

## CHAPTER IV

### RESULTS AND DISCUSSIONS

#### 4.1 OVERVIEW

This chapter deals with the analysis of data collected from the samples under study. The purpose of the present study was to find out the effect of spinning cycle exercise and protein supplementation on lipid profile and testosterone level on obese men software professionals. For the purpose of the study, sixty (N=60) obese software professionals from Chennai city were selected as subjects at random and their age ranged between 27 and 40 years. They were divided into four groups consisting of fifteen (n=15) subjects each. The selection of control and experimental groups were done at random. Experimental group I underwent spinning cycle exercise for 45 minutes in a day for three days per week for 12 weeks. Experimental group II underwent protein supplementation for 12 weeks. Experimental group III underwent the combination of both spinning cycle exercise and protein supplementation for 12 weeks. And IV group acted as control group. Subjects who were in the control group were not exposed to experimental treatment. Prior to the experiment, blood samples of all the subjects were collected to determine the selected variables, triglycerides, total cholesterol, high density lipoprotein, low density lipoprotein, very low density lipoprotein and testosterone, which forms the initial scores of the subjects. After the completion

of experimental period of twelve weeks, blood samples were collected from the subjects and determined the scores of the final scores. The difference between the initial and final scores was considered as the effect of respective experimental treatments. To test the significance of the difference were subjected to statistical treatment using ANCOVA.

#### **4.2 TEST OF SIGNIFICANCE**

As Clarke and Clarke (1971) says, “these data must be analysed in ways appropriate to the research design. Such analysis can only be appropriate to the research design and be accomplished through the application of pertinent statistics”.

This is the vital portion of thesis achieving the conclusion by examining the hypotheses. The procedure of testing the hypotheses was either by accepting the hypotheses or rejecting the same in accordance with the results obtained in relation to the level of confidence.

The test was usually called the test of significance since we test whether the differences between four groups or within many groups scores were significant or not. In this study, if the obtained F-value were greater than the table value, the null hypotheses were rejected to the effect that there existed significant difference among the means of the groups compared and if the obtained values were lesser than the required values, then the null hypotheses were accepted to the

effect that there existed no significant differences among the means of the groups under study.

#### **4.2.1 LEVEL OF SIGNIFICANCE**

The subjects were compared on the effect of spinning cycle exercise and protein supplementation on lipid profile and testosterone level on obese men software professionals. The selected criterion variables were triglycerides, total cholesterol, high density lipoprotein, low density lipoprotein, very low density lipoprotein and testosterone. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between the groups on selected criterion variables separately. In all the cases, 0.05 level of confidence was fixed to test the significance, which was considered as appropriate.

#### **4.3.1 RESULTS ON TRIGLYCERIDES**

The statistical analysis comparing the initial and final means of Triglycerides due to spinning cycling exercise, protein supplementation, combined cycling and protein supplementation and control groups of obese men software professionals is presented in Table IV

**Table IV**

**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO SPINNING  
CYCLING, PROTEIN SUPPLEMENTATION AND COMBINED  
TREATMENT ON TRIGLYCERIDES**

(In mg/dl)

	Cycling Group	Protein Supplementation Group	Combined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	182.30	184.88	185.56	179.75	B	316.54	3	105.51	0.97
Std Dev	10.52	8.26	9.03	13.14	W	6064.52	56	108.29	
Post Test Mean	180.51	188.59	180.21	179.75	B	814.02	3	271.34	1.89
Std Dev	10.09	11.47	9.03	13.14	W	8024.05	56	143.29	
Adjusted Post Test Mean	181.31	186.87	177.84	182.90	B	631.50	3	210.50	5.08*
					W	2276.91	55	41.40	

SOV: Source of Variance; B: Between W: Within

Required  $F_{(0.05), (df 3,56)} = 2.77$

\* Significant at 0.05 level of confidence

As shown in Table IV, the pre test mean on Triglycerides of spinning cycling exercise group was 182.30 with standard deviation  $\pm 10.52$  pre test mean of protein supplementation group was 184.88 with standard deviation  $\pm 8.26$ , the pre test mean of combined group consisting of cycling and protein supplementation group was 185.56 with standard deviation  $\pm 9.03$ , the pre test mean of control group was 179.75 with standard deviation  $\pm 13.14$ . The obtained F ratio of 0.97 on pre test means of the groups were not significant at 0.05 level as the obtained F value was less than the required table F value of 2.77 to be

significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table IV, the post test mean on Triglycerides of spinning cycling exercise group was 180.51 with standard deviation  $\pm$  10.09 post test mean of protein supplementation group was 188.59 with standard deviation  $\pm$  11.47, the post test mean of combined group consisting of cycling and protein supplementation group was 180.21 with standard deviation  $\pm$  11.47, the post test mean of control group was 179.61 with standard deviation  $\pm$  14.93. The obtained F ratio of 1.89 on post test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups after the experimental treatment.

Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done. The adjusted mean on Triglycerides on spinning cycling exercise group was 181.31, protein supplementation group was 186.87, combined group was 177.84 and control group was 182.90. The obtained F value on adjusted means was 5.08. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences among the adjusted means on the Triglycerides of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table V

**Table V**  
**Multiple Comparisons between Spinning Cycle Exercise, Protein**  
**Supplementation, Combined and Control Groups and Scheffe's**  
**Post Hoc Analysis on Triglycerides**  
(In mg/dl)

Spinning Cycling Exercise Group	Protein Supplementa- tion Group Group	Com- bined Group	Control Group	MEAN DIFF	C.I
181.31	186.87			5.56	6.77
181.31		177.84		3.47	6.77
181.31			182.90	1.59	6.77
	186.87	177.84		9.04*	6.77
	186.87		182.90	3.98	6.77
		177.84	182.90	5.06	6.77

\* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 6.77. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Protein Supplementation Group Vs Combined Group (MD: 9.04)

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Spinning Cycling Exercise Group Vs Protein Supplementation Group (MD: 5.56)

Spinning Cycling Exercise Group Vs Combined Group (MD: 3.47)

Spinning Cycling Exercise Group Vs Control Group (MD: 1.59)

