A Study of Lipid Profile in Sportspersons Performing Various Sports

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ABSTRACT

Regular physical exercise in any form makes lipid profile favorable and reduces the chances of heart attacks and brain strokes. The valuable effects of exercise on plasma lipids have been widely investigated. These changes depend upon the type of sports in which one is indulged.52 male sportspersons participating in 3 different games(basketball players, football players and distance runners) in the Kurnool district were selected for this study. Lipid profile of the three groups was determined and compared to each other. Total Cholesterol (TC), Triglyceride (TG) and Low Density Lipoprotein (LDL) levels were found to be significantly lower in distance runners as compared to football players and basketball players(p<0.05) . While High Density Lipoprotein (HDL) level was found to be significantly increased in runners as compared to other groups. The results of this study showed that the lipid profile is more encouraging in sports involving more aerobic activity and less physical stress.

Keywords: lipid profile, football, distance runner, basketball players

INTRODUCTION

Body fitness prolongs life. Multiple studies have shown that people, who maintain appropriate body fitness, using judicious regimens of exercise and weight control, have the additional benefit of prolonged life. Modern science has eliminated the threat of death from most infectious diseases. Cardiovascular diseases, mostly ischemic heart disease, are now the leading cause of death worldwide. This situation is not limited to developed countries only. The global burden of deaths from cardiovascular diseases has shifted to low-andmiddle income countries as lifestyles approach those of high income countries1. The major risk factors for these diseases are sedentary lifestyles, faulty dietary habits, high blood pressure, dyslipidemia, tobacco use etc. These risk factors can be modified by various interventions. Among these interventions, regular physical activity contributes both to the primary and secondary prevention of several chronic diseases and is associated with a reduced risk of premature death.

The cardiovascular diseases usually affect older adults but atherosclerosis, one of the early events contributing to cardiovascular diseases, begins in early life. So the primary prevention should start from childhood². Dyslipidemia is the most important risk factor for atherosclerosis³. Sawant et al⁴ found increased prevalence of dyslipidemia in 31-40 year old Indian males, suggesting that this group is at increased risk of developing CAD leading to young infarcts.

Regular physical activity has been found to be associated with improvement in lipid profile, with or without dietary intervention^{5, 6, and 7}. This improvement has also been found in patients^{8, 9}. Aerobic exercise has been shown to increase HDL cholesterol levels while decreasing the levels of Triglycerides and LDL cholesterol level^{10, 11}. But it has also been seen that training above the anaerobic threshold has no or even negative effects on blood lipoprotein profiles^{12, 13}. The aim of the present study was to analyze the lipid profile in different sportspersons.

MATERIAL AND METHOD

52 male subjects of Kurnool district, AP were selected for the present study. In these, 15 were

basketball players, 20 football players and 17 subjects were distance runners. These subjects were given 1-2 hours of training in the morning and 1 hour training in the evening. All of these subjects were playing regularly at inter-university and zonal level for the last 3-4 years. All the sportspersons were matched according to the age, height and weight. Institutional ethical clearance was obtained before the beginning of the study.

All the subjects were healthy, non smoker and free of any cardio respiratory disorders. There was no family history of cardiovascular disorders, hypertension, diabetes and dyslipidemia. A written consent was taken from the subjects before the procedure.

Pulse and B.P. were measured after a period of rest. Heart rate was measured by counting radial pulse for a minute while blood pressure reading was taken using mercury sphygmomanometer.

Intracubital venous blood (5ml) was withdrawn from the subjects in the morning (after 12hours of fasting).The blood was then allowed to coagulate for 60 minutes in incubator. The serum was obtained by centrifugation. 100 μ l of serum was taken in a small container of the automatic analyzer. The probe takes up 10 μ l of serum for each test and puts on a slide having the reagent in dry form. Data of subject was entered in the instrument and after 1 minute result was displayed on screen about HDL, LDL, VLDL, TGL, and S. Cholesterol.

One way analysis of variance (ANOVA) was used to compare the means. Levenne test was used to compare the homogeneity of the variance. When variances were homogeneous, comparisons were made using the post hoc Tukey test; the post hoc Games-Howell test was used for non-homogenous variances. p <0.05 was considered to be significant.

