# Lipid Profile In Sports Persons Playing Different Sports

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**Abstracts**: **Background:** The beneficial effects of exercise on plasma lipids have been widely explored. These changes depend upon the type of sports in which one is indulged. The aim of the present study was to analyze these changes in different sportspersons. **Methods:** 32 male sportspersons participating in 3 different games in the university were selected for this study. Lipid profile of the three groups was compared to each other. **Results :** 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 . Whereas High Density Lipoprotein (HDL) level was found to be significantly increased in runners as compared to other groups. **Conclusion:** The results of this study suggest that the lipid profile is more favourable in sports involving more aerobic activity with less physical stress.[Farooque I NJIRM 2014; 5(1) : 13-16]

**Key Words**: Lipid Profile, Football, Distance Runner, Basketball, Aerobic, Anaerobic, Physical Stress

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**Introduction:** A Modern science has eliminated the threat of death from most infectious diseases. Cardiovascular diseases, mostly ischaemic 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-and-middle income countries as lifestyles approach those of high income countries[1].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 childhood[2]. Dyslipidemia is the most important risk factor for atherosclerosis[3]. Sawant et al[4] found increased prevalence of dyslipidemia in 31-40 year old Indian males, suggesting that this group is at increased risk of developing coronary artery disease 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, 7]. This improvement has also been found in patients[8,9]. Aerobic exercise has been shown to increase High-density lipoprotein cholesterol levels while decreasing the levels of Triglycerides and Low-density lipoprotein 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].

Sports are now one of the major forms of exercise. The beneficial effects of sports on lipid profile depend upon the type as well as the level at which one performs. The aim of the present study is to analyze these changes in different sportspersons.

**Material and Methods:** 32 male students of Aligarh Muslim University were selected for the present study. Out of these, 10 were basketball players, 9 football players and the rest were distance runners. These trainees were given 60 to 90 minutes training in the morning and 120 minutes in the evening. All of these students 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 review board clearance was obtained before the beginning of the study.

All the subjects were healthy, non smoker and free of any cardiorespiratory disorders. There was no family history of cardiovascular disorders, hypertension, diabetes and dyslipidemia. All the

students were residents of the halls of residence. They were dependent on the hostel mess for their meals and their caloric intake was found to be similar. 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. The serum was then analyzed for lipid profile by colorimeter. 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. Table 1 shows the basic characteristics of the three groups. There is no significant difference in any parameters.

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

| | Runners(13) | Football players(9) | Basketball players(10) |
|---|---|---|---|
| Age(years) | 24.4±3.71 | 22.5±1.57 | 21.8±4.25 |
| Height(cm) | 170.97±3.64 | 169.44±4.38 | 173.86±5.76 |
| Weight(kg) | 67.33±8.06 | 70.26±4.91 | 69.5±7.14 |
| Heart rate(bpm) | 58.7 ± 3.02 | 60.92±5.11 | 59.74±4.18 |
| Blood pressure | | | |
| Systolic(mmHg) | 112.73±3.71 | 110.28±4.02 | 112.95±5.62 |
| Diastolic(mmHg) | 76.06±5.37 | 76.25±4.47 | 79.54±5.43 |

Fig.1 shows the percentage intake of macronutrients in these sportspersons. Participants were asked to complete questionnaire regarding diet history (24 hour dietary recall plus 3 day food frequency list). Total caloric intake and level of macronutrients were then analyzed.

**Fig.1: Intake of macronutrients**

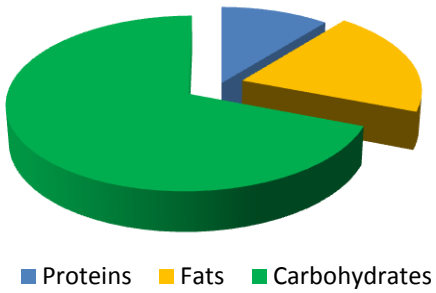


Fig.2 shows the percentage of aerobic and anaerobic activity in the training session of the 3 groups. Aerobic and anaerobic activity during training was according to the sports in which one was indulged. The distance runners have maximum aerobic activity while aerobic activity is less in football and basketball players. The majority of football play is in short intervals requiring high energy and the activity does not last for long periods of time (e.g. chasing a loose ball, making a run into space etc.). In basketball, there is lots of jumping and landing with running in between.

**Fig.2: Aerobic and anaerobic component**

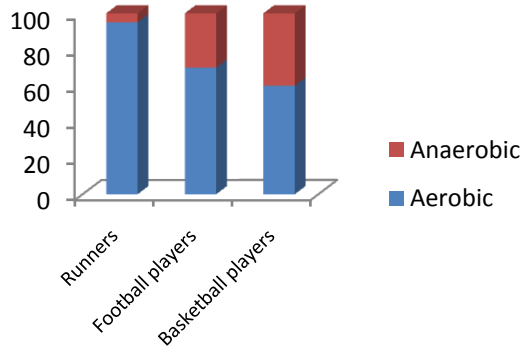


Table 2 shows the lipid profile in the three groups and the result of ANOVA test. Total Cholesterol (TC), Triglyceride (TG) and Low Density Lipoprotein (LDL) levels were found to be significantly lower in distance runners as compared to football players and basketball players. High Density Lipoprotein (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.

**Table 2: Lipid profile in different groups**

| | Runners(A) | Football players(B) | Basketball players(C) | *P* |
|---|---|---|---|---|
| TC | 165.17±12.52 | 180.35±15.63 | 182.41±17.03 | A-B<0.05, A-C<0.05 |
| HDL | 57.23±5.14 | 50.97±7.74 | 48.35±6.83 | A-B<0.05, A-C<0.05 |
| LDL | 89.43±9.98 | 98.05±12.32 | 96.64±16.44 | A-B<0.05, A-C<0.05 |
| TG | 95.85±8.49 | 112.38±9.04 | 100.66±11.41 | A-B<0.05 |

**Table 3: Atherogenic indices of the different groups**

| | Runners(A) | Football players(B) | Basketball players(C) | *P* |
|---|---|---|---|---|
| TC/HDL | 2.89±0.29 | 3.31±0.61 | 3.47±0.45 | A-B<0.05, A-C<0.05 |
| LDL/HDL | 1.56±0.24 | 1.90±0.37 | 2.03±0.42 | A-B<0.05, A-C<0.05 |

Atherogenic indices (Table 3) of the runners were significantly better than those of the football and basketball players.

**Discussion:** The lipid profile is more favourable 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 profile[7]. On the other hand, athletes who practice in sports, including anaerobic activities, generally have lower values of HDL, higher TC, TG and LDL in comparison to athletes who practice sports that include aerobic activities[14]. 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 lipoproteins[15]. Exercise has also been found to improve insulin resistance[16]. Impaired function of LPL has been found in individuals with insulin resistance[17, 18].

Other factor contributing to the lipid profile in football and basketball players is the physical stress[19] 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 metabolism[22]. The level of endotoxin has also been found to release after strenuous exercise[23] which can impair lipid metabolism[24].

The sedentary persons, healthy or patients, should be advised exercises which involve more aerobic activity and less physical injury eg. 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.

**Conclusion:** Sports having more aerobic activity led to an improvement in lipid profiles. However further studies taking a large sample and involving measurement of Lipoprotein(a) ,which is a better indicator of cardiovascular risk[25, 26,27], are required.

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