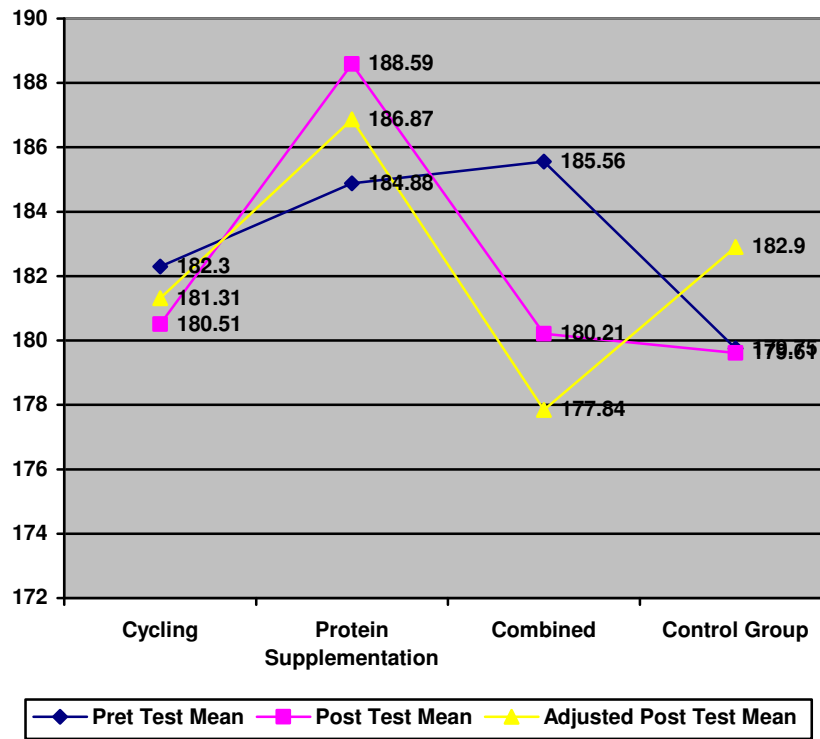
Protein Supplementation Group Vs Control Group (MD: 3.98)

Combined Group Vs Control Group (MD: 5.06)

The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure I.

Figure I

LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON TRIGLYCERIDES (In mg/dl)





### 4.3.2 RESULTS ON LOW DENSITY LIPOPROTEIN

The statistical analysis comparing the initial and final means of Low Density Lipoprotein due to spinning cycling exercise, protein supplementation, combined cycling and protein supplementation and control groups of obese men software professionals is presented in Table VI

**Table VI**

**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO SPINNING CYCLING, PROTEIN SUPPLEMENTATION AND COMBINED TREATMENT ON LOW DENSITY LIPOPROTEIN**  
(In mg/dl)

	Cycling Group	Protein Supplementation Group	Com-bined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	125.91	120.47	124.48	123.85	B	239.13	3	79.71	0.94
Std Dev	9.16	6.62	8.90	11.47	W	4740.34	56	84.65	
Post Test Mean	112.59	124.47	108.15	123.85	B	2783.47	3	927.82	11.19*
Std Dev	8.89	6.40	8.90	11.47	W	4644.58	56	82.94	
Adjusted Post Test Mean	110.54	127.43	107.42	122.50	B	3955.21	3	1318.40	116.88*
					W	620.38	55	11.28	

SOV: Source of Variance; B: Between W: Within

Required  $F_{(0.05), (df 3,56)} = 2.77$

\* Significant at 0.05 level of confidence

As shown in Table VI, the pre test mean on Low Density Lipoprotein of spinning cycling exercise group was 125.91 with standard deviation  $\pm 9.16$  pre

test mean of protein supplementation group was 120.47 with standard deviation  $\pm$  6.62, the pre test mean of combined group consisting of cycling and protein supplementation group was 124.48 with standard deviation  $\pm$  8.90, the pre test mean of control group was 123.85 with standard deviation  $\pm$  11.47. The obtained F ratio of 0.94 on pre test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table VI, the post test mean on Low Density Lipoprotein of spinning cycling exercise group was 112.59 with standard deviation  $\pm$  8.89 post test mean of protein supplementation group was 124.47 with standard deviation  $\pm$  6.40, the post test mean of combined group consisting of cycling and protein supplementation group was 108.15 with standard deviation  $\pm$  6.40, the post test mean of control group was 122.66 with standard deviation  $\pm$  11.50. The obtained F ratio of 11.19 on post test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups after the experimental treatment.

Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done. The adjusted mean on Low Density Lipoprotein on spinning cycling exercise

group was 110.54, protein supplementation group was 127.43, combined group was 107.42 and control group was 122.50. The obtained F value on adjusted means was 116.88. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences among the adjusted means on the Low Density Lipoprotein of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table VII

**Table VII**  
**Multiple Comparisons between Spinning Cycle Exercise, Protein**  
**Supplementation, Combined and Control Groups and Scheffe's**  
**Post Hoc Analysis on Low Density Lipoprotein**

(In mg/gl)

Spinning Cycling Exercise Group	Protein Supplementa- tion Group Group	Com- bined Group	Control Group	MEAN DIFF	C.I
110.54	127.43			16.89*	3.54
110.54		107.42		3.12	3.54
110.54			122.50	11.97*	3.54
	127.43	107.42		20.01*	3.54
	127.43		122.50	4.93*	3.54
		107.42	122.50	15.09*	3.54

\* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 3.54. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Spinning Cycling Exercise Group Vs Protein Supplementation Group (MD: 16.89)

Spinning Cycling Exercise Group Vs Control Group (MD: 11.97)

Protein Supplementation Group Vs Combined Group (MD: 20.01)

Protein Supplementation Group Vs Control Group (MD: 4.93)

Combined Group Vs Control Group (MD: 15.09)