RESULTS

Table 1 shows the basic characteristics of the three groups. There is no significant difference in any parameters.

Table 2 shows the lipid profile in the three groups and the result of ANOVA test. Total Cholesterol (TC), Triglyceride (TG), Low Density Lipoprotein (LDL) and Very Density Lipoproteins (VLDL) levels were found to be significantly lower in distance runners as compared to football players and basketball players. High Density Lipoprotein (HDL) level was found to be significantly increased in runners as compared to other groups. There was no significant difference in any parameters between football players and basketball players.

DISCUSSION

On analyzing our study, the lipid profile is more positive in distance runners as compared to the other 2 groups. Among the sportspersons, runners have more aerobic activity and least anaerobic activity. Aerobic activity has been found to be associated with improvement in lipid profile7. On the other hand, athletes who practice in sports, including anaerobic activities, generally have lower values of HDL, lower VLDL, higher TC, TG and LDL in comparison to athletes who practice sports that include aerobic activities14. One potential mechanism by which aerobic exercise enhances lipid metabolism is alteration of plasma lipase activity (LPL) and hepatic lipase (HL). Lipoprotein Lipase is key enzyme in the catabolism of TG-rich lipoproteins¹⁵. Exercise has also been found to improve insulin resistance¹⁶. Impaired function of LPL has been found in individuals with insulin resistance17, 18.

Other factor contributing to the lipid profile in football and basketball players is the physical stress¹⁹ in the form of frequent falls, physical contact with other players. The physical stress is minimum in runners. These physical injuries lead to release of proinflammatory cytokines^{20, 21} which are associated with abnormalities in metabolism²². The level of endotoxin has also been found to release after strenuous exercise²³ which can impair lipid metabolism²⁴.

Stray-Gundersen ET al²⁵ showed that low concentrations of total and LDL cholesterol are associated with minimal risk of arthrosclerosis, and aerobic exercise has been similarly associated with a low risk of heart disease. Our study also showed similar patterns in terms of runners.

The sedentary persons, healthy or patients should be advised exercises which involve more aerobic activity and less physical injury e.g. running, jogging, walking etc. As the obesity and dyslipidemia are increasing in the young population, these interventions should start at early age and should be within guidelines for the age and sex.

	Runners(15)	Footballplayers(20)	Basketball players(17)
Age(years)	23.4±4.71	24.5±2.57	23.8±3.25
Height(cm)	171.97±3.54	170.44±3.38	171.86±4.76
Weight(kg)	69.33±7.06	70.26±4.91	69.5±7.14
Heart rate(bpm)	60.7 ± 5.02	61.92±5.11	62.74±3.18
Blood pressure			
Systolic(mmHg)	112.73±3.71	110.28±4.02	112.95±5.62
Diastolic(mmHg)	77.06±5.37	78.25±4.47	77.54±5.43

Table 1: Mean values (±SD) of basic characteristics

Table 2: Lipid profile in three different groups

	Runners(A)	Football players(B)	Basketball players(C)	P value	
TC mg%	163.17±13.52	181.38±15.63	184.41±17.03	A-B<0.05, A-C<0.05	
HDL mg%	57.23±5.14	50.97±7.74	48.35±6.83	A-B<0.05, A-C<0.05	
LDL mg%	89.43±9.98	98.05±12.32	96.64±16.44	A-B<0.05, A-C<0.05	
TG mg%	93.85±8.49	115.38±9.04	101.66±11.41	A-B<0.05	
VLDL mg%	27.47 ±8.49	36.77 ±6.49	37.77 ±5.49	A-B<0.05, A-C<0.05	
S.Ch./HDL	3.38 ±8.49	4.28 ±6.49	4.78 ±5.49	A-B<0.05, A-C<0.05	

CONCLUSION

The observations provided affirmation to the fact that regular physical exercise in the form of sports helps in obtaining a low risk lipid profile than a leisure activity or a sedentary life style. Regular sports activity should be promoted at every level to reduce the risk of cardio vascular disease.

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Conflict of Interest: None

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