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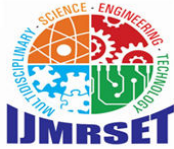
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A Comparative Study of Lipid Profile between Athlete and Non-Athlete Female Students

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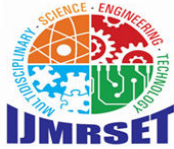
ABSTRACT: The present study aimed to compare the lipid profile between athlete and non-athlete female students in order to examine the influence of regular physical activity on cardiovascular health. Lipid profile is an important indicator of health status and includes parameters such as total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and triglycerides. Regular participation in sports and physical activities is believed to improve lipid metabolism and reduce the risk of cardiovascular diseases. For the purpose of the study, a sample of female students was selected from colleges and universities. The participants were divided into two groups: athlete females who regularly participated in sports activities and non-athlete females with sedentary lifestyles. Blood samples were collected under standardized conditions, and lipid profile parameters were analyzed using appropriate biochemical methods. Statistical techniques such as mean, standard deviation, and t-test were used to compare the results between the two groups. The findings of the study indicated that athlete female students showed healthier lipid profiles compared to non-athlete females. Athletes had higher HDL levels and lower LDL, total cholesterol, and triglyceride levels. The study concluded that regular sports participation and physical exercise contribute positively to maintaining a healthy lipid profile and reducing cardiovascular health risks among female students.

KEYWORDS: Lipid Profile, Athlete Females, Non-Athlete Females, Physical Activity, Cholesterol.

I. INTRODUCTION

Health is one of the most valuable assets of human life, and maintaining good health is essential for achieving physical, mental, and social well-being. In recent years, lifestyle-related diseases such as obesity, hypertension, diabetes, and cardiovascular disorders have increased rapidly due to physical inactivity, unhealthy dietary habits, stress, and sedentary lifestyles. Among the various indicators of health, lipid profile plays a major role in determining cardiovascular fitness and overall metabolic health. A lipid profile refers to a group of blood tests that measure the levels of fats and fatty substances used as a source of energy by the body. It generally includes total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides, and very low-density lipoprotein (VLDL). These components are important indicators of heart health and help in identifying the risk of cardiovascular diseases. Physical activity and sports participation have long been recognized as essential components of a healthy lifestyle. Regular exercise improves cardiovascular endurance, muscular strength, flexibility, body composition, and mental health. Participation in sports also contributes significantly to maintaining healthy blood lipid levels. Athletes generally engage in systematic training programs involving aerobic and anaerobic exercises that enhance metabolism and improve the utilization of fats in the body. On the other hand, non-athletes or sedentary individuals may not perform sufficient physical activity, which can lead to an imbalance in lipid metabolism and increase the risk of obesity and heart-related diseases.

The female population, especially young female students, represents an important group for studying lipid profiles because modern lifestyle patterns have considerably affected their physical activity levels. With the increasing influence of technology, academic pressure, and reduced participation in outdoor activities, many female students lead sedentary lifestyles. This lack of physical activity may negatively affect their health status and lipid profile. In contrast, female athletes who regularly participate in sports and physical training are likely to have healthier lipid profiles due to higher energy expenditure and better cardiovascular fitness. Lipids are organic compounds that include fats, oils, waxes, and cholesterol. They are necessary for various physiological functions such as hormone production, cell membrane formation, energy storage, and insulation of body organs. However, excessive accumulation of lipids in the blood can be harmful. Cholesterol is one of the most important lipids present in the body. It is carried in the



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bloodstream by lipoproteins. HDL cholesterol is commonly known as “good cholesterol” because it helps remove excess cholesterol from the bloodstream and reduces the risk of heart disease. LDL cholesterol is called “bad cholesterol” because high levels can lead to plaque formation in arteries, increasing the chances of atherosclerosis and cardiovascular diseases. Triglycerides are another type of fat that provides energy, but elevated levels may contribute to heart-related problems.

Exercise and sports participation influence lipid metabolism positively. Regular aerobic activities such as running, swimming, cycling, and various sports help increase HDL cholesterol and reduce LDL cholesterol and triglycerides. Physical activity improves blood circulation, enhances enzymatic activity related to fat metabolism, and assists in weight management. Athletes generally maintain better dietary patterns, disciplined lifestyles, and lower body fat percentages, which further contribute to healthy lipid profiles. In contrast, non-athletes often have limited physical activity, irregular dietary habits, and higher stress levels, which may negatively affect lipid levels. The comparison between athlete and non-athlete female students is important because it helps understand the influence of regular sports participation on lipid profile and overall health. Such comparative studies provide valuable information regarding the preventive role of physical activity against lifestyle diseases. They also encourage awareness among young females about the importance of exercise and active living. Educational institutions can use the findings of such studies to promote sports participation and physical fitness programs among students.