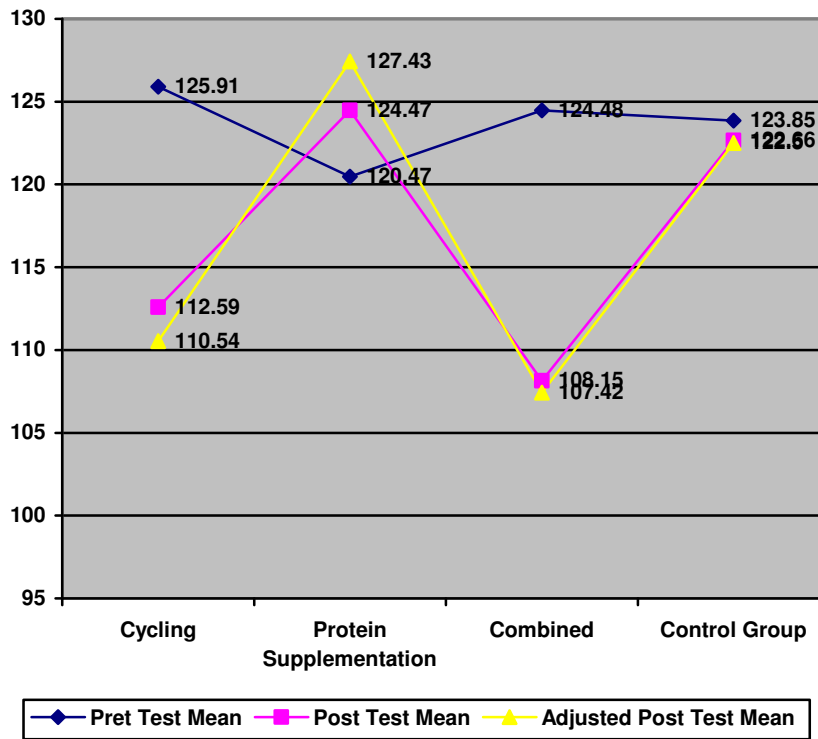
The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Spinning Cycling Exercise Group Vs Combined Group (MD: 3.12)

The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure II.

**Figure II**

**LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON  
LOW DENSITY LIPOPROTEIN  
(In m/dl)**



### 4.3.3 RESULTS ON VERY LOW DENSITY LIPOPROTEIN

The statistical analysis comparing the initial and final means of Very Low Density Lipoprotein due to spinning cycling exercise, protein supplementation, combined cycling and protein supplementation and control groups of obese men software professionals is presented in Table VIII

**Table VIII**

**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO SPINNING CYCLING, PROTEIN SUPPLEMENTATION AND COMBINED TREATMENT ON VERY LOW DENSITY LIPOPROTEIN**  
(In mg/dl)

	Cycling Group	Protein Supplementation Group	Com-bined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	36.46	36.98	37.11	35.95	B	12.66	3	4.22	0.97
Std Dev	2.10	1.65	1.81	2.63	W	242.58	56	4.33	
Post Test Mean	35.77	37.32	36.04	35.95	B	22.80	3	7.60	1.38
Std Dev	1.79	2.29	1.81	2.63	W	308.82	56	5.51	
Adjusted Post Test Mean	35.92	36.99	35.59	36.55	B	17.65	3	5.88	3.18*
					W	101.81	55	1.85	

SOV: Source of Variance; B: Between W: Within

Required  $F_{(0.05), (df 3,56)} = 2.77$

\* Significant at 0.05 level of confidence

As shown in Table VIII, the pre test mean on Very Low Density Lipoprotein of spinning cycling exercise group was 36.46 with standard deviation

$\pm 2.10$  pre test mean of protein supplementation group was 36.98 with standard deviation  $\pm 1.65$ , the pre test mean of combined group consisting of cycling and protein supplementation group was 37.11 with standard deviation  $\pm 1.81$ , the pre test mean of control group was 35.95 with standard deviation  $\pm 2.63$ . The obtained F ratio of 0.97 on pre test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table VIII, the post test mean on Very Low Density Lipoprotein of spinning cycling exercise group was 35.77 with standard deviation  $\pm 1.79$  post test mean of protein supplementation group was 37.32 with standard deviation  $\pm 2.29$ , the post test mean of combined group consisting of cycling and protein supplementation group was 36.04 with standard deviation  $\pm 2.29$ , the post test mean of control group was 35.92 with standard deviation  $\pm 2.99$ . The obtained F ratio of 1.38 on post test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups after the experimental treatment.

Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done. The adjusted mean on Very Low Density Lipoprotein on spinning cycling

exercise group was 35.92, protein supplementation group was 36.99, combined group was 35.59 and control group was 36.55. The obtained F value on adjusted means was 3.18. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences among the adjusted means on the Very Low Density Lipoprotein of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table IX

**Table IX**  
**Multiple Comparisons between Spinning Cycle Exercise, Protein**  
**Supplementation, Combined and Control Groups and Scheffe's**  
**Post Hoc Analysis on Very Low Density Lipoprotein**  
(In mg/dl)

Spinning Cycling Exercise Group	Protein Supplementa- tion Group Group	Com- bined Group	Control Group	MEAN DIFF	C.I
35.92	36.99			1.07	1.39
35.92		35.59		0.33	1.39
35.92			36.55	0.63	1.39
	36.99	35.59		1.40*	1.39
	36.99		36.55	0.45	1.39
		35.59	36.55	0.95	1.39

\* Significant at 0.05 level.



The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 1.39. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Protein Supplementation Group Vs Combined Group (MD: 1.40)

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Spinning Cycling Exercise Group Vs Protein Supplementation Group (MD: 1.07)

Spinning Cycling Exercise Group Vs Combined Group (MD: 0.33)

Spinning Cycling Exercise Group Vs Control Group (MD: 0.63)

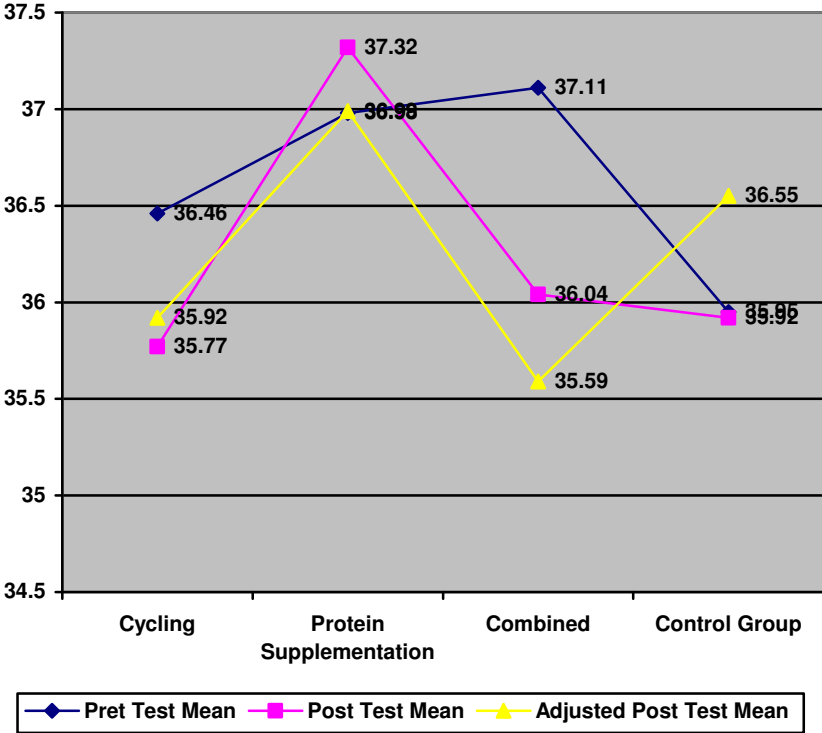
Protein Supplementation Group Vs Control Group (MD: 0.45)

Combined Group Vs Control Group (MD: 0.95)

The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure III.

