

Comparison of Blood Pressure and BMI in College Students

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Abstract

Objective:

To measure the blood pressure and BMI in 100 students of Saveetha dental collage and to find out if there is correlation between blood pressure and BMI in the subjects

Method:

This study includes measurement and statistical analysis of BMI, systolic and diastolic blood pressure in 100 BDS students of Saveetha dental college with age ranging from 17- 20 years. The study group consists of 75 females and 25 males.

Background:

BMI (body mass index) is calculated by dividing weight by square of height in meter .Blood pressure may be elevated in individuals with BMI higher than the normal. There is an increasing trend of both blood pressure and BMI in adults and youth. .Changes in the lifestyle and food habits, lack of nutritious diet, stress, lack of physical activity could increase the BMI as well as the blood pressure.

Conclusion:

There is positive correlation between systolic, diastolic blood pressure and BMI. Increased Blood pressure was seen in subjects with higher BMI when compared with subjects with lower BMI.

INTRODUCTION

BMI is defined as body mass index which is a value calculated using the height and weight of the person. BMI ranging from 18-25 is considered as normal. Obesity and overweight in the age around adolescence are the global problems on the rise especially very common in developing countries like India. Obesity is evolving as one of the major burden of India as it results in many chronic diseases [1,2]. According to the statistics, 7% people of the current population are obese [3]. Also, globally 13% of the population die due to elevated blood pressure levels and 21% of the heart diseases is said to be caused due to increased BMI [4]. Childhood obesity may result in obesity in adulthood also. Obesity leads to many diseases like hypertension, type 2 diabetes mellitus, orthopedic problems, cardiovascular problem, psychological problems and other chronic diseases [2,4,-6]. Prevention of obesity and hypertension in young age is very important to prevent major problems like cardiovascular diseases later. There is an increasing trend in both blood pressure and body mass index in the recent years. Studies on general population have demonstrated that the prevalence of hypertension in overweight subjects are more when compared to the normal subjects [2-9]. Some studies states that blood pressure does not increase in obese patients, instead high blood pressure was stated in subjects who are underweight [10]. The increase of BP and BMI in the recent years may be due to the changes in the food habits, consumption of more from fast food outlets instead of nutritious and healthy food, stress, playing video games in leisure time, increased usage of laptops and computers in leisure time, television and lack of physical exercise [2,12]. The neighborhood environment may also influence on the food habits, which leads to increased BP and BMI [11]. The prevalence of

obesity is more among urban population when compared to the rural population [13]. Population based preventive approaches should be done to manage elevated BP levels in developing countries like India. Clinic based care for blood pressure management is not a feasible option [4]. The normal blood pressure varies from each individual depending on their height, weight and body size. This study was done to find a correlation between blood pressure and BMI in college students.

BMI > 18.5	Underweight
BMI= 18.5-25	Normal
BMI= 25-29.9	Overweight
BMI < 30	Obesity

MATERIALS AND METHODS

This study comprises of 75 females and 25 males 100 in total) with age ranging from 17-20. The BMI and blood pressure was measured in the BDS students studying in Saveetha Dental College and Hospitals, Chennai, India. The systolic and diastolic blood pressure of all the subjects was measured using a Opron HEM 71133 automated blood pressure monitor. The blood pressure of the subjects was measured in the right arm of the students after a resting period of at least 10 minutes. The blood pressure was measured in sitting posture with the right arm placed on a table. Two readings of systolic and diastolic blood pressure was taken and the mean value was used for the study. The height of the subject was measured in centimeter without the shoes. While measuring the height, the subjects were made to stand facing away from the wall and heel of the foot, buttocks, shoulder and the head touching the wall. The

weight was measured using a spring balance weight machine. Weight was measured in kilograms (kg). BMI was calculated by dividing weight in kilogram by square of height in meter (kg/m²). Differences between the variables were evaluated and analyzed. The mean and standard deviation was found for age, BMI, systolic and diastolic blood pressure. Independent T test was done for BMI, systolic and diastolic blood pressure. All the analysis was performed using a SPSS software with a probability lever of p<0.05 which is considered as a statistically significant value.

