

**A COMPARATIVE STUDY OF LIPID PROFILE IN SEDENTARY AND ACTIVE ADULT FEMALES**Suhasini Sanda<sup>1</sup>, Rakesh Mamilla<sup>2</sup><sup>1</sup>Associate Professor, Department of Physiology, Siddhartha Medical College, Vijayawada, Andhra Pradesh.<sup>2</sup>Registrar, Department of Critical Care, Apollo Health City, Jubilee Hills, Hyderabad, Telangana, India.**ABSTRACT****BACKGROUND**

Lipids and lipoproteins are essential constituents of the body and their activities assist in maintenance of body homeostasis. Sedentary lifestyle has been shown to lead to inactivity, which could lead to lipid disorders. Hyperlipidaemias is one of the major independent risk factor, which affects the cardiovascular system adversely resulting eventually damage to various organs most notably heart, kidneys and brain. The present study is therefore designed to ascertain the effect of sedentary lifestyle on lipid status of sedentary adult females when compared to that of the lipid status of active adult females.

**MATERIALS AND METHODS**

The present study comprised of Group I - 50 sedentary adult females and Group II - 50 active adult females aged between 30 to 60 years. The subjects selected in both groups were matched for age and dietary habits. The subjects with hypertension, diabetes, smokers, pregnancy and subjects with Body Mass Index (BMI) greater than 30 are excluded. After overnight fasting of 12 to 14 hours, 5 mL of blood is collected from the subjects and fasting Total Serum Cholesterol (TC), Total Serum Triglycerides (TG), HDL cholesterol (HDL-C), LDL cholesterol (LDL-C) and total serum cholesterol/HDL-C ratio are measured and data is statistically analysed.

**RESULTS**

The evaluation of lipid profile patterns in above subjects showed hypercholesterolaemia, hypertriglyceridaemia, increased LDL-C and total serum cholesterol/HDL-C ratio in sedentary adult females and also decreased HDL-C levels in them when compared to the normal healthy lipid profile patterns in active adult females. A statistically significant increased lipid profiles (P-value <0.001) was observed in the sedentary adult females than in active adult females.

**CONCLUSION**

This study shows that sedentary lifestyle predisposes to hyperlipidaemias, one of the major risk factor of cardiovascular disease and lack of exercise worsens the situation.

**KEYWORDS**

Hyperlipidaemias, Sedentary Lifestyle, Active Lifestyle, Cardiovascular Disease.

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**BACKGROUND**

Lipid profile test is used in diagnosing, treatment and prediction of atherosclerosis. Hyperlipidaemia is defined as an increase in the fasting serum cholesterol or triglyceride levels or both. Lipid levels may be affected by diet, exercise, smoking and certain medications.<sup>1</sup> A sedentary lifestyle is a type of lifestyle common in modern civilisations, which is characterised by sitting most of the day in an office or at home.<sup>2</sup> It is believed to be a factor in obesity and other disorders.<sup>3</sup> A sedentary activity level describes someone who gets little to no exercise, spending lot of time sitting at a desk or watching television without working out regularly

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and the activity performed during daily routine is of low intensity. Sedentary lifestyle increases the risk of colon and breast cancer, insulin resistance, heart attacks, stroke, osteoporosis, decreased muscle mass, depression and decreased immune system.

Active living is a combination of physical activity and recreation activities aimed at the general public to encourage a healthier lifestyle. According to the definition given in Edexcel Specification, an active, healthy lifestyle is a lifestyle that contributes positively to physical, mental and social wellbeing, which includes regular exercise and physical activity. The active lifestyle includes physical activity equal to walking quickly for 1½ to 3 miles (about 30 to 40 minutes per day), plus doing light activity needed for daily life. Estimated calorie needs per day for a sedentary female aged between 30 to 60 years ranges from 1800 to 1600 and for an active female ranges from 2200 to 2000 respectively according to age. The World Health Organization estimates that a lack of physical activity is associated with 3.2 million deaths a year. Having sedentary lifestyle leads to being overweight and this can lead to hyperlipidaemias, diabetes



and hypertension, which are the risk factors for coronary heart diseases.<sup>4,5</sup> Thus, maintenance of physical fitness during the ageing process improves blood supply to the heart, improves blood clotting, reduces blood pressure in hypertensive persons, normalises blood lipid profiles, reduces overweight and helps relieve psychological stress.<sup>6,7</sup> Regular physical activity helps reduce the risk of cognitive decline. Despite the well-established physical and emotional benefits associated with regular participation in moderate physical activity, most of the people are not getting enough of this important and life sustaining behavior to reduce their risk of various illnesses. One very important way to avoid the hazards of unhealthy living is to obtain a regular dose of physical activity. Due to these obvious benefits of active lifestyle, there is need to assess the lipid profiles of sedentary adult females and compare the result with that of age-matched active adult females.

**Aims and Objectives**

To show that the sedentary adult females have hyperlipidaemias, that is increased in TC, TG, LDL-C, TC/HDL-C ratio and decrease in HDL-C when compared to active adult females.

**MATERIALS AND METHODS**

The present study was carried out in Department of Physiology, Siddhartha Medical College, Vijayawada. The present study comprised of 100 apparently healthy female volunteers aged between 30 to 60 years. Group I- 50 sedentary adult females and Group II- 50 active adult females. The subjects selected in both groups were matched for age and dietary habits. The subjects with hypertension, diabetes, smokers and pregnancy were excluded. The subjects with BMI >30 were also excluded. TC, TG, HDL-C, LDL-C and TC/HDL-C ratio were measured<sup>8</sup> and analysed in both groups. The biochemical parameters were compared in both groups and their difference between the groups was tested using appropriate statistical techniques like 'Z' test and 'T' test.

