ORIGINAL RESEARCH

Comparison of lipid profile among obese and non-obese subjects: A biochemical study

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ABSTRACT
Background: The present study was conducted for comparing the lipid profile among obese and non-obese subjects. **Materials & methods:** A total of 100 obese subjects and 100 healthy controls were enrolled. Complete demographic and clinical details of all the subjects was obtained. A Performa was made and complete anthropometric variables were recorded separately. All the subjects were recalled in the morning and fasting blood samples were obtained. All the samples were sent for evaluation of lipid profile. All the results were recorded in Microsoft excel sheet. All the results were analyzed by using SPSS software. **Results:** Mean total cholesterol levels among obese and non-obese subjects was 189.2 mg/dL and 159.8 mg/dL respectively. Mean triglycerides levels among obese and non-obese subjects was 159.7 mg/dL and 118.6 mg/dL respectively.Mean HDL-C levels among obese and non-obese subjects was 38.1 mg/dL and 41.9 mg/dL respectively.Mean LDL- C levels among obese and non-obese subjects were 137.3 mg/dL and 110.7 8 mg/dL respectively. While comparing the total cholesterol levels, triglyceride levels and low-density lipoproteins levels among obese and non-obese subjects, significant results were obtained. **Conclusion:** Obesity is accompanied by unfavorable blood lipids patterns.
Key words: Obesity, Lipid

INTRODUCTION

Obesity is the excessive or abnormal accumulation of fat or adipose tissue in the body that impairs health via its association with the risk of development of diabetes mellitus, cardiovascular disease, hypertension, and hyperlipidemia. It is a significant public health epidemic which has progressively worsened over the past 50 years.[1, 2]

There are several possible mechanisms leading to obesity. Actually, the traditional view is usually that the main cause is the significantly more excess energy stored than the energy the body used. The excess energy is stored in fat cells, thereby developing the characteristic obesity pathology. The pathologic enlargement of fat cells will alter the nutrient signals responsible for obesity.However, the latest research showed that the food sources and quality of nutrients matter more than their quantities in the diet for weight control, and also for disease prevention.[2, 3]

Abnormalities in lipid metabolism are very commonly observed in patients who are obese. Approximately 60-70% of patients with obesity are dyslipidemic. The lipid abnormalities in patients who are obese include elevated serum TG (Triglycerides), VLDL (Very low-density lipoprotein), apolipoprotein B, and non-HDL-C (High density lipoprotein- cholesterol) levels. The increase in serum TG is due to increased hepatic production of VLDL particles and a decrease in the clearance of TG rich lipoproteins. HDL-C levels are typically low and are associated with the increase in serum TG. LDL-C (low density lipoprotein-cholesterol) levels are frequently in the normal range or only slightly elevated but there is an increase in small dense LDL. Patients who are obese are at an increased risk of developing cardiovascular disease and therefore treatment of their dyslipidemia is often indicated.[4- 6]Hence; the present study was conducted for comparing the lipid profile among obese and non-obese subjects.

MATERIALS & METHODS

The present study was conducted for comparing the lipid profile among obese and non-obese subjects. A total of 100 obese subjects and 100 healthy controls

were enrolled. Complete demographic and clinical details of all the subjects was obtained. A Performa was made and complete anthropometric variables were recorded separately. All the subjects were recalled in the morning and fasting blood samples were obtained. All the samples were sent for evaluation of lipid profile. All the results were recorded in Microsoft excel sheet. All the results were analyzed by using SPSS software. Student t test was used for evaluation of level of significance. P-value of less than 0.05 was taken as significant.

RESULTS

Mean age of the obese and non-obese subjects was 45.3 years and 41.9 years respectively. Majority proportion of the subjects of both obese group and non-obese group were males. Mean total cholesterol levels among obese and non-obese subjects was 189.2 mg/dL and 159.8 mg/dL respectively. Mean triglycerides levels among obese and non-obese subjects was 159.7 mg/dL and 118.6 mg/dL respectively.Mean HDL-C levels among obese and non-obese subjects was 38.1 mg/dL and 41.9 mg/dL respectively.Mean LDL- C levels among obese and non-obese subjects were 137.3 mg/dL and 110.7 8 mg/dL respectively. While comparing the total cholesterol levels, triglyceride levels and low-density lipoproteins levels among obese and non-obese subjects, significant results were obtained.

