Panacea Journal of Medical Sciences 2024;14(2):529–533

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Panacea Journal of Medical Sciences

Journal homepage: http://www.pjms.in/

Original Research Article

A comparative study on lipid profile parameters in athlete and non-athlete adult males

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ARTICLE INFO

Article history:
Received 09-05-2023
Accepted 06-11-2023
Available online 13-06-2024

Keywords:
Physical activity
Lipid profile
Athletes
Anthropometric parameters

ABSTRACT

Introduction: Regular physical exercise has a major impact on lipid status. The particular characteristics of athletes' blood lipid profiles were examined in this literature study. When compared to a sex- and age-matched inactive group, professional athletes' blood lipid level was shown to be much better. Athletes perform lower levels of TC, LDL-C, and TG and equivalent or higher blood levels of HDL-C regardless of whether they participate in endurance or power sports. It was introduced that there are disparities in blood lipid levels and sports disciplines. Although there are many more elements that should be considered for future research, such as food, area of origin, exercise regimen, and even genetic susceptibility.
Objective: To compare the lipid profile among athlete and no-athlete adult males.
Materials and Methods: Case control study with sample size 150. Adult males of age group 20-50 & apparently healthy males were taken. Serum lipid profile and various anthropometric measurements were done. Data Collection was done using a predesigned and pre-validated interview questionnaire.
Results: Serum cholesterol, Triglyceride, VLDL & LDL values were raised in non-athletes compared to athletes and the difference was statistically significant. The serum HDL values were lower in non-athletes compared to the athletes and the difference was statistically significant ($p<0.001$).
Conclusion: Our study concludes that athletes and non-athletes differ in their lipid profile status. Athletes have better lipid status as compared to non-athletes, thus well protected from the risk of cardiovascular diseases. Physical activity significantly promotes better lipid profile, irrespective of genetic influence.

1. Introduction

The discovery of several macromolecules such as lipids, proteins, and carbohydrates, particularly lipoproteins, aided us in understanding the pathophysiology of atherosclerosis and consequent cardiovascular illnesses. Regular physical activity in any form improves lipid profiles and lowers the risk of heart attacks and strokes. The beneficial benefits of exercise on plasma lipids have been extensively researched.

Body fitness extends life. Numerous studies have demonstrated that persons who maintain optimal bodily fitness through smart exercise and weight control regimes live longer lives. Most infectious illnesses no longer pose a threat to human life, because to advances in science.

Cardiovascular disorders, particularly ischemic heart disease, have surpassed cancer as the leading cause of mortality globally. This is not just a problem in

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https://doi.org/10.18231/j.pjms.2024.096

industrialised countries. As lifestyles in low- and middle-income nations resemble those in high-income countries, the worldwide burden of cardiovascular disease fatalities has moved to them.[1] Although cardiovascular disorders mostly affect older persons, atherosclerosis, one of the early processes that contribute to cardiovascular disease, begins in childhood. As a result, primary prevention should begin in childhood.[2] The most major risk factor for atherosclerosis is dyslipidemia.[3]

Regular physical exercise has been linked to improved lipid profiles, with or without dietary intervention. This improvement has been observed in patients as well.[4,5] Aerobic exercise has been demonstrated to raise HDL cholesterol levels while reducing Triglyceride and LDL cholesterol levels.[6,7] However, it has been demonstrated that training over the anaerobic threshold has little, or even detrimental, impact on blood lipoprotein profiles.[8,9] The current study aimed to compare the lipid profiles of athletes with non-athletes.

2. Materials and Methods

2.1. Study design

The proposed study is a case control study.

2.2. Study area

Burdwan & Birbhum districts of West Bengal.

2.3. Study period

Commencing from February 2011 & continuing till September 2012.

2.4. Sample design

In this study 75 Athlete & 75 Non-Athlete Adult males were selected as Case & Control respectively. Both cases & controls will be selected consecutively following the inclusion & exclusion criteria fixed for the study. Those who will satisfy the inclusion & exclusion criteria, mentioned below will be included in the study.

2.5. Sample size

Total=150, Cases-75, Controls-75.

2.6. Inclusion criteria

The proposed study population:

1. Adult male aged 20-50 years.
2. History of regular athletic, sports activity.
3. Apparently healthy adult males with no athletic or sports activity.

2.7. Exclusion criteria

The proposed study population:

1. Known sufferers of Hypertension, Dyslipidemia.
2. Suffering from any other disease that may affect the cardiovascular system.

2.7.1. Parameters to be studied

1. Estimation of serum lipid profile by quantitative BIA method using ERBA-XL-600 (Full Auto Analyser) & ERBACHEM-5-B2 (Semi auto-analyser).
2. Body Weight, using Body weight Machine.
3. Body Height, using measuring scale.
4. Waist & Hip measurement, using measuring tape.
5. Abdominal skin folds thickness, using Skin Calliper.

2.7.2. Study tools

1. A predesigned questionnaire survey form for data collection was created. The form includes sections for personal information, medical history of any illnesses (if any), clinical examination, and biochemical testing.
2. Informed Consent Documents - For the volunteers, a subject information sheet was created. The information sheet provided information about the essential facts of the current study, the significance of the study, and the benefits of participating in the study, written in clear language in English, Bengali, and Hindi languages. A permission form in various languages was also produced to get the volunteers' legitimate consent. At the completion of the job, an annexure contains the permission form.

