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## Effect of Aerobic Training on Selected Biochemical Variables in Overweight Male Students of Mekelle University

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**Abstract:** The purpose of this study was to find the effect of aerobic exercise training program on selected biochemical variables in overweight students. From Mekelle university twenty overweight males were purposively selected as subjects. The subject's age ranged from 20- to 25 years. The selected subjects were divided in to two groups. group one(experimental) was given eight week regular aerobic exercise training program(running and cycling) with intensity of 60%-70% in gymnasium center., group two was as control group. For this study low density lipoprotein cholesterol, triglycerides, total cholesterol and fasting blood glucose were selected as biochemical variables. In order to administrate the tests and protocol of training this study done through sophisticated materials such as mindray, blood glucometer, serum tube (for blood sample and to administered the protocol of training, electrical treadmill and electrical cycle bike program component was used. The collected data of the selected variables were analyzed statistically by using spss20. Analysis of variance (ANOVA) was used to determine the differences, if any among the adjusted post test means on selected dependent variables separately. The level of significance was fixed at.05 level of confidence, which was considered as appropriate. The results of the study showed that aerobic training brought positive significant difference on the selected physiological, anthropometrical and biochemical variables in experimental group compare with to control group.

**Key Words:** Blood glucose, Biochemical, cholesterol, overweight

### Introduction

An inactive lifestyle can disrupt the energy balance, thereby causing overweight and obesity. Obesity is characterized by high fat and endomorph rates <sup>1</sup>. It has been noted that body weight beyond normal limits will cause various health problems and weaken the work capacity of a person <sup>2</sup>. Inactive and sedentary individuals are more prone to wide range of diseases, from the so-called 'the disease of our era', i.e. obesity, and cardiovascular diseases to others such as muscle weakness, postural deformations and diabetes <sup>3</sup>. Physical activity prevents and helps to cure the atherosclerotic risk factors such as high blood pressure, insulin resistance, glucose intolerance, high triglyceride concentration, low and high concentration of lipoprotein cholesterol concentration and obesity. Exercise in low density along with loss weight can both lower lipoprotein cholesterol (LDL) concentrations and control the decrease in HDL <sup>4</sup>.

Aerobic exercise prevents and helps to cure the atherosclerotic risk factors such as high blood pressure, insulin resistance, glucose intolerance, high triglyceride concentration, low and high concentration of lipoprotein cholesterol concentration and obesity. Exercise in low density along with loss weight can both lower lipoprotein cholesterol (LDL) concentrations and control the decrease in HDL <sup>4</sup>. Many studies in the field show that physical activity reduces the risk of cardiovascular diseases <sup>5</sup>.

Therefore, the researcher is initiated to investigate this study entitle "Effect of aerobic training on Selected Biochemical Variables in Overweight Male Students of Mekelle University".

### Methodology

#### Sample and Sampling technique

The researcher selected twenty overweight students purposively from Mekelle University and the selected

subjects were grouped in to experimental (n=10) and control group (n=10) by using simple random technique

#### Selection of subjects

Since the purpose of the study was to investigate and analyze the changes that occurred in the overweight male students was selected by means of vacancy, in print media and through personal contact Overweight male Voluntary students, Age range from (19 to 25 years) were assed with BMI test criteria selection.