Table 1: Demographic data

Variable	Obese group	Non-obese group	p-value
Mean age (years)	45.3	41.9	0.12
Males	63	59	0.75
Females	37	41	
Mean BMI (Kg/m^2)	32.8	24.7	0.00 (Significant)

Table 2: Comparison of lipid profile

Lipid profile (mg/dL)	Obese group	Non-obese group	p-value
Total cholesterol	189.2	159.8	0.00 (Significant)
Triglycerides	159.7	118.6	0.01 (Significant)
High density lipoproteins	38.1	41.9	0.11
Low density lipoproteins	137.3	110.7	0.03 (Significant)

DISCUSSION

Unwanted weight gain leading to overweight and obesity has become a significant driver of the global rise in chronic, non-communicable diseases and is itself now considered a chronic disease. Because of the psychological and social stigmata that accompany developing overweight and obesity, those affected by these conditions are also vulnerable to discrimination in their personal and work lives, low self-esteem, and depression. These medical and psychological sequelae of obesity contribute to a major share of health-care expenditures and generate additional economic costs through loss of worker productivity, increased disability, and premature loss of life.[7-9]

The World Health Organization (WHO) defines overweight and obesity as abnormal or excessive fat accumulation that presents a risk to health (WHO, 2016a). A body mass index (BMI) ≥25 kg/m^2 is generally considered overweight, while obesity is considered to be a BMI ≥ 30 kg/m^2. It is well known that obesity and overweight are a growing problem globally with high rates in both developed and developing countries.[10-12]Obesity is associated with social and medical risks that specially make it a problem. The importance of obesity in the prediction of cardiovascular disease has been the subject of long-standing debate. Direct correlation between plasma triglycerides and body weight have been noticed.[6]Hence; the present study was conducted for comparing the lipid profile among obese and non-obese subjects.

Mean age of the obese and non-obese subjects was 45.3 years and 41.9 years respectively. Majority proportion of the subjects of both obese group and non-obese group were males. Mean total cholesterol levels among obese and non-obese subjects was 189.2 mg/dL and 159.8 mg/dL respectively. Mean triglycerides levels among obese and non-obese subjects was 159.7 mg/dL and 118.6 mg/dL respectively.In a similar study conducted by Bhatti MS et al, authors evaluated lipid profile in obese subjects. Fifty adult subjects who were obese (body mass index > 25 Kg/m) and non smokers were selected along with thirty non obese non smokers as controls. Lipid profile was studied including total lipids, total cholesterol, HDL, LDL, VLDL and chylomicrons. Various ratios like LDL/HDL, VLDL/HDL, TG/HDL and TC/HDL ratios were calculated to find the risk of atherosclerosis and coronary heart disease.All the parameters except serum HDL level showed significant increase in obese persons while HDL level was significantly decreased.[13]

In the present study, mean HDL-C levels among obese and non-obese subjects was 38.1 mg/dL and 41.9 mg/dL respectively.Mean LDL- C levels among obese and non-obese subjects were 137.3 mg/dL and 110.7 8 mg/dL respectively. While comparing the total cholesterol levels, triglyceride levels and low-density

lipoproteins levels among obese and non-obese subjects, significant results were obtained.HDL metabolism is also strongly affected by obesity because of the increased number of remnants of chylomicrons and VLDL together with impaired lipolysis. The increased number of TG-rich lipoproteins results in increased CETP activity, which exchanges cholesterolesters from HDL for TG from VLDL and LDL. Moreover, lipolysis of these TG-rich HDL occurs by hepatic lipase resulting in small HDL with a reduced affinity for apo A-I, which leads to dissociation of apo A-I from HDL. This will ultimately lead to lower levels of HDL-C and a reduction in circulating HDL particles with impairment of reversed cholesterol transport.[14, 15]Szczygielska A et al, in a similar study, assesed the relationship between BMI (body mass index) and blood lipids in the population of 83 peoplewho spontaneously applied for medical examination performed as student research. Mean total cholesterol and triglycerides concentrations were higher in obese persons in comparison to normal weight subjects and HDL cholesterol concentration was lower in obese subjects as compared to normal and overweight individuals. Differences in mean concentrations of LDL cholesterol were not significant. A linear correlation between the degree of obesity and plasma level of LDL cholesterol and triglycerides was shown.[16] The prevalence of overweight and obesity, plasma lipid profile and atherogenic indices as markers for CVD was assessed in a study conducted by Ugwuja E et al. Male subjects were found to have more favorable plasma lipid profile than the females. Plasma lipids were positively correlated with BMI and artherogenic indices, except for HDL-C, which was negatively correlated with artherogenic indices and LDL-C but positively correlated with BMI.The findings show subjects with higher BMI and advanced in age, exhibited unfavorable plasma lipids and social habits with a low level of physical activity, which may predispose them to CVD.[17]

CONCLUSION

From the above results, the authors conclude that obesity is accompanied by unfavorable blood lipids patterns.

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