

Original Research Article

Correlation between Blood Pressure and Body Mass Index among University Students

Deeksha Kaushik¹, Dr. Gurjeet Kaur Chawla²

¹Student, ²Associate Professor, Department of Nutrition and Dietetics, Faculty of Applied Science, Manav Rachna International Institute of Research and Studies, Faridabad, Haryana, India

Corresponding Author: Deeksha Kaushik

ABSTRACT

Obesity is common risk factor of developing hypertension and other chronic disease, prevention of hypertension and increased BMI (kg/m^2) in young students is very important to prevent major problem of cardiovascular diseases. Change in lifestyle, lack of nutrition and lack of activity core factor of increases body mass index and blood pressure level. This study was found the relationship between blood pressure and body mass index among university students. The study included determining the body mass index and systolic(mmHg) and diastolic(mmHg) blood pressure of students were selected and Data collection was done through a questionnaire which included descriptive analysis of anthropometric measurement, medical history, core dietary factors, lifestyle pattern and physical activity level. Appropriate statistical analysis was done through SPSS 21.0 which included mean standard deviation, correlation bivariate analysis. This study shows positive significant correlation between body mass index and SBP and DBP, significant relationship with fat intake and physical activity with fairly adequate NAR 0.71 of energy and means NAR of fat 1.34 type of extra NAR. The problem of pre hypertension increases in overweight population. Their body mass index has positive strong relation with blood pressure and core dietary factor and lifestyle therefore there is an urgent need to change lifestyle pattern as well as physical activity.

Key words: Body Mass Index, Food Habits, Hypertension, Lifestyle, Nutrients adequacy ratio, physical activity.

INTRODUCTION

Blood in the arteries exerts pressure on the wall of the arteries which creates a pressure refer to as blood pressure. Systolic (mmHg) pressure is maximum during one heartbeat over diastolic pressure is minimum in between two heartbeat. ⁽¹⁾ When heart rate increase blood vessels in large and allowing more blood to flow into the tissues which is positive this phenomena in such during exercise which increase blood to muscles as certain hormones also facilitated this process. When your exercise, your heart speed up so more blood can reach your muscles consists of sympathetic action

that affect heart rate, BP, body balance the hormones cause physiological alteration and heart start to pump faster in order to supply the muscles with the large supply of oxygen. ⁽¹⁾ In developing countries obesity and overweight are usually rising factor of disease, in India obesity developing many chronic problems. ⁽²⁾ All studies shows that body mass index is straight relation with diabetes and chronic diseases ⁽³⁾ High body mass index with increase adipose tissue and promote increase number of factor like leptin and angiotensinogen it's cause hypertension including cardiovascular disease. ⁽⁴⁾ body weight according to the

height often used as alternative to measure of adipose tissue mass in assessment of individual person for obesity. Quetelet's index is more applicable in which body weight in kilogram divided by height in meter square ⁽⁵⁾. In the age group of 18-25 year is essential for physically, mentally and emotionally this period is starting of adulthood and is highly effect to the risk factor for obesity related diseases and hypertension. ⁽¹⁰⁾ The prevalence of overweight increased because obesity is major cause of mortality and morbidity according to global burdens of disease 2.3% death cause obesity and 2.6 million deaths worldwide. ⁽⁶⁾

Obesity is most common risk factor of developing hypertension. Globally increased BMI leads to 13 percent and 21 percent of population suffering from developed blood pressure and heart disease, all the following disease like diabetes, osteoporosis problem and other chronic diseases are caused due to obesity. ⁽⁷⁾ In India due to inadequate life style and lack of knowledge many student are now suffering from high blood pressure. Hypertension creates the excessive financial burden on population. ⁽⁸⁾ According to recent studies increase BP and BMI may be due to the change in lifestyle, more consumption of fast food, rather than nutritious and healthy meal. Increasing blood pressure and weight with the lifestyle changes for example stress, inadequate nutritious diet lack of physical activity and society environment also influence on the food habits. The inadequate life style for consumption of drugs and alcohol, smoking also a big reason of hypertension. ^(6,7) In the age group of 18-25 year is essential for physically, mentally and emotionally this period is starting of adulthood and is highly effect to the risk factor for obesity related diseases and hypertension. ⁽²⁾ So, in the present study focus on that age group and control hypertension and weight measurement and prevention of other chronic disease. This was form an early warning for student who will be avoided to change their lifestyle so

that their blood pressure is under control, this study focusing on relation and factors affecting on blood pressure and body mass index. For example food frequency knowledge, lifestyle pattern, physical activity level, food habits and 24hour dietary recall use to identify amount of food consumption and nutrition adequacy ratio of individual youth.