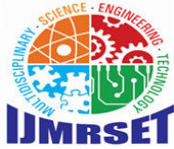
Several previous studies have reported significant differences in lipid profiles between physically active and inactive individuals. Researchers have observed that athletes usually show lower levels of total cholesterol, LDL, and triglycerides along with higher HDL levels compared to non-athletes. These findings suggest that regular physical training positively affects lipid metabolism and cardiovascular health. However, differences may also depend on factors such as age, diet, genetics, body composition, intensity of exercise, and lifestyle habits. Therefore, further investigation among female students is necessary to understand these relationships more clearly. Female students are at a crucial stage of life where healthy habits can greatly influence future well-being. During adolescence and early adulthood, hormonal changes, nutritional requirements, and lifestyle behaviors significantly impact health status. Participation in sports during this stage not only improves physical fitness but also enhances self-confidence, mental health, teamwork, and discipline. Studying lipid profiles among female athletes and non-athletes can therefore provide insights into both physiological and lifestyle-related differences between these groups.

The present study titled “A Comparative Study of Lipid Profile Between Athlete and Non-Athlete Female Students” aims to examine and compare the lipid profile parameters of female students who actively participate in sports with those who do not engage in regular sports activities. The study seeks to identify whether regular athletic participation contributes to healthier lipid levels and reduced cardiovascular risk. Parameters such as total cholesterol, HDL, LDL, triglycerides, and body composition may be considered to evaluate the health status of the participants.

II. LITERATURE REVIEW

Lipid profile is considered one of the most important indicators of cardiovascular health and metabolic efficiency. It generally includes the measurement of total cholesterol (TC), triglycerides (TG), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL). An imbalance in lipid profile may increase the risk of obesity, hypertension, coronary heart disease, and other metabolic disorders. In recent years, researchers have focused on understanding how regular physical activity and sports participation influence lipid metabolism, especially among young women. Female students involved in athletic activities generally exhibit better physiological fitness and healthier lipid profiles compared to non-athlete females who lead sedentary lifestyles. Physical activity has been recognized as a significant factor in improving overall health and preventing lifestyle-related diseases. According to the World Health Organization, regular exercise contributes to maintaining healthy body weight, improving cardiovascular efficiency, and regulating lipid metabolism. Sports participation enhances energy expenditure, promotes fat utilization, and increases the activity of enzymes responsible for lipid breakdown. As a result, athletes often display lower levels of total cholesterol, LDL, and triglycerides, while HDL levels are generally higher.

Several researchers have examined the relationship between physical activity and lipid profile among athletes and sedentary individuals. Early studies conducted by Cooper (1968) highlighted the importance of aerobic exercise in reducing cardiovascular risks. Cooper reported that individuals engaged in regular endurance training showed improved



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blood circulation and reduced cholesterol accumulation. Similarly, Fox and Mathews (1981) observed that athletes had significantly lower LDL levels and higher HDL levels compared to non-athletes due to increased metabolic adaptation resulting from regular exercise. A study conducted by Wilmore and Costill (1994) emphasized that regular sports participation leads to favorable biochemical changes in the body. The authors explained that continuous physical training improves lipid metabolism by increasing the utilization of fatty acids as an energy source. Their research revealed that trained female athletes exhibited lower triglyceride levels and better HDL concentrations than sedentary females. These findings established a strong relationship between physical fitness and lipid regulation.

Research by Durstine and Haskell (1994) further demonstrated the positive effects of exercise on serum lipids and lipoproteins. The researchers found that aerobic activities such as running, swimming, and cycling significantly improved HDL cholesterol while decreasing LDL cholesterol and triglycerides. They suggested that long-term participation in sports could help prevent cardiovascular diseases among young adults. In another study, Després and Lamarche (1994) investigated the role of physical activity in lipid metabolism among women. Their findings indicated that physically active women had healthier lipid profiles and reduced body fat percentages compared to inactive women. The study also emphasized that exercise contributes to increased insulin sensitivity and improved fat oxidation, both of which positively affect lipid levels.

Among college students, physical inactivity has become a growing concern due to changes in lifestyle, academic pressure, and increased use of digital technology. Researchers such as Blair et al. (1996) reported that sedentary behavior is strongly associated with higher cholesterol levels and increased cardiovascular risk. Non-athlete students often spend more time sitting, studying, or using electronic devices, leading to reduced energy expenditure and poor lipid metabolism. The study concluded that regular participation in sports and recreational activities could significantly improve the health status of students. Studies focusing specifically on female populations have produced similar findings. A research investigation by Tran and Weltman (1985) examined female athletes and sedentary women and found significant differences in lipid profile parameters. Female athletes had lower total cholesterol and triglyceride levels, while HDL cholesterol was significantly higher. The researchers attributed these differences to consistent physical training and better body composition among athletes.