2.7.3. Study technique

1. Interviews led by the study's questionnaire. Clinical examination, general survey, pulse rate, blood pressure measured with a mercury sphygmomanometer, weight, height, and waist circumference measured using a measuring tape.
2. Clinical examination - general survey, pulse rate, blood pressure, body weight and height measurement, measurement of waist and hip circumference, assessment of abdominal skin fold thickness using skin callipers.
3. Blood test for Lipid Profile: fast for 12 hours overnight. All individuals' blood was obtained aseptically following a 12-hour fasting period.
4. Body Mass Index (BMI) calculation in these groups, both case and control.

2.7.4. Study parameters

Estimation of serum lipid profile (total-cholesterol, triglyceride, LDL,HDL, VLDL)

1. Data Processing and analysis: After the collection of data from 75 case & 75 control subjects a master

chart was prepared and analysed using SPSS software version 17 and Microsoft Excel software of MS-office 2007 software package in computer.

Ethical permission was taken from the institutional ethics committee, KIMS, Bhubaneswar.

3. Results

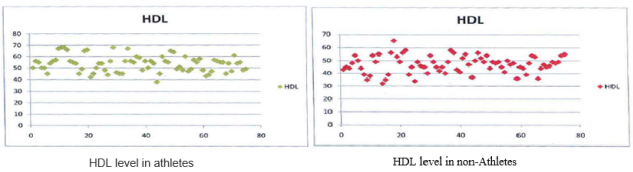

Figure 1: Scatter plot of HDL levels in Athletes and Non athletes

The scatter plots between HDL levels and Age has been plotted in Figure 1 for athletes and non-athletes. The Mean HDL level was higher among athletes (53.61±7.06) than non-athletes (46.91±6.59), and this association was found to be statistically significant (p<0.000001).

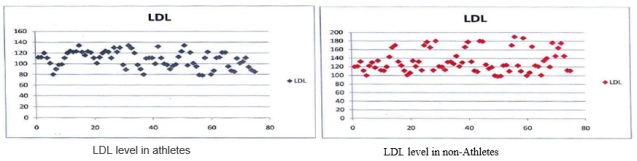

Figure 2: Scatter plot of LDL levels in Athletes and Non athletes

The scatter plots between LDL levels and Age have been plotted in 2 for athletes and non-athletes. The Mean LDL level was lower among athletes (107 .79±15.22) than non-athletes (132.5±25.63), and this association was found to be statistically significant (p<0.0001).

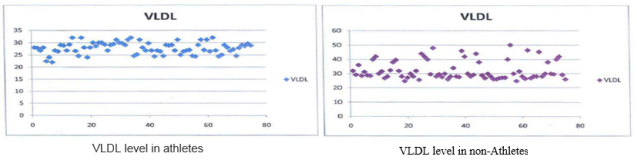

Figure 3: Scatter plot of VLDL levels in Athletes and Non athletes

The scatter plots between VLDL levels and Age has been plotted in Figure 3 for athletes and non-athletes. The Mean VLDL level was lower among athletes (27.78±2.37) than non-athletes (32.28±6.51), and this association was found to be statistically significant (p<0.000001).

The scatter plots between TG levels and Age has been plotted in Figure 4 for athletes and non-athletes. The Mean TG level was lower among athletes (138.88±11.85) than non-athletes (161.38±32.55), and this association was found to be statistically significant (p<0.000001).

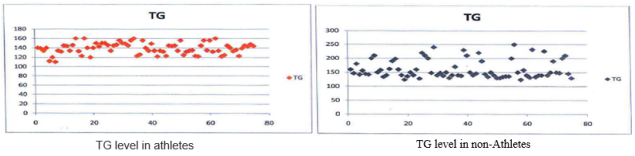

Figure 4: Scatter plot of TG levels in Athletes and Non athletes

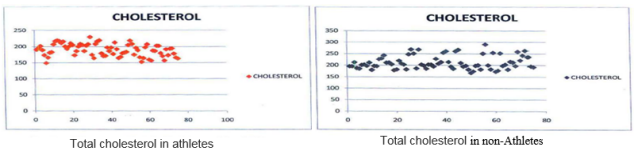

Figure 5: Scatter plot of cholesterol levels in Athletes and Non-athletes

The scatter plots between Cholesterol levels and Age has been plotted in Figure 5 for athletes and non-athletes. The Mean Cholesterol level was lower among athletes (189.18±18.97) than non-athletes (211.68±28.56), and this association was found to be statistically significant (p<0.000001).