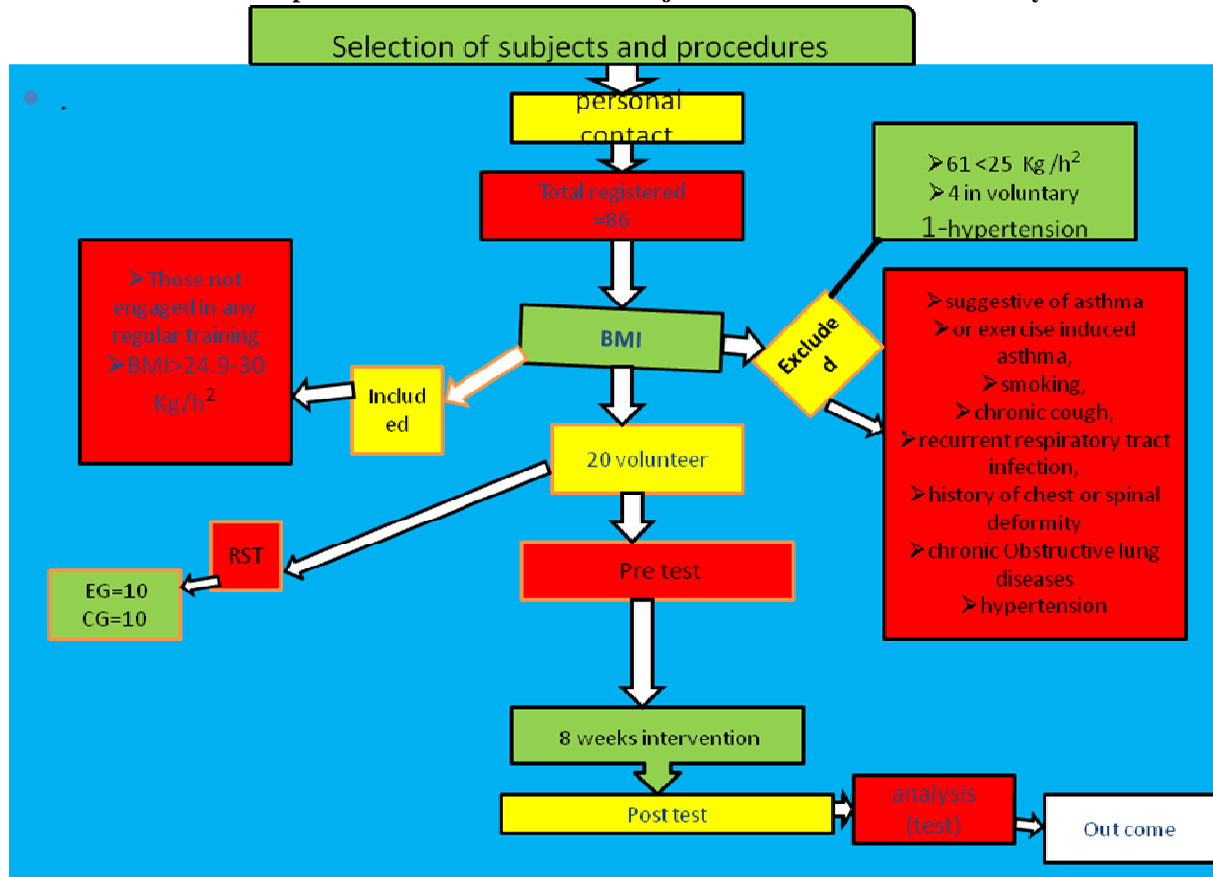
The objectives of the study were explained to all subjects and all of them agreed and made consent to undergo the testing and training program. This study was conducted after taking informed Consent, medical examination and ethical clearance from Ayder referral hospital was noted. The subjects of both groups were included pre-test and post- test for both groups.

The sample of 20 overweight students who were randomly assigned into an experimental group EG (n = 10) and a control group CG (n=10). Some criteria for exclusion were defined so as to prevent any issues with the internal and external validity of the study. For this study 20 overweight male individual free from or exercise induced asthma, smoking, chronic cough, recurrent respiratory tract infection , history of chest or spinal deformity and chronic Obstructive lung diseases were selected purposively from Mekelle university.