Figure III

LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON VERY LOW DENSITY LIPOPROTEIN (In mg/dl)



#### 4.3.4 RESULTS ON HIGH DENSITY LIPOPROTEIN

The statistical analysis comparing the initial and final means of High Density Lipoprotein due to spinning cycling exercise, protein supplementation, combined cycling and protein supplementation and control groups of obese men software professionals is presented in Table X

**Table X**

**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO SPINNING CYCLING, PROTEIN SUPPLEMENTATION AND COMBINED TREATMENT ON HIGH DENSITY LIPOPROTEIN**  
(In mg/dl)

	Cycling Group	Protein Supplementation Group	Com-bined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	55.87	54.67	56.00	55.27	B	16.85	3	5.62	1.56
Std Dev	1.96	1.88	1.77	1.98	W	202.00	56	3.61	
Post Test Mean	56.87	53.33	59.40	55.27	B	282.58	3	94.19	12.82*
Std Dev	3.27	1.63	1.77	1.98	W	411.60	56	7.35	
Adjusted Post Test Mean	56.61	53.81	59.06	56.05	B	195.68	3	65.23	10.68*
					W	335.89	55	6.11	

SOV: Source of Variance; B: Between W: Within

Required  $F_{(0.05), (df 3,56)} = 2.77$

\* Significant at 0.05 level of confidence

As shown in Table X, the pre test mean on High Density Lipoprotein of spinning cycling exercise group was 55.87 with standard deviation  $\pm 1.96$  pre test

mean of protein supplementation group was 54.67 with standard deviation  $\pm$  1.88, the pre test mean of combined group consisting of cycling and protein supplementation group was 56.00 with standard deviation  $\pm$  1.77, the pre test mean of control group was 55.27 with standard deviation  $\pm$  1.98. The obtained F ratio of 1.56 on pre test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table X, the post test mean on High Density Lipoprotein of spinning cycling exercise group was 56.87 with standard deviation  $\pm$  3.27 post test mean of protein supplementation group was 53.33 with standard deviation  $\pm$  1.63, the post test mean of combined group consisting of cycling and protein supplementation group was 59.40 with standard deviation  $\pm$  1.63, the post test mean of control group was 55.93 with standard deviation  $\pm$  1.98. The obtained F ratio of 12.82 on post test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups after the experimental treatment.

Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done. The adjusted mean on High Density Lipoprotein on spinning cycling exercise

group was 56.61, protein supplementation group was 53.81, combined group was 59.06 and control group was 56.05. The obtained F value on adjusted means was 10.68. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences among the adjusted means on the High Density Lipoprotein of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table XI

**Table XI**  
**Multiple Comparisons between Spinning Cycle Exercise, Protein**  
**Supplementation, Combined and Control Groups and Scheffe's**  
**Post Hoc Analysis on High Density Lipoprotein**  
(In mg/dl)

Spinning Cycling Exercise Group	Protein Supplementation Group	Com-bined Group	Control Group	MEAN DIFF	C.I
56.61	53.81			2.80*	2.60
56.61		59.06		2.45	2.60
56.61			56.05	0.57	2.60
	53.81	59.06		5.25*	2.60
	53.81		56.05	2.23	2.60
		59.06	56.05	3.02*	2.60

\* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 2.60. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Spinning Cycling Exercise Group Vs Protein Supplementation Group (MD: 2.80)

Protein Supplementation Group Vs Combined Group (MD: 5.25)

Combined Group Vs Control Group (MD: 3.02)

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Spinning Cycling Exercise Group Vs Combined Group (MD: 2.45)

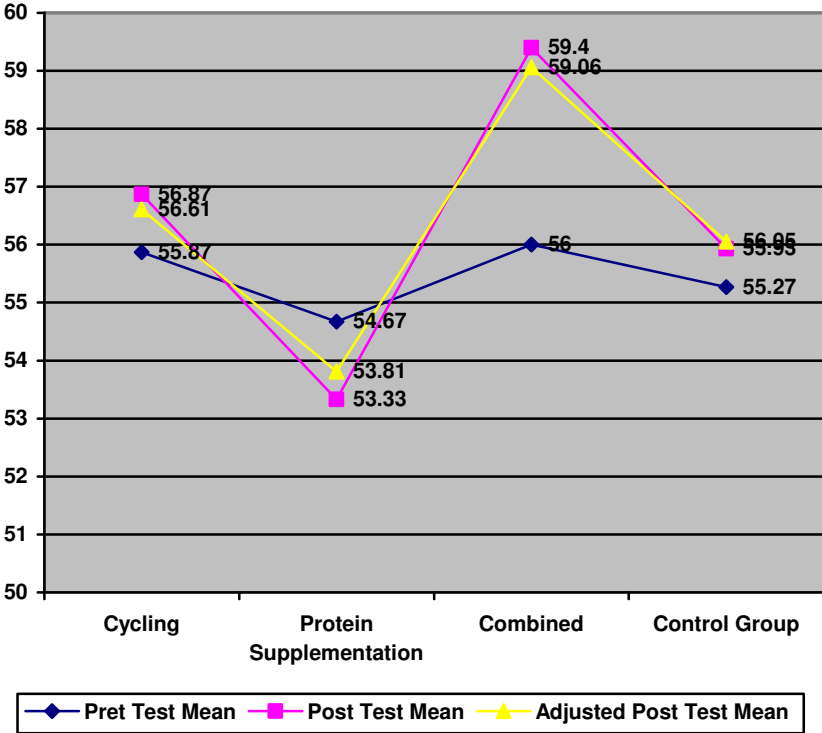
Spinning Cycling Exercise Group Vs Control Group (MD: 0.57)

Protein Supplementation Group Vs Control Group (MD: -2.23)

The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure IV.