RESULT

In this study the blood pressure and BMI was measured in 100 students. The average age of the subjects was 18.3±0.690. In females, the mean systolic and diastolic blood pressure was 120.05±4.918 and 70.68±6.646. The mean BMI in females was 21.1884±3.53. In males, the mean BMI was 22.85±3.2. the mean systolic and diastolic blood

pressure in males was 123.24±6.60 and 73.92±8.336. When an independent T test was done between males and females the value was found to be 2.088 for BMI (p=0.039), 2.565 for systolic (p=0.012), 1.977 for diastolic blood pressure (P=0.051). The p value of BMI, systolic and diastolic blood pressure is less than 0.05, it is considered to be statistically significant. The BMI was found to be within the normal range (18.5-25) for most of the subjects. 13% of the subjects were underweight (BMI<18). 18% of the subjects were overweight (BMI= 25-29.9) out of which 3% were obese (BMI>29.9). Most of the blood pressure was considered most of the subjects were normotensive. The subjects were considered as hypertensive when the systolic blood pressure is greater than 140 and diastolic blood pressure was greater than 90. About 5% of the subjects were hypertensive.

Table1: Mean and standard deviation of BMI, systolic and diastolic blood pressure in males, females and in total subjects

GENDER		AGE	BMI	SYSTOLIC	DIASTOLIC
F	Mean	18.36	21.1884	120.05	70.68
	N	75	75	75	75
	Std. Deviation	.690	3.53080	4.918	6.646
M	Mean	18.76	22.8540	123.24	73.92
	N	25	25	25	25
	Std. Deviation	.926	3.20814	6.604	8.336
Total	Mean	18.46	21.6048	120.85	71.49
	N	100	100	100	100
	Std. Deviation	.771	3.51268	5.529	7.201

Table2: Independent T test for BMI, systolic and diastolic blood pressure

	GENDER	N	Mean	Std. Deviation	Std. Error Mean	't'	Sig
BMI	M	25	22.8540	3.20814	.64163	2.088	0.039 p<0.05
	F	75	21.1884	3.53080	.40770		
SYSTOLIC	M	25	123.24	6.604	1.321	2.565	0.012 p<0.01
	F	75	120.05	4.918	.568		
DIASTOLIC	M	25	73.92	8.336	1.667	1.977	0.051 p<0.05
	F	75	70.68	6.646	.767		

Table3: Correlation between BMI and blood pressure

		SYSTOLIC	DIASTOLIC
BMI	Pearson Correlation (r value)	.436(**)	.404(**)
	p value	.000	.000

** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

In this study, blood pressure and body mass index of 100 individuals was measured. As shown in table 2, which shows independent T test between males and females. It shows that the mean systolic and diastolic blood pressure was found to be higher in males when compared to females. Also, the mean BMI was higher in males than females. Systolic, diastolic blood pressure and BMI of males was found to be statistically higher than females. The prevalence of hypertension and obesity is low in this study when compared to the other studies, but increased BMI was found in this age group. The major reason for the increasing trends of BMI and BP is the changes in the diet (lack of nutrition, lack of exercise [2,12]. Increased BP levels were seen in normal weight and underweight students also. But the prevalence of hypertension in normal and underweight students is very less compared to the prevalence of hypertension in obese students. Similar results were stated by Raj *et al* [2]. There is a significant correlation ($p < 0.01$) between the systolic, diastolic BP and BMI values as seen in table 3. There is a rise in the systolic and diastolic blood pressure with increase in BMI. This result is similar to various studies [2-9], but some studies states that hypertension is more prevalent in subjects who are under or normal weight when compared to then overweight subjects [10]. The rise of systolic blood pressure is more when compared to the diastolic blood pressure, but the difference is negligible. But some studies states that the rise of systolic blood pressure is more significant than the rise in diastolic blood pressure [14]. Since high BMI levels causes increased blood pressure, blood lipoprotein and lipid levels [2, 15], due to which it is a major risk factor for many chronic diseases like cardiovascular diseases. Hence, it is very important to maintain the BMI and blood pressure levels within normal range as childhood obesity and hypertension may lead to adulthood obesity and hypertension.

CONCLUSION

Correlation was found between blood pressure and BMI with a p value less than 0.05, which is considered as a statistically significant value. Both systolic and diastolic blood pressure was found to be high in patients with higher BMI when compared to the patients with low and normal BMI.

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