A Comparative Study Of Lipid Profile Of Sports Persons And Sedentary Persons

Dr.Saurin Sanghavi*, Dr.Rachit Joshi **, Dr.Devanshi Upadhyay***

*Tutor, Department of Physiology, B.J.Medical college, Ahmedabad ** Assistant Professor, Department of Physiology, GMERS Medical College, Gandhinagar *** Tutor, Department of Physiology, AMC MET Medical college, Ahmedabad

Abstracts: Background and objective: - Regular physical exercise in any form makes lipid profile favorable and reduces the chances of heart attacks and brain strokes. Our aim was to find out the effect of regular physical exercise on lipid profile, compare and analyze the results of sports persons and sedentary persons. Methodology: - The present work was carried out in the Indian Petro Chemical Ltd sports complex and IPCL Hospital situated in Vadodara city. Lipid profile test was carried out on the sportsperson and the control group using instrument named VITROS – 750, which is an automatic analyzer. Results: - The result was compared by statistical analysis that revealed total serum cholesterol, Low density lipoprotein cholesterol, Very low density lipoprotein and Serum Triglyceride showed significantly higher values and High density lipoprotein cholesterol showed significantly lower values in control subjects when compared with the sports persons. Conclusion: - It can be concluded that regular physical exercise in the form of sports, aerobics or workouts leads to more favorable cardio-vascular risk factors profile that improves the quality and duration of life. [Sanghavi S et al NJIRM 2012; 3(3) : 3-6]

Key Words: Regular Physical Exercise, cholesterol, low density lipoprotein, very low density lipoprotein, triglyceride.

Author for correspondence: Dr. Saurin Sanghavi, Department of Physiology, B/9 Austmangal Residency, Nr.Shreyas crossing, vasna, Ahmedabad-380016 .e- mail: saurinnh@yahoo.com

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. Studies have shown mortality to be three times less in the most fit people than in the least fit. When a person is exposed to aerobic exercise for longer duration, he a) maintains moderately low blood pressure, b) reduced blood cholesterol and LDL along with increased HDL. Which all work together to reduce the number of heart-attacks and brain strokes.'[1] In the present study we have concentrated on the effect of long term stress in the form of exercise and sport activities on Lipid profile.

Material and Methods: The present work was carried out in the Indian Petro Chemical Ltd. sports complex and IPCL Hospital (Health centre) situated in vadodara city. Subjects selected were sport persons and residents of vadodara city who had been playing in their respective fields for 5 years or more with a practice session of at least 9hours per week as selected by Stray-Gundersen et al[2] They were on season during their investigation. They were not any special kind of diet as suggested by Evelson et al[3] All the subjects were male between the age group of 20 – 35 years.

The subjects were explained the purpose and importance of study. Permission from the ethical committee of medical college vadodara was taken and only those who were motivated consented and without past history and family history of Diabetes Mellitus, HIV, IHD, TB, Asthma etc. were included in the present study. Also the subjects were not having any personal history of tobacco and alcohol consumption. They were free from any disease and were not taking any medicine.

With the similar criterion 30 male persons of same age group of Vadodara city who were not involved in any sports activity or regular daily exercise like walking, cycling, jogging etc. were taken as controls.

The parameters recorded in our study are:

<u>Lipid Profile consisting of</u>

Serum Cholesterol in gm/dl
Low Density Lipoprotein level
High Density Lipoprotein level
Serum Triglyceride level
Very Low Density Lipoprotein level

Subjects before collection of blood were instructed not to take any food in the morning. After tourniquet application on the right/left upper arm blood was collected in 5 c syringe through 16-gauge needle taking all aseptic precautions from the right/left cubital vein.

Plain bulb was centrifuged after ½ hour at the rate of 1000 rpm for 15 minutes. Supernatant fluid was taken in a separate container. 100 µl of serum was taken in a small container of the instrument named VITROS – 750, which is an automatic analyzer. The probe takes up 10 µl of serum for each test and puts on a slide having the reagent in dry form. Data of patient was entered in the instrument and after 1 minute result was displayed on screen about HDL, LDL, VLDL, TGL, and S. Cholesterol.

Result: Lipid profile and anthropometric measurement results of sports person and sedentary persons were obtained and compared using unpaired't' test. The following table show the mean, standard deviation, combined standard deviation, standard error of probability and 'p' values.

Table 1: Mean and SD values of Age (yrs), Height (cm) and Weight (kg) of Sports persons (n=30) and Control subjects (n=30).

