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THE INFLUENCE OF EXERCISE PROGRAMME ON BLOOD LIPID PROFILE OF OBESE SEDENTARY MALES

Tahir Ramzan Bhat[1],
S. Mukherjee[2]
Shahbaaz[3]
[1&3]Ph.D. Scholar, L.N.I.P.E. Gwalior, India
[2]Professor, L.N.I.P.E. Gwalior, India

Abstract:
The present study was conducted in order to investigate the Influence of selected exercise programme on blood lipid profile of obese sedentary males. Since the purpose of the study was to analyse the changes that may occur due to selected exercise programme on blood lipid profile of obese persons, it was considered necessary to choose untrained individuals who were not the part of any game or sports team and were not engaged in any training or coaching programme. For this purpose, fat percentages of 200 undergraduate sedentary male students were measured. Students were selected from different colleges of Kashmir and their age ranged between 18-25 years, Out of 200 students, 25 obese (having 18% or more than 18% of fat) students were selected as the subjects of this study. Percentage of body fat was recorded at four sites of the body i.e. biceps, triceps, subscapular and suprailliac and the total corresponding value of skin fold at four sites were referred to the help of conversion chart prepared by Durnin and Womersley. Blood samples were taken at rest before and after the training period. Lipid and lipoprotein measurements were done with enzymatic method on auto-analyser. From each subject 5 ml of blood samples were taken twice i.e. pre-test (before exercise programme) and post-test (after 8-weeks programme) respectively. Blood samples were drawn 48 hours after the last exercise bout an attempt to minimize the potential of acute exercise to mark the effect of training on the plasma lipids and lipoproteins. Plasma lipids and lipoproteins variables namely Triglycerides, Cholesterol, HDL-C and LDL and VLDL determined. The selected exercise programme for 8-weeks proved to be effective in significantly decreasing triglycerides, cholesterol, low density lipoprotein and very low density lipoprotein in post-test of obese males.

Keywords: triglycerides, cholesterol, HDL, LDL and VLDL

1. Introduction

The term 'lipid profile' describes the varying levels of lipids in the blood, the most commonly reported ones being low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol and triglycerides. High levels of LDL cholesterol indicate surplus lipids in the blood, which in turn increase the risk of cardiovascular complications. HDL cholesterol transports lipids back to the liver for recycling and disposal; consequently, high levels of HDL cholesterol are an indicator of a healthy cardiovascular system. Triglycerides in plasma are derived from fats eaten in foods or from other energy sources. An excess of triglycerides in plasma is positively and independently associated with cardiovascular disease. Very-low-density lipoprotein (VLDL) cholesterol—which is generally less frequently reported in the literature has been shown to positively correlate with triglycerides and to be independently associated with cardiovascular risk, even in individuals who express normal LDL cholesterol levels.

Obesity as one of the most blatantly visible, yet most neglected public-health problems that threaten to overwhelm both developing and developed countries. The problems of overweight and obesity is increased globally during the past 20 years in contrast to underweight, malnutrition and infectious diseases, which have always dominated thinking.

Obesity presents numerous problems for the child. In addition to increasing the risk of obesity in adulthood, childhood obesity is the leading cause of pediatric hypertension, is associated with Type 2 diabetes mellitus, increases the risk of coronary heart disease, increases stress on the weight-bearing joints, lowers self-esteem and affects relationships with peers. Some authorities feel that social and psychological problems are the most considerable consequences of obesity in children.

Obesity is a disease, but it also poses a threat as a common risk factor for various adult diseases. Compared to non-obese people, obese people have higher rate of high blood pressure, diabetes, hyperlipidaemia and more fatty liver.

The scientific use of exercise and its beneficial effects on the body is becoming increasingly important with the growing realization of the relationship of exercise with health. Field and laboratory observation on exercising human subjects are being supplemented with physiological and bio-chemical studies on laboratory animals with acute and chronic exercise pattern can now be explained at the basic cellular and molecular levels.

Different activities make different demands upon the body with respect to circulatory, respiratory, metabolic, neurological and temperature regulating functions. With training and conditioning, the heart becomes efficient and is able to circulate more blood while beating less frequently. For standard amount of work, the heart becomes slower as training progress. These heart changes indicate a decreasing load on the cardiovascular adaptation to exercise.

This effect must be taken into account in evaluating effects of exercise on lipoprotein levels as well as on molecules which are protein bound such as Free Fatty

Acid (FFA). As a result of exercise, the levels of plasma triglycerides and very low density lipoprotein remain steady or fall only slightly in fasting subjects during exercise for two hours at load up to 400kgM/minute. With more prolonged exercise and heavier exercise, their levels fall consistently. Recent research has shown that exercises not only lower total blood cholesterol, but also increases the fraction of cholesterol known as high density lipoproteins (HDL) and decreases the low density lipoprotein (LDL) fractions.

The blood lipid variables such as HDL-C, LDL-C, triglycerides and cholesterol are affected by aerobic training. But clear cut information is still not available about the effect of selected exercise programme on blood lipid profile particularly on both obese and non-obese sedentary males. So, the investigator is motivated to undertake the present study.

