steps.min-1 (males) for 3 min. The bench height is 16.25 in. (41.3 cm). Have subject remain standing after the exercise. Wait 5 sec and then take a 15 sec HR count. Concert the count to beats per minute by multiplying by 4.

The results of present study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on VO_2 max variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on VO_2 max variable between the experimental groups 1, group 2 and group 3.The results of this study clearly indicated that there was significant improvement from pre-test to post test among three group on VO_2 max, viz., explosive strength based circuit with yogic practices training, (pre-test 37.00 $\pm$ 1.56post test 38.00 $\pm$ 1.41), strength endurance based circuit with yogic practices training (pre-test 37.07 $\pm$ 1.44 post test 39.00 $\pm$ 1.41), combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 36.80 $\pm$ 1.52) post test 39.73$\pm$ 1.62).Further the results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the VO_2 max performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training also improved VO_2 max performance than the explosive strength based circuit with yogic practices training.The less improvement was observed in explosive strength based circuit with yogic practices training.

Petersen SR, Miller GD, Quinney HA, Wenger HA.(1988) conducted study on the influence of high-velocity resistance circuit training on maximal aerobic power. Twenty-seven trained males participated either as training (N = 16) or control (N = 11) subjects. The training group exercised for two 20 sec sets at each of six stations of hydraulic, variable resistance apparatus over two or three circuits maintaining an exercise:relief ratio of 1:2 during each circuit. Oxygen consumption responses measured over two circuits for six training group subjects averaged 61 and 57% of VO2max for exercise and relief

intervals, respectively. It is therefore suggested that the hydraulic circuit resistance program described will elicit a metabolic intensity sufficient to improve aerobic power, even in previously trained subjects.

The above findings make it evident that the changes in VO2 max for the experimental groups were related to involvement in the training programme.

4.9.2.3 Breath Holding Time

The findings of the study show that there was a significant difference among explosive strength based circuit with yogic practices training, strength endurance based circuit with yogic practices training and combined explosive strength and strength endurance based circuit with yogic practices training and control group on breath holding time variable owing to the ten weeks training interventions of school girls students, and the significant improvement were noticed on breath holding time variable between the experimental groups 1, group 2 and group 3.The results of this study clearly indicated that there was significant improvement from pre-test to post test among three group on breath holding time, viz., explosive strength based circuit with yogic practices training, (pre-test 25.20 $\pm$ 1.78, post- test 27.33 $\pm$ 1.72), strength endurance based circuit with yogic practices training (pre-test 25.13 $\pm$ 1.46 post test 26.27 $\pm$ 1.53), combined explosive strength and strength endurance based circuit with yogic practices training (pre-test 25.07 $\pm$ 1.79) post test 30.93$\pm$ 1.53)

Further the results indicate that the combined explosive strength and strength endurance based circuit with yogic practices training dominated in the breath holding time performance better than the strength endurance based circuit with yogic practices training. Further the strength endurance based circuit with yogic practices training also improved breath holding time performance than the explosive strength based circuit with yogic

practices training. The less improvement was observed in explosive strength based circuit with yogic practices training. Sekar Babu and Kulothugan (2011) studied the effect of yogic practices on selected physiological variables of men hockey players. Breath hold time was measured by the standard stop watch and resting pulse rate measured by using stethoscope. The data demonstrates that the participants in the training groups were able to increase breath holding time as measured by stop watch (in numbers), while those in the control group remained unchanged in this regard throughout the course of the programme.

Hence the above mentioned study lends support to the results of the present study.

4.10 HYPOTHESES

H1- The first hypothesis stated that explosive strength based circuit with yogic practices **(ESBC-YP)** may produce significant improvement on selected motor fitness attributes (speed, explosive power, flexibility and muscular strength endurance) and physiological variables (resting pulse rate, VO_2 max and breath holding time,), among school girls students. The results of the study show that explosive strength based circuit training with yogic practices produced significant improvement on the selected motor fitness attributes (speed, explosive power, flexibility and muscular strength endurance) and physiological variables (resting pulse rate, VO_2 max and breath holding time,), among school girls students. Hence the researcher first hypothesis was accepted based on the results of the present study.

H2- The second hypothesis stated that strength endurance based circuit with yogic practices **(SEBC-YP)** may produce significant improvement on the selected motor fitness attributes and physiological variables, among school girls' students.

The results of the study show that strength endurance based circuit training with yogic practices produced significant improvement on the selected motor fitness attributes and physiological variables, among school girls' students. Hence the researcher second hypothesis was accepted based on the results of the present study.

H3- The third hypothesis stated that combined explosive strength and strength endurance based circuit with yogic practices **(CES& SEBC-YP)** may produce significant improvement on the selected motor fitness attributes and physiological variables, among school girls' students

The results of the study show that combined explosive strength and strength endurance based circuit with yogic practices produced significant improvement on the selected motor fitness attributes and physiological variables, among school girls' students. Hence the researcher third hypothesis accepted based on the results of the present study.

H4 - The fourth hypothesis stated that combined explosive strength and strength endurance based circuit with yogic practices **(CES& SEBC-YP)** may produce significant improvement on the selected motor fitness attributes and physiological variables greater than explosive strength based**(ESBC-YP)** and strength endurance based circuit training with yogic practices**(SEBC-YP)** among school girls students.

The results of the study show that combined explosive strength and strength endurance based circuit training with yogic practices produced significant improvement on muscular strength endurance, resting pulse rate VO_2 max and breath holding time greater than the explosive strength based circuit with yogic practices and strength endurance based circuit training with yogic practices. Hence the researcher fourth hypothesis was accepted on the above said variables and rejected in the case of speed, explosive power and flexibility.

H4 - The fifth hypothesis stated that explosive strength based circuit with yogic practices **(ESBC-YP)** may produce significant improvement on selected motor fitness attributes and physiological variables greater than combined explosive strength and strength endurance based circuit with yogic practices **(CES& SEBC-YP)** and strength endurance based circuit with yogic practices**(SEBC-YP)** among school girls students.

The results of the study show that explosive strength based circuit training with yogic practices produced significant improvement on speed, explosive power, and flexibility better than the combined explosive strength and strength endurance based circuit with yogic practices and strength endurance based circuit with yogic practices. Hence the researcher fifth hypothesis was accepted on the above said variables and rejected in the case of muscular strength endurance, resting pulse rate VO_2 max and breath holding time.

H5 - The sixth hypothesis stated that strength endurance based circuit with yogic practices**(SEBC-YP)** may produce significant improvement on the selected motor fitness attributes and physiological variables greater than combined explosive strength and strength endurance based circuit with yogic practices**(CES& SEBC-YP)** and explosive strength based circuit with yogic practices**(ESBC-YP)** among school girl's students.

The results of the study show that strength endurance based circuit with yogic practices produced significant improvement on muscular strength endurance, resting pulse rate VO_2 max and breath holding time greater than the explosive strength based circuit with yogic practices. Hence the researcher sixth hypothesis was accepted on the above said variables and rejected in the case of speed, explosive power and flexibility.