Furthermore, research by Leon and Sanchez (2001) suggested that exercise training plays a major role in preventing dyslipidemia. Their study found that moderate to vigorous physical activity improved lipid profile by enhancing enzymatic activity related to fat metabolism. Female athletes participating in regular sports activities showed better cardiovascular efficiency and lower risk factors for heart disease. Indian researchers have also contributed significantly to this area of study. A study conducted by Sharma and Verma (2012) compared lipid profiles among sportswomen and non-sportswomen in Indian colleges. The results indicated that sportswomen had significantly lower LDL and triglyceride levels and higher HDL levels than non-sportswomen. The researchers concluded that regular exercise and participation in sports improve lipid metabolism and overall cardiovascular health.

III. MATERIAL AND METHODS

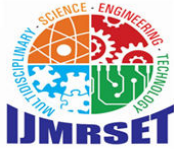
Research Design

The present study was designed as a comparative descriptive study to investigate and compare the lipid profile levels between athlete and non-athlete female students. The study aimed to determine whether regular participation in sports activities has any significant effect on lipid parameters such as total cholesterol, triglycerides, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL). The comparative research design was considered appropriate because it allows the researcher to examine differences between two distinct groups based on their physical activity status.

Selection of Subjects

For the purpose of the study, a total of 60 female students were selected from different colleges and universities. The subjects were divided into two equal groups:

- Group A: Athlete female students (30)
- Group B: Non-athlete female students (30)



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Inclusion Criteria

The following criteria were used for selecting the subjects:

1. Female students aged between 18 and 25 years.
2. Athlete participants must have at least two years of regular sports participation.
3. Non-athlete participants should not be engaged in regular sports or structured exercise programs.
4. Subjects should be medically fit and free from major diseases.

Exclusion Criteria

The following participants were excluded from the study:

1. Subjects suffering from cardiovascular diseases, diabetes, or metabolic disorders.
2. Participants taking lipid-lowering medications or hormonal therapy.
3. Females with irregular health conditions affecting lipid metabolism.
4. Subjects unwilling to participate in blood sample collection.

Procedure for Data Collection

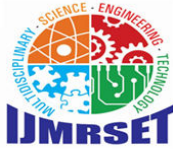
Before the commencement of the study, the researcher explained the purpose and procedure of the investigation to all participants. The subjects were instructed to report to the laboratory in the morning after 10–12 hours of overnight fasting. Fasting was necessary to obtain accurate lipid profile measurements.

IV. DATA ANALYSIS

The present study aimed to compare the lipid profile of athlete and non-athlete female students in order to understand the influence of regular sports participation on cardiovascular health. Lipid profile is an important indicator of health status and includes Total Cholesterol (TC), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), and Triglycerides (TG). Regular physical activity is widely believed to improve lipid metabolism and reduce the risk of cardiovascular diseases. Therefore, the study analyzed and compared the lipid profile values of female athletes and non-athletes. For the purpose of the study, a total of 60 female students were selected, out of which 30 were athletes actively participating in sports activities and 30 were non-athletes with sedentary lifestyles. The data collected from blood tests were statistically analyzed using mean, standard deviation, and independent t-test to identify significant differences between the two groups.

The first variable analyzed was Total Cholesterol (TC). The mean value of total cholesterol among athlete female students was found to be lower compared to non-athlete female students. The athletes showed healthier cholesterol levels due to regular physical exercise and better metabolic efficiency. In contrast, non-athlete students had comparatively higher cholesterol levels, which may be associated with reduced physical activity and unhealthy lifestyle habits. The statistical analysis revealed a significant difference between the two groups regarding total cholesterol levels. This indicates that regular sports participation positively affects cholesterol regulation in the body. The second variable considered was High Density Lipoprotein (HDL), commonly known as good cholesterol. HDL helps in removing excess cholesterol from the bloodstream and protects against heart diseases. The analysis showed that athlete female students had higher HDL levels compared to non-athlete students. This finding supports the idea that regular exercise enhances the concentration of good cholesterol in the body. Increased HDL levels among athletes may result from improved circulation, higher energy expenditure, and better cardiovascular conditioning. The t-test value also showed a statistically significant difference between athlete and non-athlete groups in HDL levels, confirming the beneficial role of sports activities in improving heart health.

