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Research Article

Altered high density lipoprotein (HDL), triglyceride (TG) and anthropometric measurements in normal, overweight and obese under graduate medical students

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ABSTRACT

Background: Obesity has reached epidemic proportions in India, affecting 5% of the country's population. Urbanization and modernization has been associated with obesity in population of younger generation. The aim of the study was to find out variation in metabolic indicators (HDL, TG and anthropometric measurements) of normal overweight and obese undergraduate medical students.
Methods: Total of 194 students took part in this study. Their height, weight and waist circumference were measured by standard methods. Their serum was estimated for HDL, TG and, fasting sugar on fully automatic Vitros 250 dry chemistry analyser from Orthoclinical diagnostics from Johnson & Johnson USA.
Results: Over all females students were more overweight (Females 16% and Males 8%) and obese (F 18%, M 9%) as compared to males. Blood pressure, weight, waist circumference, HDL, and TG levels were more in overweight and obese group as compared to normal group.
Conclusion: The results of the current study have shown an increasing trend of obesity and derangement of metabolic indicators among under graduate medical students.

Keywords: High density lipoprotein, Triglyceride, Obesity, Metabolic syndrome

INTRODUCTION

Obesity has reached epidemic proportions in India in the 21st century, with morbid obesity affecting 5% of the country's population.[1] Urbanization and modernization has been associated with obesity.[2] In Northern India obesity was most prevalent in urban populations (Males 5.5%, Females 12.6%), followed by urban slums (Males 1.6%, Females 3.8%).[2] Socioeconomic class also had an effect on the rate of obesity. Women of high socioeconomic class had rates of 10.4% as opposed to 0.9% in women of low socioeconomic class.[3]

Obesity is a state of excess adipose tissue mass. It is gauged by Body Mass Index (BMI) which is equal to weight upon height square (in Kg/m^2)[4] and further evaluated in terms of fat distribution by measuring the Waist Circumference (WC) and total cardiovascular risk factors.[5] BMI is closely related to both percentage body fat and total body fat.[6] In children, a healthy weight varies with age and sex. Obesity in children and adolescent is defined as an absolute no in relation to historical normal group, such that obesity is a BMI >95th percentile.[7] The reference data on which these percentiles were based dated from 1963 to 1994, and thus have not been affected by the recent increase in weight.[8] With people moving into urban centres and wealth increasing, concerns about an obesity epidemic in India are growing. So the study was conducted on under graduate medical college students to observe the changes in metabolic indicators.

Table 1: Classification of BMI according to WHO.

BMI (Kg/m^2)	Classification[9]
<18.5	Underweight
18.6-24.99	Normal weight
25-29.9	Overweight
30-34.99	Class I
35-39.99	Class II
>40	Class III

METHODS

Current study was conducted on 194 undergraduate medical students of Subharti medical college, Meerut in the year 2013-2014.

The students were informed about the significance of study and its outcome. A written consent was obtained from all of the students.

All participants were subjected to anthropometric measurements including height, weight and abdominal circumference and their fasting blood sugar, High Density Lipoprotein (HDL) and triglycerides (TGs). Anthropometric measurements were done by standard procedures.

Fasting blood sugar, HDL, and TGs were estimated by Vitros 250 fully automatic analyser using readymade dry chemistry kits from Orthoclinical diagnostics, Johnson and Johnson, USA.

Data was analysed by unpaired student t test. Values were given as Mean ± SD. P value of <0.001 was considered as significant.

RESULTS

The mean age of undergraduate medical students selected in our study was 20.6 ± 2.1 year. According to BMI we have divided them into three groups, normal, overweight and obese. Out of 194 students 92 were found to be normal, 48 were overweight and obese.

Table 2 compares the distribution of males and females according to BMI values. Among the males 29% were normal, 8% were overweight and 9% were obese. In case of females 17% were normal, 16% were overweight and 18% were obese. Overall females were more overweight and obese as compared to males.

Data of anthropometric parameters are summarized in Table 3 which indicates that mean ± SD values of WC and weight were significantly higher (P <0.001) in overweight and obese as compared to normal group. There was a direct proportional relationship of BMI to WC and weight (P <0.001).