Figure IV

LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON HIGH DENSITY LIPOPROTEIN (In mg/dl)



### 4.3.5 RESULTS ON TOTAL CHOLESTEROL

The statistical analysis comparing the initial and final means of Total Cholesterol due to spinning cycling exercise, protein supplementation, combined cycling and protein supplementation and control groups of obese men software professionals is presented in Table XII

**Table XII**

**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO SPINNING CYCLING, PROTEIN SUPPLEMENTATION AND COMBINED TREATMENT ON TOTAL CHOLESTEROL**  
(In mg/dl)

	Cycling Group	Protein Supplementation Group	Combined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	219.49	213.21	220.01	215.25	B	491.05	3	163.68	1.32
Std Dev	12.64	8.40	10.75	12.20	W	6927.03	56	123.70	
Post Test Mean	205.87	215.89	204.85	215.25	B	1551.86	3	517.29	4.57*
Std Dev	10.96	9.47	10.75	12.20	W	6343.79	56	113.28	
Adjusted Post Test Mean	203.56	219.40	202.06	216.70	B	3324.13	3	1108.04	147.38*
					W	413.50	55	7.52	

SOV: Source of Variance; B: Between W: Within

Required  $F_{(0.05), (df 3,56)} = 2.77$

\* Significant at 0.05 level of confidence

As shown in Table XII, the pre test mean on Total Cholesterol of spinning cycling exercise group was 219.49 with standard deviation  $\pm$  12.64 pre test mean of protein supplementation group was 213.21 with standard deviation  $\pm$  8.40, the



pre test mean of combined group consisting of cycling and protein supplementation group was 220.01 with standard deviation  $\pm$  10.75, the pre test mean of control group was 215.25 with standard deviation  $\pm$  12.20. The obtained F ratio of 1.32 on pre test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table XII, the post test mean on Total Cholesterol of spinning cycling exercise group was 205.87 with standard deviation  $\pm$  10.96 post test mean of protein supplementation group was 215.89 with standard deviation  $\pm$  9.47, the post test mean of combined group consisting of cycling and protein supplementation group was 204.85 with standard deviation  $\pm$  9.47, the post test mean of control group was 215.09 with standard deviation  $\pm$  11.88. The obtained F ratio of 4.57 on post test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups after the experimental treatment.

Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done. The adjusted mean on Total Cholesterol on spinning cycling exercise group was 203.56, protein supplementation group was 219.40, combined group was 202.06

and control group was 216.70. The obtained F value on adjusted means was 147.38. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences among the adjusted means on the Total Cholesterol of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table XIII

**Table XIII**

**Multiple Comparisons between Spinning Cycle Exercise, Protein Supplementation, Combined and Control Groups and Scheffe's Post Hoc Analysis on Total Cholesterol**  
(In mg/dl)

Spinning Cycling Exercise Group	Protein Supplementation Group	Com-bined Group	Control Group	MEAN DIFF	C.I
203.56	219.40			15.84*	2.89
203.56		202.06		1.50	2.89
203.56			216.70	13.14*	2.89
	219.40	202.06		17.34*	2.89
	219.40		216.70	2.69	2.89
		202.06	216.70	14.64*	2.89

\* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 2.89. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Spinning Cycling Exercise Group Vs Protein Supplementation Group (MD: 15.84)

Spinning Cycling Exercise Group Vs Control Group (MD: 13.14)

Protein Supplementation Group Vs Combined Group (MD: 17.34)

Combined Group Vs Control Group (MD: 14.64)

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

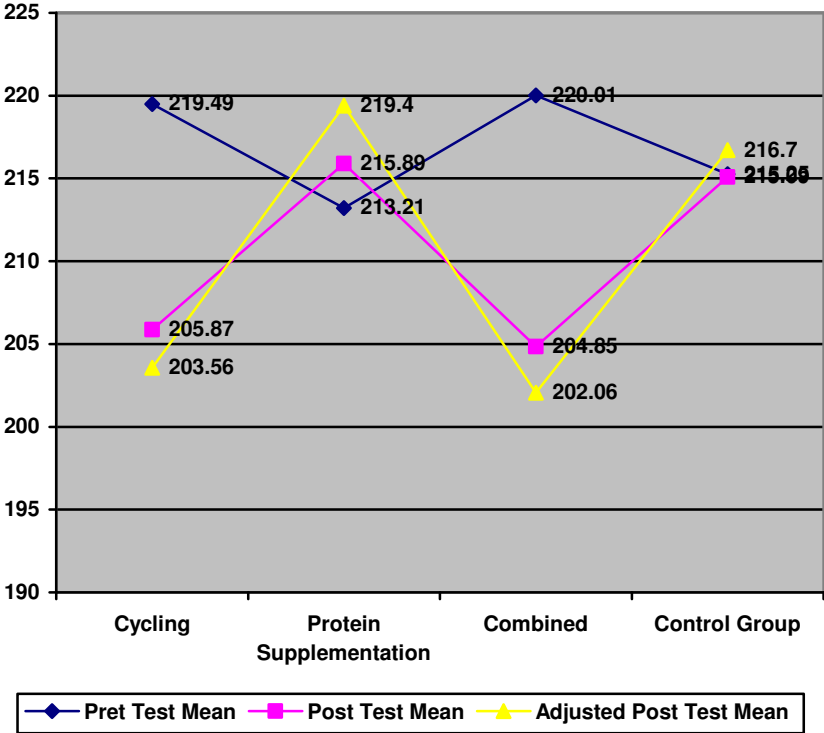
Spinning Cycling Exercise Group Vs Combined Group (MD: 1.50)

Protein Supplementation Group Vs Control Group (MD: 2.69)

The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure V.