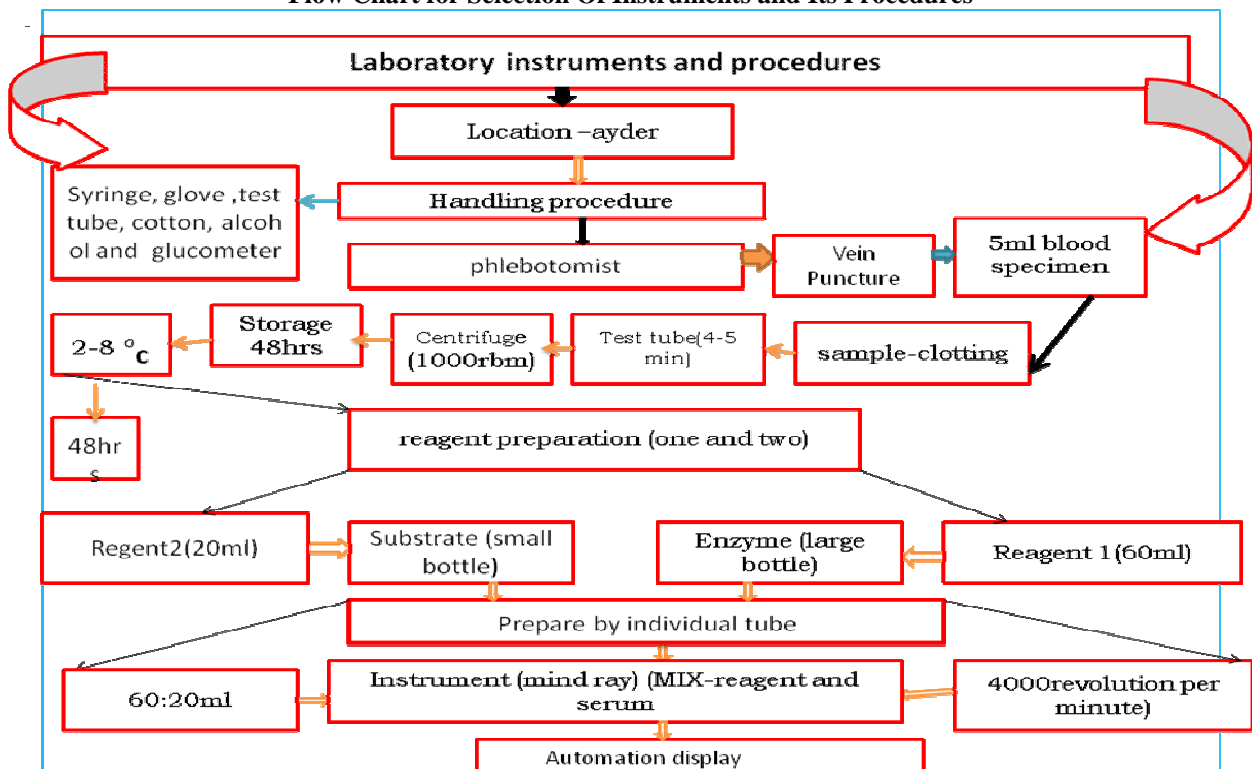
#### Collection of data

To collect the data the research was taken through sophisticated and modern chemistry laboratory equipments, mind ray, glucometer, Serum test tube, strip, electrical treadmill, and electrical cycle bike measurements and experienced doctor and laboratory physician. Pre and posttest on the selected biochemical variables were tested. For the biochemical variables data was gathered by professional experts.

Flow Chart Representation for Selection of Subjects and Procedures of the Study



Flow Chart for Selection Of Instruments and Its Procedures



**Statistical technique**

The following statistical techniques were employed for the analysis of data:

1. To find out the significance of difference between the pre-test mean of the experimental and control group, the 't' test was employed.
2. Analysis of variance (ANOVA) was applied to find out the significant difference if any, among the experimental group and control group on selected criterion variables
3. The collected data during Pre-test and post-test was analyzed using SPSS version 20 software.

4. To test research hypotheses, in all cases 0.05 level of significance was set.

**Area of the study**

Mekelle University is located in Mekelle town Tigray, Regional State of Northern Ethiopia .it is found about 783

**Analysis of Data**

**Table-1** Descriptive Analysis of Mean Scores Between Experimental and Control Groups on Total Cholesterol

Group	Test	N	Mean	SD	SE	Minimum	Maximum
Experimental	Pre	10	197.40	20.090	6.353	176	230
Control	Pre	10	196.00	18.294	5.785	180	226
Experimental	post	10	182.8000	14.68786	4.64471	166.00	206.00
Control	post	10	204.9000	17.09743	5.40668	189.00	231.00

K.M from Addis Ababa, capital city of Ethiopia Under the study area there are five campuses (Arid campus, Aynalem campus, Ayder campus, Adihaki campus and kalamino campus).