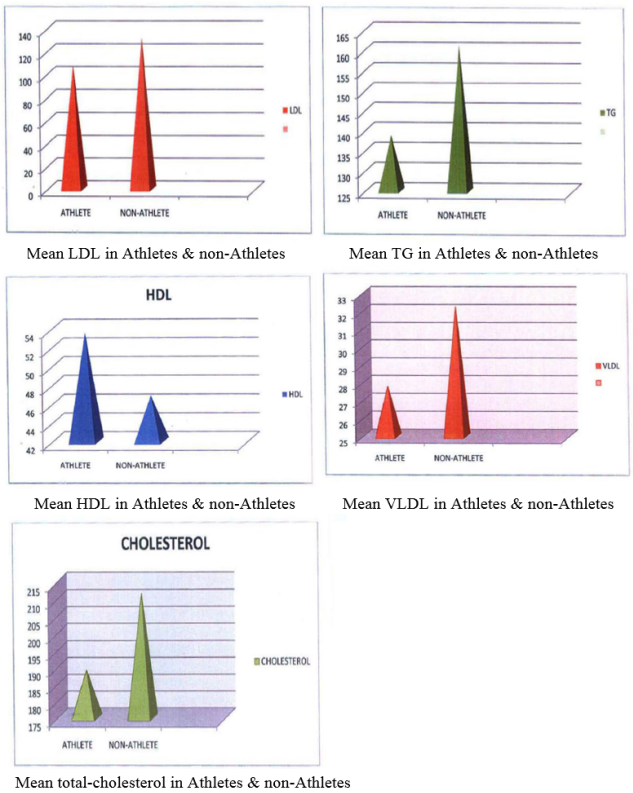

Figure 6: Histogram showing mean values of different variables amongathletes and non-athletes

The mean LDL, TG, VLDL and Total cholesterol is higher among non-athletes when compared to athletes. Only

Table 1: Comparing anthropometric parameters amongathletes and non-athletes

Parameters	Athletes (n=75)	Non-Athletes (n=75)	P value
Age (in years)	32.02 ± 8.29	31.69 ±7.90	0.80
Weight (kilograms)	68.79 ± 7.21	74.59±9.39	<0.0001
Height (meters)	1.66 ± 0.09	1.65±0.10	0.5208
BMI (weight/height in met sq)	25. 18 ± 3.01	27.42±3.90	0.0001
Waist (in cm)	34.55 ± 2.25	36.64±2.51	0.8175
Hip (in cm)	41.92±1.92	43.26±1.46	<0.000001
Waist: Hip Ratio	0.82 ±0.04	0.85±0.04	<0.000001
Abdominal girth (in cm)	24.33± 1.19	26.36±1.87	<0.000001

p-values calculated using two-sample independent Student's t -test, significance levels p< 0.05

Table 2: Lipid status among athletes and non-athletes

Parameters	Athletes (n=75)	Non-Athletes (n=75)	P value
Cholesterol (mg/dl)	189.18±18.97	211.68±28.56	<0.000001
Triglyceride (mg/dl)	138.88±11.85	161.38±32.55	<0.000001
LDL (mg/dl)	107 .79±15.22	132.5±25.63	<0.000001
VLDL (mg/dl)	27.78±2.37	32.28±6.51	<0.000001
HDL (mg/dl)	53.61±7.06	46.91±6.59	<0.000001

p-values calculated using two-sample independent Student's t -test, significance levels p< 0.05

HDL is higher among athletes than non-athletes.Figure 6

4. Discussion

In the present study, the goal was to assess the blood lipid profile of athletes and compare it to that of non-athletes. A total of 150 participants were included in the study, 75 in each group. We compared the Body Mass Index of both athletes and non-athletes. There was statistically significant difference between both the groups. Similar findings have been reported by other studies done in other parts.[10] Regular physical activity has multiple favorable effects on baseline values of lipid levels, irrespective of influence of genetic factors.[11] This confirms that genetics only has a partial role in determining the lipid profile results to physical activity.[12] Anthropometry evaluation showed that the athletes had lower body weight as compared to the other group of non-athletes. This finding was in agreement with results of other authors.[13] On analyzing, it was found that LDL, TC, VLDL and TG values were higher among non-athletes than that of the athletes. The difference was found to be statistically significant, thus emphasizing the importance of physical activity in reducing the risk factors for cardiovascular diseases. Similar findings were also concluded by other studies.[14,15]

HDL also plays a role pertaining to coronary artery disease risk reduction. Reduced levels of HDL levels in non-athletes, compared to athletes highlight the effect of physical activity on HDL levels. The difference was also significant among the two groups, which further strengthens our hypothesis. Similar findings were reported by other studies also.[16] Labovic B. S. et al in their study also showed that athletes have lower total cholesterol, LDL cholesterol and triglyceride levels, and higher serum HDL than people who are not involved in sports.[17] The results of our study was also consistent with the results of numerous other studies.[18,19]

5. Conclusion

Our study concludes that athletes and non- athletes differ in their lipid profile status. Athletes have better lipid status as compared to non-athletes, thus well protected from risk of cardiovascular diseases. Physical activity significantly promotes better lipid profile, irrespective of genetic influence. This preventive aspect should be emphasized more to the general population to prevent cardiovascular disease risk.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Cite this article: Banerjee B, Patra S, De K, Chaterjee S, Ray A, Debata I. A comparative study on lipid profile parameters in athlete and non-athlete adult males. *Panacea J Med Sci* 2024;14(2):529-533.