Figure V

LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON TOTAL CHOLESTEROL (In mg/dl)



### 4.3.6 RESULTS ON TESTOSTERONE

The statistical analysis comparing the initial and final means of Testosterone due to spinning cycling exercise, protein supplementation, combined cycling and protein supplementation and control groups of obese men software professionals is presented in Table XIV

**Table XIV**

**COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO SPINNING CYCLING, PROTEIN SUPPLEMENTATION AND COMBINED TREATMENT ON TESTOSTERONE**  
(In ng/dl)

	Cycling Group	Protein Supplementation Group	Combined Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	4.69	4.82	4.86	4.84	B	0.25	3	0.08	0.15
Std Dev	0.79	0.80	0.79	0.65	W	32.32	56	0.58	
Post Test Mean	5.11	4.75	5.62	4.84	B	7.05	3	2.35	3.41*
Std Dev	0.79	0.95	0.79	0.65	W	38.57	56	0.69	
Adjusted Post Test Mean	5.21	4.73	5.57	4.78	B	6.98	3	2.33	10.19*
					W	12.56	55	0.23	

SOV: Source of Variance; B: Between W: Within

Required  $F_{(0.05), (df 3,56)} = 2.77$

\* Significant at 0.05 level of confidence

As shown in Table XIV, the pre test mean on Testosterone of spinning cycling exercise group was 4.69 with standard deviation  $\pm 0.79$  pre test mean of

protein supplementation group was 4.82 with standard deviation  $\pm$  0.80, the pre test mean of combined group consisting of cycling and protein supplementation group was 4.86 with standard deviation  $\pm$  0.79, the pre test mean of control group was 4.84 with standard deviation  $\pm$  0.65. The obtained F ratio of 0.15 on pre test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table XIV, the post test mean on Testosterone of spinning cycling exercise group was 5.11 with standard deviation  $\pm$  0.79 post test mean of protein supplementation group was 4.75 with standard deviation  $\pm$  0.95, the post test mean of combined group consisting of cycling and protein supplementation group was 5.62 with standard deviation  $\pm$  0.95, the post test mean of control group was 4.82 with standard deviation  $\pm$  0.64. The obtained F ratio of 3.41 on post test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups after the experimental treatment.

Taking into consideration of the pre test means and post test means, adjusted post test means were determined and analysis of covariance was done. The adjusted mean on Testosterone on spinning cycling exercise group was 5.21,

protein supplementation group was 4.73, combined group was 5.57 and control group was 4.78. The obtained F value on adjusted means was 10.19. The obtained F value was greater than the required value of 2.77 and hence it was accepted that there was significant differences among the adjusted means on the Testosterone of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results are presented in Table XV

**Table XV**  
**Multiple Comparisons between Spinning Cycle Exercise, Protein**  
**Supplementation, Combined and Control Groups and Scheffe's**  
**Post Hoc Analysis on Testosterone**  
(In ng/dl)

Spinning Cycling Exercise Group	Protein Supplementation Group	Com-bined Group	Control Group	MEAN DIFF	C.I
5.21	4.73			0.48	0.50
5.21		5.57		0.36	0.50
5.21			4.78	0.43	0.50
	4.73	5.57		0.84*	0.50
	4.73		4.78	0.05	0.50
		5.57	4.78	0.79*	0.50

\* Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 0.50. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Protein Supplementation Group Vs Combined Group (MD: 0.84)

Combined Group Vs Control Group (MD: 0.79)

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Spinning Cycling Exercise Group Vs Protein Supplementation Group (MD: 0.48)

Spinning Cycling Exercise Group Vs Combined Group (MD: 0.36)

Spinning Cycling Exercise Group Vs Control Group (MD: 0.43)

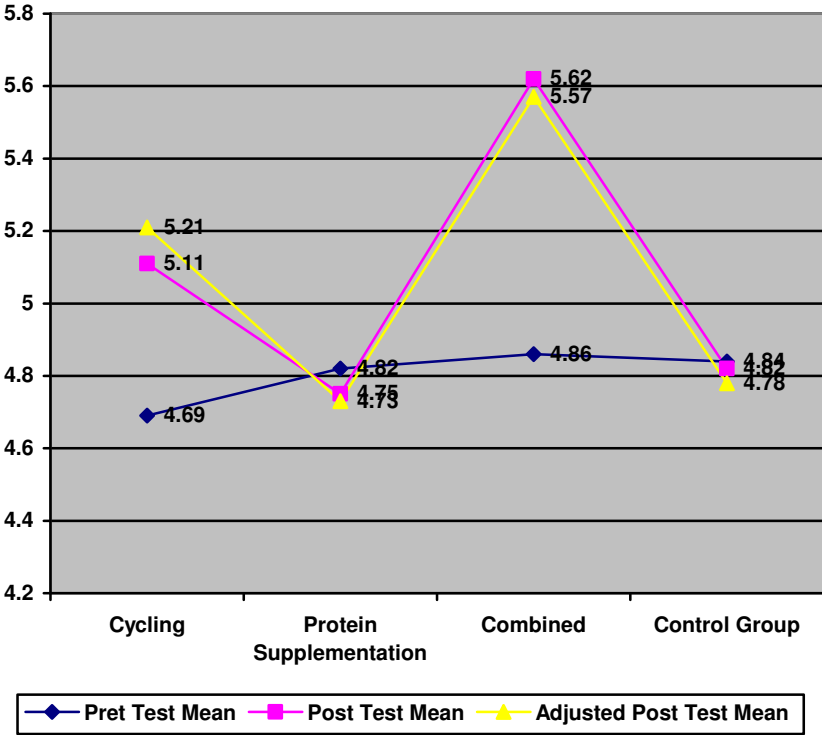
Protein Supplementation Group Vs Control Group (MD: 0.05)

The pre test, post test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure VI.



Figure VI

LINE GRAPH SHOWING PRE, POST AND ADJUSTED MEANS ON TESTOSTERONE (In ng/dl)



#### 4.4 DISCUSSIONS ON FINDINGS

Cycling is an effective mode of aerobic exercises which is more beneficial to sedentary men like software professionals. Spinning cycle exercises is having more benefits than regular cycling exercises. There are many different forms of protein supplements and each offers a different benefit. Researches show taking protein supplements help them build the muscle that they need. For many people they find that this practice is not a good idea while others think that it does not hurt anything. The truth of the matter is that there are pros and cons to this, that means, if taken excessive amounts of protein, the extra calories will be stored as fat. It can also lead to over straining of kidneys and long term metabolic problems. Excess protein intake enhances diuresis (loss of body water) as the body excretes excess nitrogen (urea and ketones) through urine. This cause mineral losses and increases the risk of dehydration. This gives the further scope for research in this direction with the knowledge to stay safe. In this research, the investigator was interested to find out which of the different experiments, that is, spinning cycle exercise, or protein supplementation, or combination of both is beneficial to software professionals in beneficially altering their lipid profiles and testosterone level.