**Table-1** shows that the pretest mean and standard deviation values on total cholesterol for experimental and control groups were 197.40 ±20.090 and 196.00 ±18.294

respectively. The posttest means and standard deviation for the experimental and control groups after eight weeks were 182.8000 ±14.68786 and 204.9000 ±17.09743 respectively

**Table-2** Analysis Of Variance of the Mean Scores Between Experimental and Control Groups on Total Cholesterol

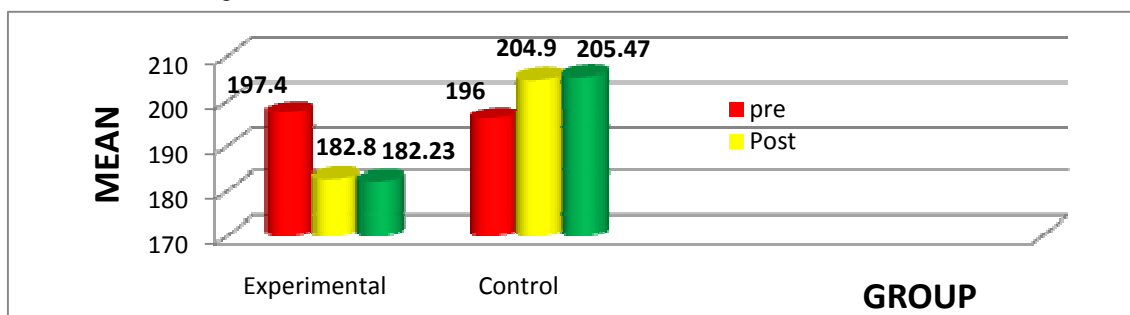
Means	Group		SV	SS	DF	MS	F. ratio	Sig.
<b>Pre-test</b>	Experimental	Control						
<b>Mean</b>		196.00	B	9.800	1	9.800	.027	.872
<b>SD</b>	197.40 20.090	18.294	W	6644.400	18	369.133		
<b>Post-test</b>	182.8000 14.68786	204.9000	B	2442.050	1	2442.050	9.613	.006
<b>Mean</b>		17.09743	W	4572.500	18	254.028		
<b>SD</b>								
<b>Adjusted post test</b>	182.230	205.470	B	2696.528	1	2696.528	275.703	.000
				166.270	17	9.781		

\*Significant at 0.05 level of significance

F= ratio needed for significance at 0.05 level of significance, SV=source of variance SS= sum of square, DF= degree of freedom, MSS= mean sum of square

**Table-2** shows that the F-ratio for pre test of is .027 against the table value of 1.734 (df 1 and 18) which is not significant at 0.05 level of confidence. It implies that there is no significant difference between the pre tests mean scores of experimental and control groups on total cholesterol. From the above table it infers that the F-ratio for post test of is 9.613 against the table value 1.734 (df 1 and 18) which is significant at 0.05 level of confidence. Since the obtained F-ratio is greater than the table value, it

implies that there is significant difference between the post test mean scores of experimental and control groups. The table that the F-ratio for adjusted post test of is 275.703 against the table value 1.740 (df 1 and 17) which is significant at 0.05 level of confidence. Since the value of F-ratio is higher than the table value, it indicates that there is significant difference among the adjusted post-test means of experimental and control groups on total cholesterol.



**Figure-1** Graphic Presentation of Mean Scores Between Experimental and Control Groups on Total Cholesterol

**Table-3** Descriptive Analysis of Mean Scores Between Experimental and Control Groups on Low Density Lipoproteins

Group	Test	N	Mean	SD	SE	Minimum	Maximum
Experimental	pre	10	93.50	8.114	2.566	81	107
Control	pre	10	89.90	5.280	1.670	83	102
Experimental	post	10	87.6000	7.05849	2.23209	77.00	100.00
Control	post	10	91.5000	5.23344	1.65496	83.00	101.00

**Table-3** shows that the pretest mean and standard deviation values on low density lipoprotein for experimental and control groups were 93.50 ±8.114 and 89.90 ±5.280 respectively. The posttest means and standard deviation for the experimental and control groups after eight weeks were 87.6000 ±7.05849 and 91.5000 ±5.23344 respectively

**Table-4** Analysis Of Variance of Mean Scores low density lipoprotein Of Between Experimental Group and Control Groups on Low Density Lipoprotein

