Original Article

BMI – Cholestrol & Sugar

Correlation of BMI with Cholesterol and Sugar in Adults

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ABSTRACT

Objective: This study was aimed to find the correlation of BMI with cholesterol and sugar level in adult

Place and Duration of Study: This study was carried out in Department of Medicine, Combined Military Hospital (CMH) Quita from 2006 to 2009.

Study Design: Prospective observational cross sectional studies

Materials and Methods: Individuals with different ages, sex were selected as study population. The cholesterol and fasting blood sugar were measured according to standard protocol. Height in centimeter and weight in kilograms of each individual was recorded and BMI calculated as kg/m^2. Physical examination was done for everybody. The SPSS-20 was used for statistical significant analysis. The frequencies of variable and correlation between BMI, heights, weight, sugar and cholesterol were comprehensively analyzed.

Results: A total of 2,174 adults, 1,947 (89.56%) male and 227 (10.44%) female were included in study. Age range was between 20 and 55years.The mean age was 38.47±12.66. Mean BMI was 23.57±2.58.Mean cholesterol was4.57±.60. Mean fasting blood sugar (FBS) was 4.67±.75.Mean weight 70.32±9.1 Mean height 172.73±.7.85.The correlation analysis revealed that weight, fasting blood sugar (FBS) and cholesterol had positive correlation with BMI [correlation coefficient of 0.734 (p<0.000), 0.167(p<0.000), 0.164 (p<0.000) respectively and height had negative correlation with BMI [-0.123 (p<0.000).

Conclusion: BMI is positively correlated with weight, RBS and cholesterol. The effect of age, sex, exercise and current medical status, this correlation is reduced.

Key Words: Body Mass Index, blood sugar, Cholesterol, Obesity

INTRODUCTION

High BMI has been associated with great morbidity and mortality worldwide.[1-2]The obesity is hazardous health problems. Overweight is defined as BMI of 25 to 29.9kg/m2 and obesity as a BMI of >30kg/m2. The mortality increases with increase prevalence of obesity[3].The overweight and Obesity have significant association with hypercholesterolemia and adults diabetes mellitus (DM)[4-5].Lipid metabolism is also adversely affected in obesity. The prevalence of these risk factors substantially increases with increasing BMI. Overweight and obesity are also known to be independent risk factor for atherosclerotic cardiovascular risk disease in adults[6] .Increased body weight is a major risk factor for the metabolic syndrome as well as coronary heart disease (CAD). Many studies have demonstrated that individuals with metabolic syndrome are at high risk for subsequent development of non insulin dependent diabetes mellitus (NIDDM). [7-9] .The Higher BMI and impaired glucose tolerance is prevalent in children and adolescents .The relationship between BMI, glucose and lipids have been studied earlier[11-14].The aim of the present study was to investigate the relationship of BMI with atherosclerotic cardiovascular risk factors like serum cholesterol and glucose level in adult population.

MATERIALS AND METHODS

This study was aimed to find association of BMI with blood sugars and cholesterol in adults. The data was collected during 2006 and 2009 by the team of expert doctors. This cohort population studied was belonging to same professional groups and socioeconomic class. The data regarding the name, gender, marital status, nature of job, smoking, medical and drug history was obtained, entered and analyzed in SPSSS 20. . Height and body weight were measured by anthropometry. Body Mass Index (BMI) was determined as weight divided by height squared (Kg/m2). BMI was divided into three groups 1:≤24.9, group 2: 25–29.9, and group 3: ≥30 as normal, overweight and obesity and assigned different categories. Fasting blood glucose and total cholesterol of each individual was measured. Frequency of variables calculated.

Quantitative data was expressed as Mean ±SD and comparison between genders analyzed by independent sample *t*-test. The comparisons of BMI groups were accomplished by one way ANOVA. Pearson's correlation coefficient for continuous data between BMI, weight, cholesterol, sugar and heights two tailed taken as significant at p<0.01 levels was used to show correlation between these variables.

RESULTS

A total of 2,174 individuals, 1,947 (89.56%) male and 227 (10.44%) female were examined. The mean age was 38.47±12.66. Mean BMI was 23.57±2.58. Mean cholesterol was4.57±.60. Mean fasting blood sugar (FBS) was 4.67±.75.Mean weight 70.32±9.1 Mean height 172.73±.7.85. Comparison of these parameters between males and females showed that BMI, weight, sugar and cholesterol were significantly higher in male but height though higher but statistically insignificant (Table-1). Overweight individuals had significantly higher level of FBS and cholesterol than individuals of normal weight (Table -2). Our correlation analysis revealed that weight, fasting blood sugar (FBS) and cholesterol had positive correlation with BMI [correlation coefficient of 0.734 (p<0.000), 0.167(p<0.000), 0.164 (p<0.000) respectively and height had negative correlation with BMI [-.123 (p<0.000). Table 2.

Table No.1: Gender Distribution of Cardiovascular Factors (Height, Weight, FBS and Cholesterol)

Parameters	Male n=1947	Female n=227	p-value
BMI	23.66±2.66	22.58±3.38	0.000
Height	174.28±6.88	159.50±6.88	0.950
Weight	71.82±7.84	57.49±9.60	0.000
Sugar	4.75±0.89	4.44±0.75	0.035
Cholesterol	4.57±0.61	4.51±0.53	0.039

Independent sample t-test for comparing means

Table No.2: Correlation between BMI, Height, Weight and Cholesterol (Correlation Coefficient (p)

	BMI	Height	Weight	Sugar	Cholesterol
BMI	1				
Height	-.123 (0.000)	1			
Weight	.734 (0.000)	0.578 (0.000)	1		
Sugar	.167 (0.000)	0-.038 (0.076)	0112 (0.000)	1	
Cholesterol	.164 (0.000)	0-.024 (0.272)	0.115 (0.000)	0.172 (0.000)	1

Correlation is significant at the 0.01 level (2-tailed

DISCUSSION

Overweight and obesity lead many complications including diabetes mellitus, dyslipidemia and CAD[15]. Most of the studies on CAD risk factors have been done in developed county[16-17]. The higher BMI increases these CAD risk factors[18]. In our study high BMI groups have significant statistical association with overweight and Obesity. These results have been demonstrated with many previous studies[19-20] .Our study showed cholesterol, and Fasting blood glucose level have positive correlation with BMI as reported in developing and developed population[21,22]. Differences have been reported in India and other studies [23,24].High BMI has predisposition to CVD in either sex[25]. In our study correlation of mean cholesterol and fasting blood glucose with BMI is statistical significant.

Limitations in our study was not direct measurement of body fat by using CT and MRI[26].Others limitations were non utilities of parameters like physical activities[27], dietary habits[28], level of education with smoking[29], and not measuring of visceral fats by utilization of waist and waist hip ratio[30,31]. Mean age in our study is actually representative of adult population. Our population compromising of healthy individual in contrary to general population with mean BMI in our study was below mean BMI reported earlier in our country[32]. In Asian high BMI has significant association with obesity [33-34]. High BMI has also correlation with overweight which is related to high food intake, genetic makeup and lack of exercise. As matter of fact our population has great risk of obesity as observed in world. As High BMI has major impact as atherosclerosis on health and associated with CVD and stroke. Therefore BMI should be routinely checked in clinical practice and epidemiological studies should be carried out to assess the atherosclerotic related disease burden in our society in order to make guidance for our population.

CONCLUSION

BMI is positively correlated with weight, RBS and cholesterol and is negatively correlation with weight.

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