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EVALUATION OF LIPID PROFILE LEVEL AMONG HEALTHY SUBJECTS AND THEIR RELATION WITH OBESITY

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ABSTRACT

background and Aim: The rising prevalence of obesity in India has a direct correlation with the increasing prevalence of obesity-related co-morbidities; hypertension, the metabolic syndrome, dyslipidemia, type 2 diabetes mellitus (T2DM), and cardiovascular disease (CVD). The present study was conducted to assess lipid profile level among healthy subjects and their relation with obesity. **Material and Methods:** The present study was conducted in department of Medicine. It comprised of 300 healthy subjects of both gender. General information such as name, age, gender etc. was recorded. In all subjects, height, weight and BMI were calculated. Their total cholesterol, triglycerides, low density lipoproteins, high density lipoproteins and very low density lipoproteins was studied. **Results:** Mean cholesterol in males was 181.5 mg/dl and in females was 166.4 mg/dl, HDL was 40.8 mg/dl in males and 51.1 mg/dl in females, LDL was 111.5 mg/dl in males and 99.1 mg/dl in females, VLDL was 23.5 mg/dl in males and 22.3 mg/dl in females. The difference was significant (P< 0.05). There was significant higher level of lipid profile in obese subjects as compared to healthy subjects. The difference among males and females was significant (P< 0.05). **Conclusion:** Obesity is associated with lipid disturbances, especially with HDL-C reduction as compared to healthy subjects. Health education and more preventive measures should decrease the prevalence of obesity and cardiac risks by modifying their lifestyle.

KEYWORDS: Cardiovascular disease, Cholesterol, High Density Lipoproteins, Obesity.

INTRODUCTION

In India, obesity is emerging as an important health problem particularly in urban areas.[1] The prevalence of obesity is rising to epidemic proportions at an alarming rate in both developed and less developed countries around the world.[2]

Almost 30-65% of adult urban Indians is either overweight or obese or has abdominal obesity. The rising prevalence of obesity in India has a direct correlation with the increasing prevalence of obesity-related co-morbidities; hypertension, the metabolic syndrome, dyslipidemia, type 2 diabetes mellitus (T2DM), and cardiovascular disease (CVD).[1]

Obesity is now estimated to be the second leading cause of mortality and morbidity, causing an estimated 2.6 million deaths worldwide and 2.3% of the global burden of disease.[3] There is an overall consensus that obesity poses a significant risk for the development of cardiovascular disease, alterations in glucose metabolism and reduces life expectancy.[4] Lipids and lipoproteins are well known risk factors for ischemic heart disease. Elevated levels of triglyceride, cholesterol and LDL-C

are documented as risk factors for atherogenesis.[5] LDL-C in its oxidized or acetylated form has been identified as a major atherogenic particle, as it not only load macrophages with cholesterol for the formation of foam cells but also because it is chemotactic for circulating monocytes, is cytotoxic and can adversely alter coagulation pathways.[6-8] The blood level of HDL-C in contrast bears an inverse relationship of the risk of atherosclerosis and coronary heart disease that is higher the level, smaller the risk.[9-10]

Almost 30-65% of adult urban Indians is either overweight or obese or have abdominal obesity. The rising prevalence of obesity in India has a direct correlation with the increasing prevalence of obesity-related co-morbidities; hypertension, the metabolic syndrome, dyslipidemia, type 2 diabetes mellitus (T2DM), and cardiovascular disease (CVD).[1]

Results of the some recently published studies suggest that WHtR (waist-to-height ratio), the newer obesity index, may be helpful for assessing risk of metabolic complications, including dyslipidemia, and it may also be a predictor of cardiovascular events in obese

patients.[11-14] Nevertheless, there is little data about the associations between other newer obesity indices and lipid profile in obese patients. The present study was conducted to assess lipid profile level among healthy subjects and their relation with obesity.

MATERIALS AND METHODS
The present study was conducted in department of Medicine. It comprised of 300 healthy subjects of both gender. All patients were informed and written consent was taken. The approval was obtained from institutional ethical committee.

Inclusion criteria: 1. who were willing to take part in this programme 2. Who could stand up for measurement of height and weight. Exclusion criteria: previously diagnosed with diabetes, hypertension or Dyslipidemia with and without treatment.
General information such as name, age, gender etc. was recorded. In all subjects, height, weight and BMI were calculated. Their total cholesterol, triglycerides, low density lipoproteins, high density lipoproteins and very low density lipoproteins was studied.

Statistical analysis
The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

RESULTS
Out of 300 subjects, there were 205 males and 95 females.(Table 1) Mean cholesterol in males was 181.5 mg/dl and in females was 166.4 mg/dl, HDL was 40.8 mg/dl in males and 51.1 mg/dl in females, LDL was 111.5 mg/dl in males and 99.1 mg/dl in females, VLDL was 23.5 mg/dl in males and 22.3 mg/dl in females. (Table 2) The difference was significant (P< 0.05). Out of 300 subjects, there were 39 obese subjects. There was significant higher level of lipid profile in obese subjects as compared to healthy subjects. The difference among males and females was significant (P< 0.05)

Table 1: Distribution of study participants according to Gender.