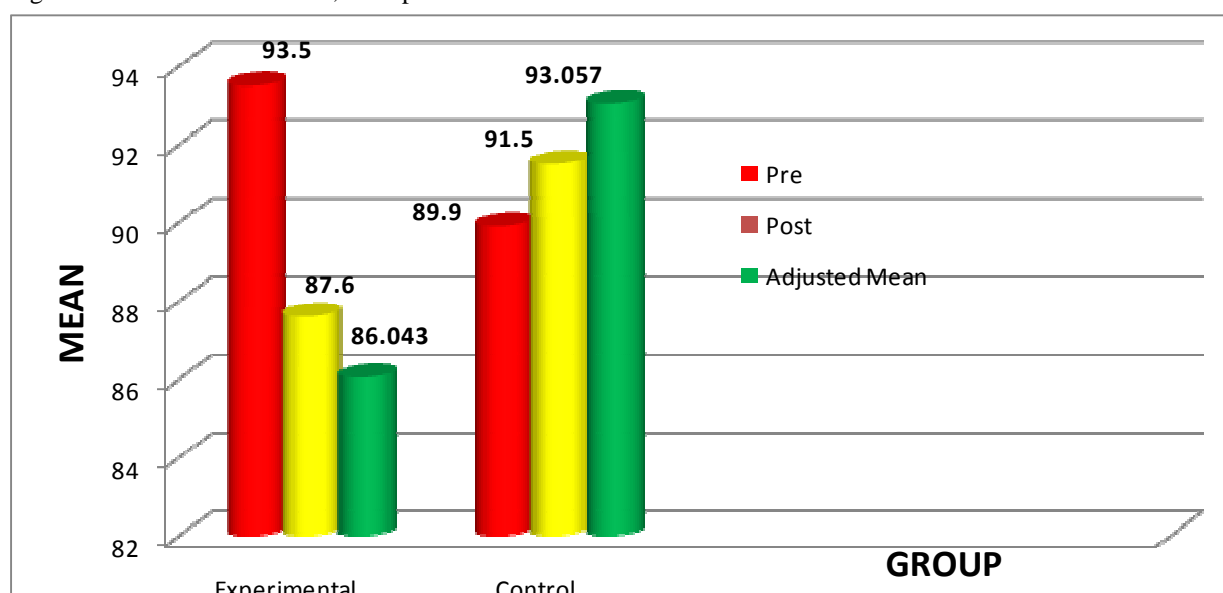
Means	Group	SV	SS	DF	MS	F. ratio	Sig.
<b>Pre-test</b>	Experimental	B	64.800	1	64.800	1.383	.255
	Control						
<b>Mean</b>	93.50						
<b>SD</b>	8.114	W	843.400	18	46.856		
<b>Post-test</b>	Experimental	B	76.050	1	76.050	1.970	.177
	Control						
<b>Mean</b>	87.6000						
<b>SD</b>	7.05849	W	694.900	18	38.606		
<b>Adjusted Posts-test Mean</b>	86.043	B	228.419	228	228.419	60.75	.000
		W	63.918	17	3.760		

\*Significant at 0.05 level of significance

F= ratio needed for significance at 0.05 level of significance, SV=source of variance SS= sum of square, DF= degree of freedom, MSS= mean sum of square

**Table-4** shows that the F-ratio for pre test of is 1.383 against the table value 1.734 (df 1 and 18) which is insignificant at 0.05 level of confidence. It implies that there is no significant difference between the pre tests mean scores of experimental and control groups on low density lipoprotein. From the above table it infers that the F-ratio for post test of is 1.970 against the table value 1.734 (df 1 and 18) which is significant at 0.05 level of confidence. Since the obtained F-ratio is greater than the table value, it implies that there is

significant difference between the post test mean scores of experimental and control groups. The table of that the F-ratio for adjusted post test is 60.752 against the table value 1.740 (df 1 and 17) which is significant at 0.05 level of confidence. Since the value of F-ratio is higher than the table value, it indicates that there is significant difference among the adjusted post-test means of experimental and control groups on low density lipoprotein.



**Figure-2** Graphic Presentation of Mean Scores Between Experimental and Control Groups on Low Density Lipoprotein

**Table-5** Descriptive Analysis of Mean Scores Between Experimental and Control Groups on Fasting Blood Sugar

Group	Test	N	Mean	SD	SE	Minimum	Maximum
Experimental	pre	10	89.10	2.685	.849	86	94
Control	pre	10	89.00	2.211	.699	86	93
Experimental	post	10	87.7000	2.05751	.65064	84.00	91.00
Control	post	10	91.8000	1.87380	.59255	89.00	95.00

**Table-5** shows that the pretest mean and standard deviation values on fasting blood pressure for experimental and control groups were 89.10 ±2.685 and 89.00 ±2.211 respectively.