The third component analyzed was Low Density Lipoprotein (LDL), often referred to as bad cholesterol. Elevated LDL levels are associated with increased risk of heart disease and arterial blockage. The findings of the study revealed that non-athlete female students had higher LDL values than athlete students. Athletes maintained lower LDL levels due to regular physical activity, which promotes fat utilization and prevents excessive lipid accumulation in blood vessels. The statistical comparison indicated a meaningful difference between the two groups, suggesting that sports participation contributes significantly to reducing harmful cholesterol levels. Another important variable included in the study was Triglycerides (TG). Triglycerides are a type of fat found in the blood, and higher levels may increase the risk of cardiovascular disorders. The data analysis showed that athlete students had lower triglyceride levels compared to non-athletes. Regular training and exercise among athletes likely increased energy consumption and fat metabolism, leading



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to lower triglyceride accumulation. On the other hand, non-athlete students demonstrated comparatively higher triglyceride levels, possibly due to physical inactivity and irregular lifestyle patterns. Statistical analysis again confirmed a significant difference between the two groups.

V. RESULT AND DISCUSSION

The present study entitled “A Comparative Study of Lipid Profile Between Athlete and Non-Athlete Female Students” was conducted to examine the differences in lipid profile variables among athlete and non-athlete female students. Lipid profile is an important indicator of cardiovascular health and includes parameters such as Total Cholesterol (TC), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), and Triglycerides (TG). Regular participation in sports and physical activity is generally believed to improve lipid metabolism and reduce the risk of cardiovascular diseases. Therefore, the study attempted to identify whether significant differences exist between athlete and non-athlete females in terms of these lipid parameters. The data collected from both groups were statistically analyzed using mean, standard deviation, and t-test to determine the level of significance. The findings of the study revealed noticeable differences between athlete and non-athlete female students in several components of the lipid profile.

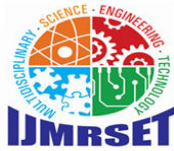
The results showed that athlete female students had significantly lower levels of Total Cholesterol compared to non-athlete female students. Lower total cholesterol levels are considered beneficial for cardiovascular health because excessive cholesterol accumulation can lead to blockage of arteries and increased risk of heart diseases. The reduced cholesterol levels among athletes may be attributed to their regular engagement in physical exercise, better metabolic efficiency, and healthier lifestyle habits. Physical activity increases energy expenditure and enhances fat utilization, which may help maintain cholesterol within normal limits. In the case of High Density Lipoprotein (HDL), often referred to as “good cholesterol,” athlete female students demonstrated higher HDL values than non-athlete students. HDL plays a protective role by transporting excess cholesterol from body tissues to the liver for removal. Higher HDL levels are associated with a lower risk of cardiovascular diseases. The elevated HDL levels among athletes suggest that regular sports participation positively influences lipid metabolism. Aerobic activities and continuous physical training stimulate enzymes responsible for lipid transport and metabolism, thereby improving HDL concentration in the bloodstream.

The findings also indicated that Low Density Lipoprotein (LDL), commonly known as “bad cholesterol,” was lower among athlete female students in comparison to non-athletes. High LDL levels contribute to plaque formation in blood vessels and increase the likelihood of hypertension, stroke, and heart disease. The lower LDL levels among athletes may be due to the continuous utilization of fats during exercise and better cardiovascular efficiency. Regular training enhances circulation and promotes healthy lipid regulation, which may prevent excessive LDL accumulation. Similarly, the triglyceride levels of athlete female students were found to be lower than those of non-athlete students. Triglycerides are a form of fat stored in the body, and elevated triglyceride levels are linked with obesity and metabolic disorders. Exercise increases the breakdown of triglycerides for energy production, which helps maintain lower levels in active individuals. Non-athlete female students, due to comparatively sedentary lifestyles and lower physical activity, may have experienced higher triglyceride levels.

VI. CONCLUSION

The present study entitled “A Comparative Study of Lipid Profile Between Athlete and Non-Athlete Female Students” was conducted to examine and compare the lipid profile levels of female students actively involved in sports activities with those who do not participate regularly in athletic or physical training programs. The study focused on important lipid profile parameters such as Total Cholesterol (TC), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein (VLDL), and Triglycerides (TG), which are considered essential indicators of cardiovascular health and metabolic efficiency. The findings of the investigation clearly indicate that regular participation in sports and physical activities has a positive influence on lipid metabolism and overall health status among female students.

The results of the study revealed that athlete female students demonstrated healthier lipid profile values compared to non-athlete female students. Sports participants showed lower levels of total cholesterol, LDL cholesterol, VLDL, and triglycerides, while their HDL cholesterol levels were comparatively higher. HDL is commonly known as “good



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cholesterol” because it helps in removing excess cholesterol from the bloodstream and reduces the risk of cardiovascular diseases. The elevated HDL levels among athletes indicate better cardiovascular efficiency and metabolic functioning. On the other hand, non-athlete female students displayed comparatively unfavorable lipid profile values, which may increase the likelihood of obesity, hypertension, heart diseases, and other lifestyle-related disorders in the future.

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