MATERIALS AND METHODS

The study was composed of 100 respondents for 50 male and 50 female with 18-25 age (in year) group selected randomly. Interview schedule was prepared with the help of questionnaire, which composed of anthropometric measurement, medical history, physical activity, lifestyle pattern and 24 hour dietary recall.

DEMOGRAPHIC PROFILE

Individual population information of their age, educational status, family income and food habits. Before starting actual anthropometric measurements, subjects were asked to provide demographic information.

ANTHROPOMETRICAL PARAMETERS

Height and weight of the respondents were measured by using of standardized tools. Then Body mass index was calculated with the weight in (kilogram) divided by height in meter square ⁽⁶⁾ and determine the range according to WHO 2000 body mass index category.

Nutritional status	WHO criteria of BMI
Underweight	< 18.5
Normal	18.5- 24.9
Overweight	25.0- 29.9
Type 1 obese	30.0 - 34.9
Type 2 obese	35.0 – 39.9
Type 3 (super obese)	>40.0

For the assessment of Systolic (mmHg) and diastolic (mmHg) blood pressure was measured by automatic calibrated machine. It's measured in Millimetre of mercury (mmHg). The normal value of systolic is less than 120mmHg and diastolic less than 80mmHg. ⁽¹⁾

DIETARY ASSESSMENT

24 hour dietary recall method to determine on basis of food actually consumed by an individual per day. The dietary asked about everything to eat and drink in past 24hours and including local food of both region to identify the local fatty foods that may be cause of the condition. Food frequency to assist in cross examining the 24hour dietary recall data of the respondents.

NUTRIENT INTAKE:

The intake of nutrients was calculated taking the mean of the 24 hour intake. It was compared with the Recommended Dietary Allowances given by National Institute of Nutrition (2010)

Statistical analysis

After data collection analysis was executed through SPSS software (statistical package of social sciences) version 21.0. the data analyzed by such as percentage, mean and standard deviation. To determine the relationship with using Pearson correlation coefficient to see the significance association between the variables.

RESULT

Out of 100 subjects participates in that study, the mean age of respondents 24% were below 20year and 76% of subjects were above 20 year with 21.38±2.2282, the average BMI (kg/m²) of the total population was 24.842±4.3837 and the mean of systolic (mmHg) and diastolic (mmHg) blood pressure was 124.45±14.05 and 80.01±7.03741.

Table No.1: Mean and standard deviation of demographic profile of respondents.

Variable	Mean ± SD
Age(in year)	21.38±2.2282
Height(m)	165.373±9.51035
Weight (kg)	68.37±12.5261
BMI(kg/m ²)	24.842±4.3837
Systolic BP(mmHg)	124.45±14.05
Diastolic BP(mmHg)	80.01±7.03741

Table No.2: Association between blood pressure and body mass index.

Correlation	BMI (kg/m ²)	SYSTOLIC (mmHg)	DIASTOLIC (mmHg)
Pearson correlation	1	.470	.542
Sig (2- tailed)		.000	.000
N	100	100	100

**Correlation is significant at the 0.01 level

Table 1 depicts that p< 0.01 there was a significant correlation between systolic, diastolic and BMI.

Table No.3: Association between Body Mass index and physical activity level.

Correlation	BMI(kg/m ²)	Physical activity
Pearson correlation	1	.447
Sig (2- tailed)		.000
N	100	100

Table no. 3 depicts that p<0.05 therefore significant relationship of physical activity with Body mass index. When physical activity increase and maintain body weight.

Table No. 4 correlation between BMI and fat

Correlation	BMI(kg/m ²)	Fat
Pearson correlation	1	0.46
Sig (2- tailed)		.000
N	100	100

Table no.4 depicts that p < 0.005 therefore significant relationship of Body mass index and fat intake.

Table No. 5 correlation between blood pressure with dietary recall.

Correlation	Systolic (mmHg)	Diastolic (mmHg)	Fat	CHO
Pearson correlation	1	.552	.430	.255
Sig (2- tailed)		.000	.000	.001
N	100	100	100	100

Table depicts that SBP (mmHg) is significantly positively correlated with FAT or CHO However, DBP (mmHg) is correlated significantly with FAT whereas their value is less than 0.05, When increase fat and CHO intake its affect to the rising blood pressure level.