The posttest means and standard deviation for the experimental and control groups after eight weeks were 87.7000± 2.05751 and 91.8000 ± 1.87380 respectively.

**Table-6** Analysis Of Variance of Mean Scores Between Experimental and Control Groups on Fasting Blood Sugar

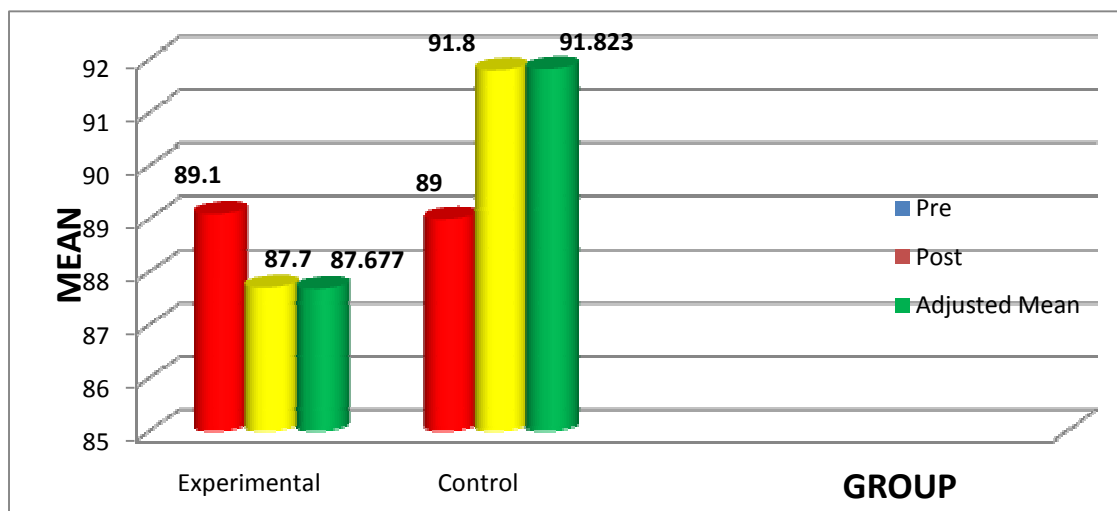
Means	Group	SV	SS	DF	MS	F. ratio	Sig.
Pre-test	Experimental	Control	B	1	.050	.008	.929
	W		108.900				
Post-test	87.7000	91.8000	B	1	84.05	21.706	.000
	W		69.700				
Adjusted Posts-test Mean	87.677	91.823	B	1	85.88	30.812	.000
	W		47.381				

\*Significant at 0.05 level of significance

F= ratio needed for significance at 0.05 level of significance, SV=source of variance SS= sum of square, DF= degree of freedom, MSS= mean sum of square

**Table-6** shows that the F-ratio for pre test is .008 against the table value 1.734 (df 1 and 18) which is insignificant at 0.05 level of confidence. It implies that there is no significant difference between the pre tests mean scores of experimental and control groups on fasting blood pressure.. From the above table it infers that the F-ratio for post test is 21.706 against the table value 1.734 (df 1 and 18) which is significant at 0.05 level of confidence. Since the obtained F-ratio is greater than the table value, it implies that there is

significant difference between the post test mean scores of experimental and control groups. The table of that the F-ratio for adjusted post test of is 30.812 against the table value 1.740 (df 1 and 17) which is significant at 0.05 level of confidence. Since the value of F-ratio is higher than the table value, it indicates that there is significant difference among the adjusted post-test means of experimental and control groups on fasting blood glucose



**Figure-3** Graphic Presentation of Mean Scores Between Experimental and Control Groups on Fasting Blood Glucose

**Table-7** Descriptive Analysis of Mean Scores Between Experimental and Control Groups Triglycerides

Group	Test	N	Mean	SD	SE	Minimum	Maximum
Experimental	pre	10	189.70	14.989	4.740	170	220
Control	pre	10	188.80	12.934	4.090	170	213
Experimental	post	10	180.5000	13.23505	4.18529	162.00	207.00
Control	post	10	199.4000	14.42375	4.56119	183.00	230.00

**Table-7** shows that the pretest mean and standard deviation values on triglycerides for experimental and control groups were  $189.70 \pm 14.989$  and  $188.80 \pm 12.934$  respectively. The

posttest means and standard deviation for the experimental and control groups after ten weeks were  $180.5000 \pm 13.23505$  and  $199.4000 \pm 14.42375$  respectively.