	Sports Person		Non-sports Person	
	Mean (SD)	**Range**	**Mean (SD)**	**Range**
Age (yrs)	27.77 (4.93)	20 – 35	29.80 (2.71)	25 – 34
Height (cms)	168.40 (4.32)	164 – 178	167.47 (5.61)	157 – 178
Weight (Kg)	60.90 (5.98)	50 – 72	62.00 (7.63)	47 – 77

Discussion: On analyzing our results High-density lipoprotein of sports persons (51.47 ± 5.38 mg %) was significantly more ($p<0.001$) than that of control subjects (47.53 v 3.89 mg %). Similarly the ratio of serum cholesterol and LDL was significantly lower ($p<0.001$) in sportspersons (3.58 ± 0.50 mg %) than that of control subjects (4.24 ± 0.72 mg %). LDL values in sportspersons (107.83 ± 12.70 mg %) was significantly lower than that in control subjects, (119.03 ± 15.6 mg %). The values of VLDL in sports persons also showed significantly lower ($p<0.05$) values in sports persons (28.77 ± 10.04 mg %) than that in control subjects (36.09 ± 13.46 mg %). Similarly the values for triglycerides also showed significantly lower ($p<0.001$) in sportspersons (151.47 ± 56.92 mg %) than that of control subjects (203.50 ± 64.52 mg %).

Table 2: Mean and SD values of parameters of Lipid Profile in sports persons (n=30) and non-sport persons (n=30).

	Sports Person		Non-sports Person		
	Mean	**SD**	**Mean**	**SD**	**'t'**
HDL (Mg %)	51.47	5.38	47.53	3.89	*** 3.25
S.Ch./HDL	3.58	0.50	4.24	0.72	*** 4.13
LDL (Mg %)	107.83	12.70	119.03	15.68	*** 3.04
VLDL (Mg %)	28.77	10.04	36.09	13.46	* 2.39
Tg (Mg %)	151.47	56.92	203.50	64.52	*** 3.31

HDL = High-density lipoprotein (mg %), S. Ch. /HDL = Ratio of serum cholesterol and high-density lipoprotein, LDL = Low density lipoprotein (mg %), VLDL = Very low-density lipoprotein (mg %) and Tg = Triglyceride (mg %). cSD = Combined Standard Deviation. SEP = Standard Error of Probability

* = $p < 0.05$ (Just significant), *** = $p < 0.001$ (High significant)

Cardoso et al[4] reported in his study Ninety-one young athletes, 70 men and 21 women, who practiced sports such as running, swimming, rowing, boxing and soccer, were studied. The control group included 101 healthy subjects, 77 men and 24 women, with sedentary life style. The mean plasma levels of total cholesterol (TC) ($p = 0.04$), low-density lipoprotein cholesterol (LDL-C) ($p = 0.04$) and the atherogenic index ($p = 0.01$) were lower, and high-density lipoprotein cholesterol (HDL-C) ($p < 0.005$) significantly higher in male athletes than in controls which were in agreement to our study he suggested that aerobic exercise may modify lipid levels in obese subjects. The resulting change in lipid profile reduces the risk of atherosclerosis.

On his study in obese recreational foot ball players Dansou ET al[5] found mixed and non significant changes in lipid profile which were not in

agreement to our study. They suggested that regular sports activity with intensive coaching is probably the best way to manage the risks of atherosclerosis.

By using their study on endurance running performance and its relation to biochemical cardiovascular disease risk indicators on 879 Swedish adolescents Bergstrom ET al[6] showed that they had higher HDL and lower LDL levels which coincides with our study. They arrived at conclusion that endurance running performance was related to a favorable CVD risk indicator profile.

Aguilo et al[7] reported in this article that the amateur cyclists had mild increase in total cholesterol after sub-maximal and maximal exercises, while a rise in HDL-cholesterol was there only after maximal exercise. There were no changes in professional cyclists as they already had a higher HDL and lower LDL Levels. Our results were similar to those of the professional cyclists who had undergone the endurance exercise. The increase was explained as a consequence of the different training status of sportsmen and intensity and duration of exercise tests.

Taylor et at[8] demonstrated that regular physical activity leads to more favorable cardiovascular risk factor profile and a lower risk of developing incident coronary heart disease. Sports-related physical activity was associated with lower body mass index ($r = -0.11$; $P = 0.001$), higher high-density lipoprotein (HDL) cholesterol ($r = 0.13$; $P = 0.003$) and less glucose resistance as assessed by fasting serum insulin levels ($r = -0.16$; $P = 0.001$). Leisure-time and work-related physical activity was unrelated to any coronary risk variables. Results from our study showed a slightly better HDL levels in sportsperson than the above study. Hence, physical activity promotes a healthy cardiovascular risk profile including lower body mass index and insulin resistance.

Evelson ET al[3] concluded with this finding in combination with the improved lipid and antioxidant status that that would add to the link between regular physical activity and protection against cardiovascular disease. Their study on professional rugby players showed a higher level of HDL cholesterol ($p<0.05$) which was similar to our study.

Stray-Gundersen ET al[2] 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. Their results showed markedly low concentrations of serum LDL cholesterol and total cholesterol, as well as the expected high concentrations of HDL cholesterol and low concentrations of triglycerides in cross-country skiers. The results of our study are comparable and in agreement to their study.

In his investigation Ferrauti ET al[9] compared the effect of short term tennis playing and regular tennis playing for long term and found that regular players had a higher HDL levels like our study than that of short term playing and sedentary persons. They indicated that typical regular tennis training influences cardiovascular risk factors in a positive manner and can be suggested as an attractive alternative to other current health oriented sports programs.

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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