The results presented in Table IV proved that protein supplementation has slightly increased the triglycerides of the subjects and spinning cycling group and combined group (spinning cycling and protein supplementation) reduced

triglycerides of the subjects. And the ANCOVA results proved that there was significant difference among adjusted post test means as the obtained F value of 5.08 was greater than the required table F value of 2.77. The post hoc analysis presented in Table V proved that the difference between protein supplementation group and combined group was significant at 0.05 level and it was proved that combined treatment, spinning cycling and protein supplementation was better than protein supplementation group in reducing triglycerides of the obese software professionals.

Triglycerides are a key factor in cardiovascular health. Like cholesterol, triglycerides are a form of blood lipid, or fat. However, triglycerides don't build up on the artery walls; instead, they are stored in fat cells if not used by the body for energy. High triglycerides are strongly influenced by the foods we eat, says Cleveland Clinic (2009). In this study, the protein supplementation has increased the triglycerides in the lipid profiles and the spinning cycle and combined groups have reduced the triglycerides as these groups used triglycerides for energy for the increased physical activities in the form of spinning cycle and combined groups.

The hypothesis No. 1 that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on triglyceride among obese men software professionals compared to control group was rejected at 0.05 level as there was no significant difference between treatment groups and control group.

The hypothesis No. 2 that the combined group would be better than other isolated treatments, namely, spinning cycle exercise and protein supplementation, was accepted at 0.05 level as the combined group was significantly better than isolated group, protein supplementation. However there was no significant difference between the combined group and spinning cycling group and the hypothesis No. 2 that combined group would be better than spinning group was rejected at 0.05 level as there was no significant difference between spinning cycling group and combined group.

The findings of this study are in agreement with the findings of Poole CN, et.al. (2011) who found the combined effect of a meal replacement with exercise could favourably change serum markers of clinical health and Numao S, (2011) who found 60 minutes of stationary cycle exercise at high-intensity (HE) could reduce triglycerides.

The results presented in Table VI proved that protein supplementation has slightly increased the low density lipoprotein of the subjects and spinning cycling group and combined group (spinning cycling and protein supplementation) reduced low density lipoprotein of the subjects. And the ANCOVA results proved that there was significant difference among post test and adjusted post test means as the obtained F values of 11.19 and 5.08 respectively were greater than the required table F value of 2.77. The post hoc analysis presented in Table VII proved that the spinning cycling exercise was better than protein supplementation

and control group. And the combined treatment, spinning cycling exercise and protein supplementation was better than protein supplementation and control group. There was no significant difference between spinning cycle exercise group and combined group. Thus it was proved that spinning cycling exercise as well as combination of spinning cycling exercise with protein supplementation equally reduced low density lipoprotein of the obese software professionals.

The diet, activity level, family history and weight can influence the levels of both types of cholesterol - Low Density Lipoprotein, or bad, cholesterol and high density lipoprotein, or good, cholesterol.(Mayo Clinic, 2011) . In this study, the protein supplementation on the obese subjects increased the lipoprotein, as they do not involved in any physical activity to use the cholesterol accumulated because of protein supplementation, and the spinning cycling exercises and combined group had reduced low density lipoprotein as these groups involved in spinning cycling activities to burn out the cholesterol accumulated.

The hypothesis No. 1 stated that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on low density lipoprotein among obese men software professionals compared to control group was accepted at 0.05 level as there was significant difference between treatment groups and control group.

The hypothesis No. 2 that the combined group would be better than other isolated treatments, namely, protein supplementation, was accepted at 0.05 level as the combined group was significantly better than isolated group, protein supplementation. However, the hypothesis that the combined group would be better than spinning cycling group was rejected at 0.05 level as there was no significant difference between spinning cycling group and combined group.

The findings of this study are in agreement with the findings of Poole CN, et.al. (2011) who found the combined effect of a meal replacement with exercise could favourably change serum markers of clinical health and Tishova Y, and Kalinchenko SY. (2009) who found normalization of laboratory variables due to diet and exercise.

The results presented in Table VIII proved that protein supplementation has slightly increased the very low density lipoprotein of the subjects and spinning cycling group and combined group (spinning cycling and protein supplementation) reduced very low density lipoprotein of the subjects. And the ANCOVA results proved that there was significant difference among adjusted post test means as the obtained F value of 3.18 was greater than the required table F value of 2.77. The post hoc analysis presented in Table IX proved that the difference between protein supplementation group and combined group was significant at 0.05 level and it was proved that combined treatment, spinning cycling and protein supplementation was better than protein supplementation

group in reducing very low density lipoprotein of the obese software professionals.

The diet, activity level, family history and weight can influence the levels of both types of cholesterol - Low Density Lipoprotein, or bad, cholesterol and HDL, or good, cholesterol.(Mayo Clinic, 2011). In this study, the protein supplementation on the obese subjects increased the very low density lipoprotein, as they do not involved in any physical activity to use the cholesterol accumulated because of protein supplementation, and the spinning cycling exercises and combined group had reduced very low density lipoprotein as these groups involved in spinning cycling activities to burn out the cholesterol accumulated.

The hypothesis No. 1 stated that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on very low density lipoprotein among obese men software professionals compared to control group was rejected at 0.05 level as there was no significant difference between treatment groups and control group.

The hypothesis No. 2 stated that the combined group would be better than other isolated treatment, namely, protein supplementation, was accepted at 0.05 level as the combined group was significantly better than isolated group, protein supplementation. However, the hypothesis that the combined group would be

better than spinning cycling group was rejected at 0.05 level as there was no significant difference between spinning cycling group and combined group.

The findings of this study are in agreement with the findings of Poole CN, et.al. (2011) who found the combined effect of a meal replacement with exercise could favourably change serum markers of clinical health and Tishova Y, and Kalinchenko SY. (2009) who found normalization of laboratory variables due to diet and exercise.

The results presented in Table X proved that protein supplementation has slightly decreased the high density lipoprotein of the subjects and spinning cycling group and combined group (spinning cycling and protein supplementation) increased high density lipoprotein of the subjects. And the ANCOVA results proved that there was significant difference among post test and adjusted post test means as the obtained F values of 12.82 and 10.68 respectively were greater than the required table F value of 2.77. The post hoc analysis presented in Table XI proved that the spinning cycling exercise was better than protein supplementation group. And the combined treatment, spinning cycling exercise and protein supplementation was better than protein supplementation and control group. There was no significant difference between spinning cycle exercise group and combined group. Thus it was proved that spinning cycling exercise as well as combination of spinning cycling exercise with protein supplementation equally improved HDL of the obese software professionals.