**Table-8** Analysis Of Variance of the Mean of Experimental Group and Control Groups on Triglycerides

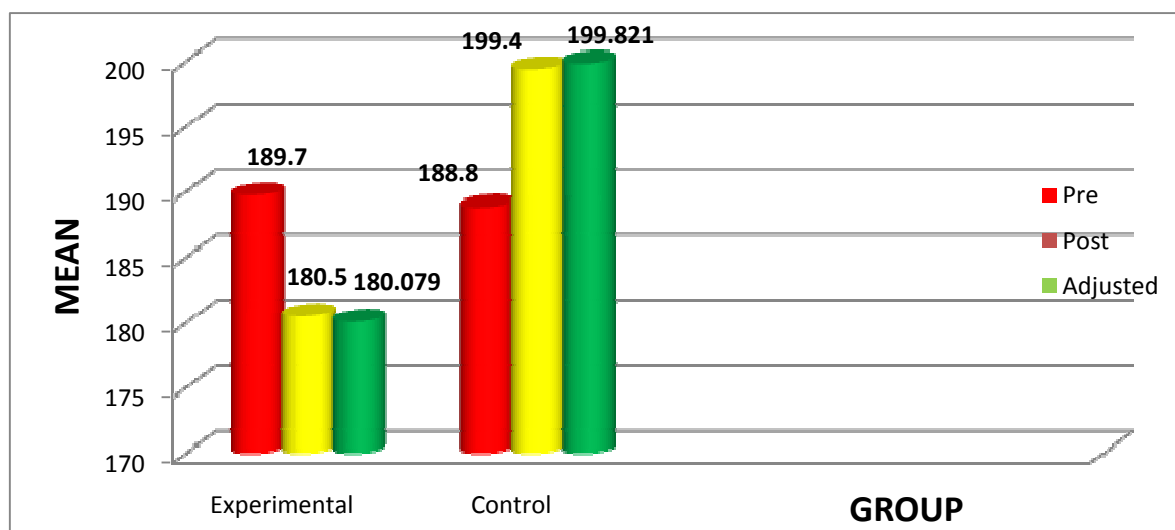
Means	Group		S	SS	DF	MS	F. ratio	Sig.
Pre-test	Experimental	Control	V					
Mean	189.70	188.80	B	4.050	1	4.050	.021	.887
SD	14.989	12.934	W	3527.700	18	195.983		
Post-test	180.5000		B	1786.050	1	1786.050	9.321	.007
Mean	13.23505	199.4000	W	3448.900	18	191.606		
SD		14.42375						
Adjusted Posts test Mean	180.079 <sup>a</sup>	199.821 <sup>a</sup>	B	1946.646	1	1946.646	93.029	.000
			W	355.726	17	20.925		

\*Significant at 0.05 level of significance

F= ratio needed for significance at 0.05 level of significance, SV=source of variance SS= sum of square, DF= degree of freedom, MSS= mean sum of square

**Table-8** shows that the F-ratio for pre test of is .021 against the table value 1.734 (df 1 and 18) which is insignificant at 0.05 level of confidence. It implies that there is no significant difference between the pre tests mean scores of experimental and control groups on triglycerides. From the above table it infers that the F-ratio for post test of is 9.321 against the table value 1.734 (df 1 and 18) which is significant at 0.05 level of confidence. Since the obtained F-ratio is greater than the

table value, it implies that there is significant difference between the post test mean scores of experimental and control groups. The table of that the F-ratio for adjusted post test of is 93.029 against the table value 1.740 (df 1 and 17) which is significant at 0.05 level of confidence. Since the value of F-ratio is higher than the table value, it indicates that there is significant difference among the adjusted post-test means of experimental and control groups on triglycerides



**Figure-4** Graphic Presentation of Mean Scores Between Experimental and Control Groups On Triglycerides

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