2. Purpose of the Study

The purpose of the study was stated in terms of following objectives:

1. To investigate the influence of selected exercise programme on the blood lipid profile of obese males.
2. To compare the influence on the blood lipid profile before and after selected exercise programme on obese sedentary males.

2.1 Hypothesis

On the basis of literature, discussion with experts and research scholars own understanding it was hypothesized that there would be significant effect of selected exercise programme on blood lipid profile of obese sedentary males.

3. Methodology

3.1 Selection of Subjects

Since the purpose of the study was to analyse the changes that may occur due to selected exercise programme on blood lipid profile of obese persons, it was considered necessary to choose untrained individuals who were not the part of any game or sports team and were not engaged in any training or coaching programme. For this purpose, fat percentages of 200 undergraduate sedentary male students were measured. Students were selected from different colleges of Kashmir and their age was ranged between 18-25 years, Out of 200 students, 25 obese (having 18% or more than 18% of fat) students were selected as the subjects of this study.

3.2 Selection of Variables

The following blood lipid profile parameters were selected.

1. Triglycerides;
2. Cholesterol;
3. High Density Lipoprotein-Cholesterol (HDL-C);

4. Low Density Lipoprotein-Cholesterol (LDL-C);
5. Very Low Density Lipoprotein-Cholesterol (VLDL-C).

3.3 Criterion Measures

A. Blood Lipid Profile

Concentration of all the parameters of blood lipid profile was recorded in mg/dl.

B. Skin fold

It was measured by skin fold caliper and recorded in millimeter.

C. Collection of Data

The necessity of taking blood samples and the harmless nature of taking such samples under strict conditions of hygiene and sterility was explained to them so that students would not have any reservation in this matter. No special technique was used to motivate the subjects to put in their best efforts, but the subjects were quite mature and participated whole heartedly in testing. Subjects had an overnight fast 12 hours and abstained from exercise for 48 hours prior to the blood collection for plasma lipids and lipoprotein determination. Blood samples were taken from a vein near the antecubital fossa. From each subject 5 ml of blood samples were taken twice i.e. pre-test (before exercise programme) and post-test (after 8 weeks) respectively.

D. Analysis and Interpretation of Data

To find out the significant difference if any between the mean in the selected variables before and after exercise programme, standard deviation and Dependent t-test statistics were employed to analysis the data.

Table 1: Mean, Standard Deviation and t-Test for the Data on Triglycerides Before and After Exercise Programme of Obese Subjects

Triglycerides	Mean	S.D	M.D	S.E	t-ratio
Before Training	153.08	31.20	11.67	1.30	8.95*
After Training	141.41	28.33			

*Significant at .05 level

Tabulated $t_{.05}$ (24) = 2.064

It is evident from the Table 1 that the values on triglycerides of the selected subjects before and after exercise programme are153.08±31.20 and 141.41±28.33. Mean difference is 11.67 and standard error of mean difference is 1.30. After the statistical treatment t-ratio is found to be significant as the calculated-value 8.95 is quite higher than the tabulated t-value of 2.064 needed to be significant at 0.05 level for the 24 degrees of freedom, which indicates that the mean difference is statistically significant.

Table 2: Mean, Standard Deviation and t-Test for the Data on Cholesterol before and after Exercise Programme of Obese Subjects

Cholesterol	Mean	S.D	M.D	S.E	t-ratio
Before Training	209.88	20.26	9.55	2.03	4.73*
After Training	200.22	16.35			

*Significant at .05 level
Tabulated $t_{.05}$ (24) = 2.064

The findings of the Table 2 shows that the values on cholesterol of the selected subjects before and after exercise programme are 209.88±20.26 and 200.22±16.35. mean difference is 9.55 And standard error of mean difference is 2.03, after the statistical treatment t-ratio is found to be significant as the calculated t-value of 4.73 is greater than the tabulated t-value of 2.064 needed to be significant at 0.05 level for the 24 degrees of freedom.

Table 3: Mean, Standard Deviation and t-Test for the Data on High Density Lipoprotein before and after Exercise Programme of Obese Subjects

HDL	Mean	S.D	M.D	S.E	t-ratio
Before Training	37.88	6.55	4.13	0.88	4.67*
After Training	42.01	6.34			

*Significant at .05 level
Tabulated $t_{.05}$ (24) = 2.064

The finding of Table 3 reveals that the values on high density lipoprotein of the selected subjects before and after exercise programme are 37.88± 6.55 and 42.01 ± 6.34. Mean difference is 4.13 and standard error of mean difference is 0.88, after the statistical treatment t-ratio is found to be significant as the calculated t-value of 4.67 is quite higher than the tabulated t-value of 2.064 needed to be significant at .05 level for the 24 degrees of freedom.