The values of metabolic indicators among normal, overweight and obese group are compared in Table 4. BP, HDL and TG were significantly altered in overweight and obese as compared to normal group. There was no significant alteration in blood sugar levels and its values were within the normal range in all the three groups.

Table 2: Distribution of sex according to BMI values.

	Male	Female
Normal	58 (29%)	34 (17%)
Overweight	16 (8%)	32 (16%)
Obese	19 (9%)	35 (18%)

Table 3: Anthropometric measurements in normal, overweight and obese students.

	Normal (BMI- 18.6-24.9)	Overweight (BMI-25-29.9)	Obese (BMI- >30)	P value
No. of students	92	48	54	
Waist circumference	80.57 ± 9.4	91.71 ± 18.4	95.26 ± 18.2	P <0.001
Weight	58.31 ± 7.8	72.83 ± 6.4	87.94 ± 13.2	P <0.001

Table 4: Metabolic indicators in normal, overweight and obese student.

	Normal	Overweight	Obese	P value
Systolic BP	117.12 ± 13.3	125.37 ± 17.3	132.52 ± 10.9	P <0.001
Diastolic BP	81.25 ± 7.8	86.72 ± 8.8	88.68 ± 11.1	P <0.001
Fasting sugar	69.51 ± 8.3	71.84 ± 11.9	73.56 ± 12.5	P <0.001
HDL	51.2 ± 15.9	44.96 ± 9.4	41.54 ± 9.4	P <0.001
TG	81.87 ± 29.3	84.63 ± 12.6	118.6 ± 37.1	P <0.001

DISCUSSION

Many studies have shown an increased alteration in lipid profile and anthropometric parameters among the medical students which can be suggestive of risk factors for metabolic syndrome leading to diabetes and hypertension. Further many studies have shown an increase in the incidences of cardiovascular disorders worldwide especially in developing countries due to altered lipid profile and abnormal anthropometric parameters.[10-12] Anthropometric variables also have been extensively been shown to predict cardiovascular risk.[13] Some of the studies have also shown a considerable prevalence of overweight and obesity, particularly in females, among university students.

In the study done by Silva JCS et al.[14] BMI showed a directly proportional relationship with serum total cholesterol and LDL-c levels. The greater the BMI value, greater the prevalence of higher than desired values for these parameters, which indicates the importance of this simple and in expensive anthropometric evaluation.

According to Ogus E et al.[15] as the body weight increases, so does the risk of metabolic syndrome. Considering the interaction between gender and weight, males over 80 kg are at higher risk of metabolic syndrome than females. Similar to our study significant finding were also observed in a study conducted by Rashidi et al.[16] in Iran, who reported that metabolic students are at risk of developing metabolic syndrome.

Huang et al.[17] reported that being overweight increases the risk for experiencing at least one component of the metabolic syndrome by approximately three fold among US college students with an average age of 22.2 ± 1.7 years.

Koziarska et al.[18] evaluated that young men (mean age 24.9 ± 2.6) are at greater risk than women (mean age 24.2 ± 2.5) among the young students in Poland, where as this tendency is reversed in elderly people.

Another study presented at the 2009 World Congress on Public Health[19] found that the percentage of the students of the Universidad Juarez Autonoma de Tebasco, Mexico have metabolic syndrome due to risk factors during the earlier years and men had more risk factors than the women in this university.

CONCLUSION

The results of the current study have shown an increased trend of obesity and derangement of metabolic indicators among undergraduate medical students. One of the causative factors could be excessive use of electronic gadgets by our younger generation which spent most of their time on television, mobiles and computer, so there is lack of physical activity and increase in sedentary life style leading to risk of cardiovascular disorders, diabetes and metabolic syndrome. Some of the metabolic indicators can be modified by change in lifestyle pattern and indulgence in physical activity. Some of the educational programme should be based on the holistic approach which includes dietary modification, practicing yoga and meditation.

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Ethical approval: The study was approved by the institutional ethics committee

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