Gender	Number	Percentage
Male	205	68.3
Female	95	31.6

Table 2: Assessment of Lipid Profile

Lipid (Mean)	Male	Female	P value
Cholesterol	181.5	166.4	0.02*
HDL	40.8	51.1	0.03*
LDL	111.5	99.1	0.05*
VLDL	23.5	22.3	0.5

*indicates statistically significance at p≤0.05

DISCUSSION
Dyslipidemia is a group of disorders associated with deranged plasma lipids and lipoprotein levels. It is the most important risk factor responsible for the genesis of atherosclerosis leading to coronary heart disease, cerebral vascular disease and peripheral vascular disease. Lipid disorders are prevalent in the world. Some of their risk factors are modifiable such as mental and physical stresses. The main etiology of lipid disorders is genetic factor and family history that is not changeable. In recent decade researchers have worked on risk factors for lipid disorders.[5] Hypertriglyceridemia, hypercholesterolemia, and related lipid disorders are very common, their prevalence are between 20% and 50% in different populations. Dyslipidemia, the main pathological factor in atherosclerosis, led to a number of interventional trials worldwide. Earlier the Lipid Research Clinics Coronary Prevention Trial Result I (LRC-CPPT) 1984 provided strong evidence for a casual role of the lipids in the pathogenesis of CHD.[6]

Lipoproteins are mainly responsible for the transfer of cholesterol esters and triglycerides from the site of synthesis to the site of utilization.[7] These are classified according to their protein to lipid ratio and resultant density. Four major types of lipoproteins are chylomicrons comprising mainly triglycerides, very low density lipoproteins (VLDL) comprising mainly triglycerides, low density lipoproteins (LDL) which are the major cholesterol containing lipoproteins, high density lipoproteins (HDL) which are integral to reverse cholesterol transport.[8] The present study was conducted to assess lipid profile level among healthy subjects and their relation with obesity.

Being overweight or obese can lead to adverse metabolic effects on, cholesterol and triglycerides.[15] Free fatty acids (FFA) are released in abundance from adipose tissue mass. As a consequence, FFA increases the liver production of TG and secretion of VLDL. Hypertriglyceridaemia and VLDL reduce HDL cholesterol. Circulating FFA, may contribute to the induction of hypertension.[16]

In this study, out of 300 subjects, there were 205 males and 95 females. Mean cholesterol in males was 181.5 mg/dl and in females was 166.4 mg/dl, HDL was 40.8 mg/dl in males and 51.1 mg/dl in females, LDL was 111.5 mg/dl in males and 99.1 mg/dl in females, VLDL was 23.5 mg/dl in males and 22.3 mg/dl in females. Djindjić et al[17] in their study, fasting samples of 914 subjects from healthy population were analyzed for total cholesterol, triglyceride and three major fractions of lipoproteins i.e. high-density lipoprotein cholesterol, low lipoprotein cholesterol and very low-density lipoprotein cholesterol. The values obtained were (in mg/dl) 165.7±30.2, 88.36±31.2, 44.86 ±10.68, 101.66±29.8 and 18.11±7.35 respectively. When these subjects were grouped according to the age and sex, no appropriate differences were observed between most of the groups.

Triglycerides were found to be low and HDL cholesterol was high in female when compared with male of similar age. Beyond age 40 years cholesterol level and low density lipoprotein cholesterol was found to be gradually increased in case of women.

Many available studies suggest a correlation between obesity and lipid indices. Howard et al. concluded, based on results of clinical studies, that the relationship between BMI and LDL-C serum levels is complex and depends on numerous factors such as age or sex.[18] It was demonstrated that higher LDL-C levels were seen in young (20–44 years of age) obese women, and were positively correlated with BMI.[18] The authors did not observe significant differences between patients from different obesity classes with regards to levels of HDL-C and TG. In the Strong Heart Study conducted in 773 women and 739 men of Native American origin, Hu et al. found significant negative correlation between BMI and HDL-C in women.[19] WC values were positively correlated with serum TG levels and negatively correlated with HDL-C levels, and the relation between WC and assessed lipid fraction levels in women was much stronger than in the case of BMI. In men, positive correlations were observed between BMI, WC, and TG levels, as well as a negative correlation between BMI, WC, and HDL-C levels, although, in contrast with women, the strength of correlation was comparable for both obesity parameters.[19]

There was significant higher level of lipid profile in obese subjects as compared to healthy subjects. Xu et al.[20] assessed the association between lipid responses to acute mental stress and fasting serum lipid levels 3 years later in 199 middle-aged men and women. Total cholesterol, low-density lipoprotein (LDL), and highdensity lipoprotein (HDL) cholesterol increased following moderately stressful behavioral tasks. LDL cholesterol, HDL cholesterol, and total: HDL ratio measured 3 years later were predicted by acute stress responses independent of gender, age, socioeconomic position, change in body mass, smoking, alcohol consumption, or hormone replacement therapy baseline lipid levels.

CONCLUSION
Obesity is associated with lipid disturbances, especially with HDL-C reduction as compared to healthy subjects. Health education and more preventive measures should decrease the prevalence of obesity and cardiac risks by modifying their lifestyle.

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