Table 4: Mean, Standard Deviation and t-Test for the Data on Low Density Lipoprotein before and after Exercise Programme of Obese Subjects

LDL	Mean	S.D	M.D	S.E	t-ratio
Before Training	141.42	24.27	11.71	2.27	5.15*
After Training	129.71	17.33			

*Significant at .05 level
Tabulated $t_{.05}$ (24) = 2.064

Table 4 indicates that the values on low density lipoprotein of the selected subjects before and after exercise programme are 141.42 ± 24.27 and 129.71 ± 17.33. Mean difference is 11.71 and standard error of mean difference is 2.27, after the statistical treatment t-ratio is found to be significant as the calculated t-value of 5.15 is quite higher than the tabulated t-value of 2.064 needed to be significant at .05 level for the 24 degrees of freedom. This indicates that the mean difference is statistically significant,

Table 5: Mean, Standard Deviation and t-Test for the Data on Very Low Density Lipoprotein before and after Exercise Programme of Obese Subjects

VLDL	Mean	S.D	M.D	S.E	t-ratio
Before Training	30.77	6.40	2.47	0.28	8.66*
After Training	28.30	5.64			

*Significant at .05 level
Tabulated $t_{.05}$ (24) = 2.064

It is evident from the table-5 that the values on triglycerides of the selected subjects before and after exercise programme are30.77±6.40 and 28.30±5.64. Mean difference is 2.47 and standard error of mean difference is 0.28. After the statistical treatment, t-ratio is found to be significant as the calculated-value 8.66 is quite higher than the tabulated t-value of 2.064 needed to be significant at 0.05 level for the 24 degrees of freedom, which indicates that the mean difference is statistically significant.

4. Discussion on findings

The findings of this study showed that exercise programme has caused significant variations in blood lipid profile of obese sedentary males. Exercise/training which is regular, continued for a span of 8-weeks, enhances the metabolic breakdown for triglycerides, possibly through mechanisms involving increased activity of lipoprotein lipase (Hardman A.E., 1999).

In human body, liver is mainly responsible for metabolism and synthesis of cholesterol. Increasing metabolism leads to speeding up the process of excretion of cholesterol and it also prevents cholesterol synthesis. Low Density Lipoprotein Cholesterol (LDL-C) and High Density Lipoprotein Cholesterol have opposite functions to perform in the catabolism of cholesterol. Low Density Lipoprotein Cholesterol (LDL-C) helps in the cholesterol synthesis and by increases in the blood cholesterol circulation. On the other hand, High Density Lipoprotein Cholesterol (HDL-C) takes cholesterol to liver for changing it into bile and excreted. This High Density Lipoprotein Cholesterol (HDL-C) mechanism helps the body to decrease its cholesterol storage. Thereby any kind of physical exercise thus lowers the blood cholesterol.

Exercise conventionally is always one of the first recommendations for lowering blood cholesterol and triglycerides levels. High Density Lipoprotein Cholesterol (HDL-C) scours the walls of blood vessels, cleaning out excess cholesterol. It then carries that excess cholesterol which otherwise might have been used to make the plaques that cause coronary artery disease, back to the liver for processing. So when we measure the individual's High Density Lipoprotein Cholesterol level, we seem to be measuring how vigorously his or her blood vessels are being scrubbed free of cholesterol.

The changes in plasma lipid levels have generally been found to be related to the intensity and duration of exercise. That is, the reductions in cholesterol, LDL-C and triglycerides and the increase in HDL-C is proportional to the intensity and duration of exercise (Kraus et.al, 2002).

Pitsacos et al. suggest that combining aerobic and resistance type activities may confer a better effect on lipoprotein profile in healthy individual than aerobic activities alone.

The result of the study of the scholar showed that the post-test (which was taken after 8-weeks) also had significant differences. This might be due to the fact that 8-weeks exercise programme also significantly contributed some adaptations of physiological mechanism in the subjects.

Further, the findings showed that the relative change in the effect of exercise training was statistically significant. However, the magnitude of change in obese group was higher in post-test. This may be due to the fact that exercise lowers triglycerides level more so in individuals who are having higher initial level of triglycerides.

As the subjects of experimental groups had undergone selected exercise programme comprising of aerobic and resistance exercises, this might have attributed to the more loss of fat more in post-test in experimental groups.

The findings of this study are in consonance with findings of Fahlman et al., Tokmakidis et al., and William E. et al. All of their studies were in blood lipids and lipoprotein among various groups i.e. obese group, normal group, highly trained and non-trained groups with purposes of estimating cardiac risk factor, establishing the relationship of blood lipid level and training intensity and type.

5. Conclusion

On the basis of the findings of the study, the following conclusions may be drawn.

1. The selected exercise programme conducted for period of 8-weeks has decreased triglycerides levels of obese males.
2. The exercise programme has shown reduction in cholesterol levels in post-test of obese group.
3. The findings of study also showed significant change in LDL-C and VLDL-C in post-test of obese group.
4. The results of the study further revealed an improvement in HDL-C in post-test of obese group.
5. The findings having shown significant reduction in cholesterol and increase in HDL-C levels, indicates the health benefits of given exercise programme which included aerobic, resistance and flexibilities exercises. The regular exercise programme can be suggested for the obese sedentary adults as an attempt to prevent coronary heart diseases and atherosclerosis. The role of HDL-C in reducing the risk of CAD and hypertension has been well established.

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