

Comparative Study of Lipid Profile with Body Mass Index in young Healthy Medical Students

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Abstract

Background: This study was conducted to determine the association between s serum lipids among the three BMI groups (underweight, normal and overweight) in healthy young males and females admitted in a private medical college.

Methods: This cross sectional study was conducted over a period of 4 months (2017) on a sample of 127 conveniently selected medical students between 17-20 years of age, comprising of first year undergraduates in Mahavir medical college and hospital Vikarabad

Results: The total participants were 127 healthy young students males and females admitted in a private medical college Based on the value of BMI, subjects were classified as underweight (BMI < 19 kg/m²), normal weight (BMI 19–26 kg/m²), Overweight (BMI>26kg/m²) Mean serum cholesterol in 127 students was 158.57 ± 26 mg/dl, mean LDL-C was 92.64 ±25.9 mg/dl, mean HDL-C was 16.43±4.93 mg/dl and mean triglycerides were 82.18 ±24.7 mg/dl. The mean BMI of students was 21.1 kg/m² ±4.1. Among 127 students, 33 were underweight that is their BMI was less than 19 kg/m², 68 were normal that is their BMI was between 19 kg/m² and 26 kg/m² and 26 were overweight that is their BMI was more than 26Kg/m². There were No significant correlation was found between any of the lipid profile variables with BMI.

Conclusion: It was found in our study that high percentage prevalence of overweight is the major driving forces in the development of diabetes mellitus and metabolic syndrome.

We concluded from this study that obesity in significant number of young medical student population. This prevalence may be due to lack of awareness and unhealthy lifestyles, so health education and more preventive measures should decrease the prevalence of obesity and cardiac risks in our medical college by modifying their lifestyle.

Keywords: Body Mass Index, Lipid Profile, Healthy medical students.

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 are 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]

Obesity is defined as an excess accumulation of fat in the body resulting in adverse effects on health of the individual. [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]

In recent years, BMI has become the medical standard used to measure over weight and obesity. This is a measure of how appropriate person's weight is for his/her height [11]. BMI was calculated as weight in kilograms divided by height in meters squared as indicated by the World Health Organization [12]. Association of lipid profiles with obesity and BMI has been reported [13,14]. Waist circumference is increasingly being accepted as the best anthropometric indicator of abdominal adiposity and metabolic risk [15]. There is limited published data about the association of body mass index

(BMI) with lipid profile among healthy medical students.

Aim: The aim of this study was to determine the association between s serum lipids among the three BMI groups (underweight, normal and overweight) in healthy young males and females admitted in a private medical college.

MATERIALS AND METHODS

This cross sectional study was conducted over a period of 4 months (2017) on a sample of 127 conveniently selected medical students between 17-20 years of age, comprising of first year undergraduates in Mahavir medical college and hospital Vikarabad

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.

Data collection procedure: The following parameters are measured for all the study subjects anthropometric, and lipid profile.

Anthropometric: Body mass index (BMI) was calculated as weight in kilograms divided by height in squared meters as indicated by the World Health Organization [16]. Height was measured using the height meter and Weight with standardized scale. BMI between 25 -29.9 is overweight and 30.0 or higher is obese according to Centre for Disease Control and Prevention and WHO [17]

Laboratory investigations: Blood samples were collected from the antecubital vein, in the early morning, after a minimum of 12 hours of fasting period, in a supine position. Biochemical analysis Serum cholesterol, (TC) triglycerides (TG), Serum high density lipoprotein (HDL) were measured by International Federation of clinical chemistry (IFCC) approved enzymatic methods processed Autoanalyzer Erba- 200, reagents and calibrators were used for the analysis at Mahavir medical college hospital laboratory, Vikarabad. VLDL and LDL were calculated using the formula.

Statistical analysis

Statistical analysis was performed with the SPSS version 20. The differences between groups were compared using one-way analysis of variance (ANOVA). The statistical significance was set at the P value of less than 0.05.

Ethical Considerations

The study was approved by the ethics committee of Mahavir Institute of Medical Sciences (MIMS). We obtained a written informed consent from all study subjects before enrolling them in the study. Confidentiality of data was preserved.