The diet, activity level, family history and weight can influence the levels of both types of cholesterol - Low Density Lipoprotein, or bad, cholesterol and HDL, or good, cholesterol.(Mayo Clinic, 2011) . In this study, the protein supplementation on the obese subjects slightly decreased the high density lipoprotein, as they do not involved in any physical activity to use the cholesterol accumulated because of protein supplementation. The spinning cycling exercises and combined group had reduced cholesterol as these groups involved in spinning cycling activities to burn out the cholesterol accumulated, which resulted in improving high density lipoprotein.

The hypothesis No. 1 stated that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on high density lipoprotein among obese men software professionals compared to control group was accepted at 0.05 level for combined group as there was significant difference between combined group and control group. However, the hypothesis No. 1 was rejected at 0.05 level for treatment groups, spinning cycling group and protein supplementation group as there was no significant difference between these two treatment groups and control group.

The hypothesis No. 2 stated that the combined group would be better than other isolated treatment, namely, protein supplementation, was accepted at 0.05 level as the combined group was significantly better than isolated group, protein

supplementation. However, the hypothesis that the combined group would be better than spinning cycling group was rejected at 0.05 level as there was no significant difference between spinning cycling group and combined group.

The findings of this study are in agreement with the findings of Poole CN, et.al. (2011) who found the combined effect of a meal replacement with exercise could favourably change serum markers of clinical health and Tishova Y, and Kalinchenko SY. (2009) who found normalization of laboratory variables due to diet and exercise.

The results presented in Table XII proved that protein supplementation has slightly increased the total cholesterol of the subjects and spinning cycling group and combined group (spinning cycling and protein supplementation) reduced total cholesterol of the subjects. And the ANCOVA results proved that there was significant difference among post test and adjusted post test means as the obtained F values of 4.57 and 147.38 respectively were greater than the required table F value of 2.77. The post hoc analysis presented in Table XIII proved that the spinning cycling exercise was better than protein supplementation and control group. And the combined treatment, spinning cycling exercise and protein supplementation was better than protein supplementation and control group. There was no significant difference between spinning cycle exercise group and combined group. Thus it was proved that spinning cycling exercise as well as

combination of spinning cycling exercise with protein supplementation equally reduced total cholesterol of the obese software professionals.

The diet, activity level, family history and weight can influence the levels of both types of cholesterol - Low Density Lipoprotein, or bad, cholesterol and HDL, or good, cholesterol.(Mayo Clinic, 2011) . In this study, the protein supplementation on the obese subjects increased total cholesterol, as they do not involved in any physical activity to use the cholesterol accumulated because of protein supplementation and the spinning cycling exercises and combined group had reduced total cholesterol as these groups involved in spinning cycling activities to burn out the cholesterol accumulated.

The hypothesis No. 1 stated that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on total cholesterol among obese men software professionals compared to control group was accepted at 0.05 level for spinning cycling group and combined group as there were significant difference between spinning cycling group and control group, and combined group and control group. However, the hypothesis was rejected at 0.05 level for treatment groups protein supplementation group as there was no significant difference between the protein supplementation group and control group.

The hypothesis No.2 stated that the combined group would be better than other isolated treatment, namely, protein supplementation, was accepted at 0.05 level as the combined group was significantly better than isolated group, protein supplementation. However, the hypothesis that the combined group would be better than spinning cycling group was rejected at 0.05 level as there was no significant difference between spinning cycling group and combined group.

The findings of this study are in agreement with the findings of Poole CN, et.al. (2011) who found the combined effect of a meal replacement with exercise could favourably change serum markers of clinical health and Tishova Y, and Kalinchenko SY. (2009) who found normalization of laboratory variables due to diet and exercise.

The results presented in Table XIV proved that protein supplementation has slightly reduced testosterone of the subjects and spinning cycling group and combined group (spinning cycling and protein supplementation) improved testosterone of the subjects. And the ANCOVA results proved that there was significant difference among post test and adjusted post test means as the obtained F values of 3.41 and 10.19 respectively were greater than the required table F value of 2.77. The post hoc analysis presented in Table XV proved that the combined treatment, spinning cycling exercise and protein supplementation was better than protein supplementation and control group. There was no significant difference between spinning cycle exercise group and combined group. Thus it

was proved that combination of spinning cycling exercise with protein supplementation improved testosterone of the obese software professionals.

Protein supplements are usually consumed by athletes and those who wish to increase their muscle mass. These supplements also improve their performance in sports. These supplements increase the muscle mass drastically in a very short span of time, which might prove to be either futile or harmful. The protein supplementation provided to obese software professionals, increased the fat mass and bad cholesterol, as they do not involved in any physical activity to use the excess calories by the protein supplement, which in turn slightly reduced the testosterone level of the subjects. Further, the spinning cycling exercises and combined with protein supplementation beneficially improved the testosterone of the obese software professionals.

The hypothesis No. 1 stated that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on testosterone among obese men software professionals compared to control group was accepted at 0.05 level for combined group as there were significant difference between combined group and control group. However, the hypothesis was rejected at 0.05 level for treatment groups, spinning cycling group and protein supplementation group as there were no significant differences.

The hypothesis No. 2 stated that the combined group would be better than other isolated treatment, namely, protein supplementation, was accepted at 0.05 level as the combined group was significantly better than isolated group, protein supplementation. However, the hypothesis that the combined group would be better than spinning cycling group was rejected at 0.05 level as there was no significant difference between spinning cycling group and combined group.

The findings of this study are in agreement with the findings of Allan CA, and McLachlan RI. (2010) who found that testosterone levels are frequently reduced in obesity. Hough JP, et.al. (2011) who found the 55/80 cycle protocol induces a prolonged testosterone response. In this study, the protein supplementation has slightly reduced the testosterone, because the obesity of the software professionals were not altered due to protein supplementation. The findings that combination of spinning cycling exercise and protein supplementation improved testosterone was because the obesity could be reduced among this group and improved testosterone as found by McLachlan RI (2010) and Hough JP et.al. (2011).