**Collection of Blood Samples-** After an overnight fasting of 12 to 14 hours, about 5 mL of whole blood was collected via venipuncture with the help of disposable syringe in the morning. The estimation of lipid profiles was carried out in laboratory after getting fasting blood samples.

**The following biochemical investigations were done-**

- Total serum cholesterol.
- Serum triglycerides.
- Serum HDL-C.
- Serum LDL-C.
- Total serum cholesterol/HDL-C ratio.

**Total Cholesterol and HDL Cholesterol Estimation-Method-**

Enzymatic method (Kit method).<sup>9,10</sup> Monozyme Liquichem cholesterol and HDL cholesterol (CHOD/POP-Phosphotungstate Method). The desirable value for total serum cholesterol - <200 mg/dL. The desirable value for HDL-C - >40 mg/dL.

**Total Serum Triglyceride Estimation-Method-**

Enzymatic method (Kit method),<sup>11</sup> (GPO-POP Method with ESPAS) (Monozyme Liquichem Triglycerides). The desirable value for serum triglycerides up to 150 mg/dL.

**LDL Cholesterol- LDL-C Select FS (DiaSys)-**

Diagnostic reagent for quantitative in vitro determination of Low-Density Lipoprotein Cholesterol (LDC-C) in serum or plasma on photometric systems.

The desirable value for serum LDC-C- <130 mg/dL.

**Total Serum Cholesterol/Serum HDL-C Ratio-**

Total serum cholesterol/serum HDL-C ratio is calculated from the above values. The desirable value <5.0.

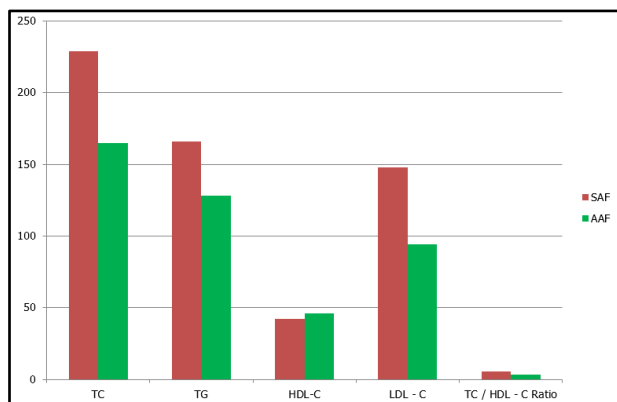
**RESULTS**

The evaluation of lipid profile patterns in above subjects showed hypercholesterolaemia, hypertriglyceridaemia, increased LDL-C and total serum cholesterol/HDL-C ratio in sedentary adult females and also decreased HDL-C levels in them when compared to the normal healthy lipid profile patterns in active adult females. A statistically significant increased lipid profiles (P-value <0.001) was observed in the sedentary adult females than in active adult females. HDL-C is decreased in sedentary adult females when compared to normal healthy HDL-C in active adult females. The same is shown in Table 1 and Graph 1.

	<b>SAF (Group I) M ± SD</b>	<b>AAF (Group II) M ± SD</b>	<b>Z Value</b>	<b>P Value</b>	<b>S</b>
TC	229 ± 6.5	165 ± 12.42	32.32	<0.001	S
TG	166 ± 24.4	128 ± 16.8	5.20	<0.05	S
HDL - C	42 ± 0.87	46 ± 0.87	23.12	<0.001	S
LDL - C	148 ± 6.8	94 ± 7.9	36.73	<0.001	S
TC/HDL - C ratio	5.65 ± 0.285	3.6 ± 0.256	19.90	<0.001	S

**Table 1. Comparative Statistical Analysis of Lipid Profiles in Sedentary Active Females (Group I - 50) and Active Adult Females (Group II - 50)**

S- Significant; SAF- Sedentary Active Female; AAF- Active Adult Females.



**Graph 1. Comparative Statistical Analysis of Lipid Profiles in Sedentary Active Females (Group I - 50) and Active Adult Females (Group II - 50)**

**SAF** - Sedentary Active Female; **AAF** - Active Adult Females.

## DISCUSSION

In present study, the lipid profile of sedentary adult females revealed a significant increase in TC, TG, LDL-C and TC/HDL-C ratio ( $P < 0.001$ ), whereas decrease in HDL-C ( $P < 0.001$ ) when compared with active adult females. This observation is in agreement with the report of Fonseca and Moriguchi<sup>12</sup> and Prabhakaran et al.<sup>13</sup> From this study, the abnormal findings have shown that living sedentary lifestyle can be a predisposition factor to some metabolic disorders of lipid and lipoprotein metabolism and in turn to coronary heart disease.<sup>14</sup> This condition could be further worsened when such lifestyle is unaccompanied by adequate exercise program.

The present study also shows that the active lifestyle helps to achieve the proper management of hyperlipidaemias in order to reduce the morbidity and mortality due to premature cardiovascular disease.<sup>15</sup>

## CONCLUSION

As sedentary lifestyle predisposes to hyperlipidaemias, regular longer training programme at higher working intensity and reduced fat diet should be encouraged to evoke significant decrease in blood lipid concentrations and other risk factors of heart disease such as hypertension and obesity. This study may influence the attitude of the physicians as well as the society in promoting active lifestyle thus controlling the abnormal lipid profiles in turn better management of cardiovascular diseases.

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