DISCUSSION

In the study a strong significant relationship was established between SBP (mmHg), DBP (mmHg) and BMI (kg/m²) among University students. The risk of hypertension is higher among population group with overweight and obesity, many other studies also observed similar finding the past study on obesity in Indian children and its relation with hypertension. In overweight children have mostly found hypertension there are a big need for prevention programs and aware the society

regarding hypertension and obesity and their other side effects ⁽⁶⁾

Some other report found that increasing number of diabetics and hypertension in the population according in union territory of so that made to assess prevalence of overweight and obesity in amongst school going children. ⁽⁹⁾

Recent study Data was observed that only 20% subjects were involved in BP check-up regularly.

some study on association of physical activity, blood pressure level and body mass index among youth for prevention of hypertension, to observed low and middle income countries youth population the positive impact of body mass index and blood pressure in community and their public health consequences. Risk factor like physical inactivity directly related to the body mass index and blood pressure, to suggested prevalence strategy for adult to improving and control mortality and morbidity and improves their health status. ⁽⁷⁾

Our findings also indicated that same things body mass index strongly significant with physical activity level. The greater number of students, 72% of them were have sedentary activity level and only 27% subjects were involved in daily physical activity schedule for example walking and jogging etc where as knowledge and awareness factors affecting blood pressure level or not its found that 70% were know that regular exercise maintain blood pressure level still they were not doing exercise regularly. Some other studies determine the prevalence of obesity in children and asses their nutrients intake and compare with nutrients value of India and improve their awareness. ⁽⁸⁾

Our data found that majority of subject aware about fatty food increase blood pressure level while the eating fried food regularly, there were significant relationship of BMI with fat intake and carbohydrate intake, there were similar relation with systolic and diastolic blood pressure also. According to inadequate

lifestyle large number (54%) of subjects skip their breakfast majority (44%) of subjects considered lunch as a main meal of the day but not all subjects think about breakfast as a main meal, it was the main reason for skipping breakfast which affects their health status. The data observed that most (33%) of the subjects drink more than 8 glass of water per day but rest of them consumed less than 5 glasses which was not good for the health. The mean was found similar in both male and female for energy with 0.79 fairly adequate NAR, mean of CHO with 0.82 fairly adequate and fat was found to be 1.44 extra NAR. and majority of 30% subjects going to canteen regularly and consumed fried food daily, 38% students were consume fruits juice weekly. 70% of students were aware about factor affecting of blood pressure from excess salt intake and lack of activity still they were not willing to change their habits.

CONCLUSION

This study found positive significant relationship between blood pressure and BMI with less than value 0.05, In obese and overweight subjects were found to be high blood pressure and majority of normal BMI subjects were found normal blood pressure level. Some fluctuation also observed that in few cases of overweight with low or normal blood pressure. Reason of them is some hormonal changes occur in individuals' body. This study gave early warning of students to change their lifestyle pattern and eating habits and maintain their body weight and blood pressure and other chronic disease.

REFERENCES

1. Chobanian A V, Bakris GL, Black HR, et al. (2003);Seventh report of the joint National Committee on Prevention, Detection, Evaluation, and Treatment of high blood pressure; hypertension42(6);1206-52.
2. Varshitha A; Comparison of blood pressure amd BMI; J, Pharm,Sci.& Res.;Vol.7(10), 2015,849-851.
3. H. King, R.E. Aubert, W.H. Herman, Global burden of diabetes, 1995-2025 prevalence,

- numerical estimates and projection, Diabetes Care ;21(1998);1414-1431.
4. Shah Mohd Abbas Waseem, RubeenaBano;Blood pressure measurement in overweight, underweight and normal BMI; Int. J Res Med Sci. 2017 jul;5(7);2921-2925.
 5. F Tesfaye, NG Nawi, H Van Minh, P Byass, Y Berhane, R Bonita and S Wall; Association between body mass index and blood pressure across; journal of human hypertension;2007;21;28-38.
 6. Manu Raj, K.R.Sundaram, Mary Paul, R. Krishna kumar, Obesity in Indian children: time trends and relationship with hypertension, The national journal of India, vol.20, No.6,2007.
 7. Ernest afrifa-anane, Charles Agyemang, Samuel niardeycodjoc, Gbenga ogedegbe, The association of physical activity, body mass index and the blood pressure level among urban poor youth in Acra, Ghana, BMC public health 2015.
 8. Kapil U , Singh P Dwivedi et al ; prevalence of obesity amongst affluent school children in delhi;2002;39;449-452.
 9. Preetam B Mahajan, Anil J Purty et al; study of childhood obesity among aged 6 to 12 year union territory of Puducherry; Indian J Community Med.2011;36;45-50.
 10. P Chhabra, V. L. Grover, K. Aggarwal, A.T. Kannan; Nutritional status and blood pressure; Indian Journal of Community Medicine vol.31, No,4;oct2005.

How to cite this article: Kaushik D, Chawla GK. Correlation between blood pressure and body mass index among university students. Int J Health Sci Res. 2019; 9(8):394-398.