RESULTS

The total participants were 127 healthy young students males and females admitted in a private medical college Based on the value of BMI, subjects were classified as underweight (BMI < 19 kg/m²), normal weight (BMI 19–26 kg/m²), Overweight

(BMI>26kg/m²)

Mean serum cholesterol in 127 students was 158.57 ± 26 mg/dl, mean LDL-C was 92.64 ±25.9 mg/dl, mean HDL-C was 16.43±4.93 mg/dl and mean triglycerides were 82.18 ±24.7 mg/dl.

The mean BMI of students was 21.1 kg/m² ±4.1. Among 127 students, 33 were underweight that is their BMI was less than 19 kg/m², 68 were normal that is their BMI was between 19 kg/m² and 26 kg/m² and 26 were overweight that is their BMI was more than 26Kg/m². Mean values of serum cholesterol, LDL-C, HDL-C, triglycerides; VLDL and Triglycerides with their standard deviations according to three BMI groups are given in table-1. There were No significant correlation was found between any of the lipid profile variables with BMI.

Table-1: Cholesterol, LDL-C, HDL-C, triglycerides, according to three BMI groups (Mean ±SD)

Variables	Under weight (BMI<19kg/m ²)	Normal (BMI19- 26kg/m ²)	Overweight (BMI>26kg/m ²)	p- value*
Cholesterol (mg/dl)	153.83 ±21.9	158.57 ±26.1	156.91 ±21.5	0.37
LDL (mg/dl)	86.91 ±20.9	92.64 ±25.9	90.23 ±21.4	0.53
VLDL (mg/dl)	15.43±3.68	16.43±4.93	17.24±5.8	0.06
Triglycerides (mg/dl)	77.2 ±18.4	82.18 ±24.7	86.2 ±29.14	0.06
HDL-C (mg/dl)	51.48 ±5.6	49.5 ±5.1	49.43 ±4.5	0.54

*p-value calculated by ANOVA comparing the means of the variables for the three BMI groups P<0,05 Considered Significant

DISCUSSION

In this study, comparison of three BMI groups (underweight, normal and overweight) with regards to serum total cholesterol, LDL-C, HDL-C, triglycerides, and VLDL were examined.

We found no significant difference in serum total cholesterol (P=0.37), LDL-C (P=0.53) triglycerides (P=0.06) and HDL-C, (P=0.54) in three BMI groups. Findings of our study are consistent with the previous studies [18 19 20].

Being overweight or obese can lead to adverse metabolic effects on, cholesterol and triglycerides [21]. 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 [22]. Circulating FFA, may contribute to the induction of hypertension [22].

These findings can be explained by the results of certain studies that showed that hyperinsulinemia and insulin resistance are strongly correlated with obesity.[23-26]

It has been estimated that risk of myocardial infarction is 35% to 55% less in adults and normal weight as compared to obese adults.[27] However, the influence of obesity on cardiovascular risk begins before adulthood and overweight during adolescence is associated with an increased risk of coronary heart disease in male and female subjects. [28] As 20% students of our total study population are overweight, so number of at-risk individuals is much higher. Therefore, strategies designed to limit cardiovascular risk should address weight reduction during childhood and adolescence.

CONCLUSION

It was found that high percentage prevalence of overweight is the major driving forces in the development of diabetes mellitus and metabolic syndrome.

We concluded from this study that obesity in significant number of young medical student population. This prevalence may be due to lack of awareness and unhealthy lifestyles, so health education and more preventive measures should decrease the prevalence of obesity and cardiac risks in our medical college by modifying their lifestyle.

From our study we have drawn the following suggestions, to decrease the prevalence of diabetes mellitus metabolic syndrome and cardiovascular disorders.

Initially, Identifying students who are gaining weight, overweight or obese, is a first step in preventing and treating overweight by interventions,

“We recommend to governments to create environments that allow for lifestyle changes. This will require a coordinated approach across all sectors including health, education, sports and agriculture, but it is the only way we can curb the burden of type 2 diabetes and cardiovascular disease.”

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CONFLICT OF INTEREST: Authors have declared that no competing interest exists.

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