

To Know the Future Risk Factor of Blood Pressure & in Relation with BMI & WHR in Different Individuals**M.P. Singh**

Associate Professor, Dept. of Physiology, Amaltas Institute of Medical Sciences, Dewas, M.P.

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Corresponding author: Dr. M.P. Singh

Conflict of interest: Nil

Abstract:

Background & Methods: The aim of the study is to advice preventive measures of high blood pressure & optimum level of exercise to maintain normal blood pressures & BMI. All the participants were subjected to a self-made questionnaire to get information regarding their personal, present, past, family, socioeconomic and medical history in detail. Special information about their exercise schedule was also obtained through the questionnaire regarding type, duration and length of time of exercise.

Results: Chi squared equals 1.935 with 1 degree of freedom. The two-tailed P value equals 0.164. The association is considered to be not statistically significant. Out of 38 female medical students, 23 students having blood pressure ≤ 120 mmHg and body mass index ≤ 24.99 i.e. in normal range. The 06 students having blood pressure ≤ 120 mmHg but their body mass index is >25 . The 05 female students having blood pressure >120 mmHg and body mass index ≤ 24.99 i.e. in normal range.

Conclusion: The systolic blood pressure was found to be strongly associated with lean body mass index than to the fat mass index in male medical students. The systolic blood pressure was not to be found statistically significant with lean body mass index while it was significantly associated with fat mass index in female students. Body Mass Index was found significantly correlated with systolic blood pressure in male medical students while in female students it was not associated with systolic blood pressure in my study. Waist circumference was significantly associated with systolic blood pressure in both male as well as female medical students. Prevalence of high Systolic Blood Pressure i.e. Pre-hypertension is approximately same in both male as well as female subjects while as obesity is more prevalent in female subjects.

Keywords: preventive, high blood pressure & BMI.

Study Design: Randomized Cross Sectional Study.

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Introduction

As a result of various research and developments in the medical field in 20th century, many health problems that were common a century ago do not exist today. But they have been replaced by disease like high blood pressure, obesity, and coronary heart disease attributed to faulty and sedentary life style associated with industrialization, urbanization, economic development and market globalization. This combination of unhealthy diet and lifestyle is having a significant impact on the health and nutritional status of population, particularly in developing countries and countries in transition [1].

Prevalence of high blood pressure and obesity are increasing in India in recent years even though under nutrition continues to be an important public health issue even in the 21st century [2]. Despite the availability of a few therapeutic agents, the management of obesity is still mainly by change in lifestyle and dietary modification. Physical activity and dietary modifications are the cornerstones for

management of high blood pressure and obesity [3].

Cardiovascular diseases (CVD) continue to be the major cause of mortality representing about 30 per cent of all deaths worldwide. Lifestyle diseases like hypertension, diabetes mellitus and overweight/obesity are the major risk factors for the development of CVD. With rapid economic development and increasing westernization of lifestyle in the past few decades prevalence of these diseases has reached alarming proportions among Indians in the recent years [4].

Overall, encouragement of healthy lifestyles in the population should help to reduce the high burden of lifestyle diseases in India. Governmental and non-governmental agencies of the country should work together to achieve this goal. Lifestyle interventions have shown definite benefit in the management and

prevention of these diseases in large scale studies [5].

Material and Methods

We have selected the 125 individuals of age group 17 to 25 years at Amaltas Institute of Medical Sciences, Dewas, M.P. for 01 Year. A randomized cross sectional study was performed, an informed consent had been taken from these subjects after explaining the study procedure and written consent was obtained from them. And then after taking detailed history, the physical examination including general as well as systemic examination particularly the Cardio-vascular system was done.

All the participants were subjected to a self-made questionnaire to get information regarding their personal, present, past, family, socioeconomic and medical history in detail. Special information about their exercise schedule was also obtained through the questionnaire regarding type, duration and length of time of exercise.

Inclusion

1. Healthy Individuals doing their routine activity.
2. Male medical students of 17 to 25 years age group.

Exclusion

1. Students less than 17 years of age.
2. Students more than 25 years of age.

Body mass index was calculated as weight in kilograms divided by squared height in meters.

$$\text{BMI} = \text{Weight in Kg} / \text{Height in Meters}^2$$

Normal weight: BMI between 18.5 to 23.0 Kg/m².

Overweight: BMI more than 23.0 Kg/m².

Result

Table 1: Table showing Systolic Blood Pressure, Body Mass Index and Waist Hip Ratio

| | SBP(n=125) | | BMI(n=125) | | WHR(n=125) | |
|---------------|---------------------------|---------------------|-------------------------|--------------------|------------------------|----------------------|
| | Normal (≤ 120 mmHg) | High (>120 mmHg) | Normal (≤ 24.99) | High (≥ 25) | Normal ($>1 \& 0.9$) | High ($<1 \& 0.9$) |
| Male | 66 | 22 | 67 | 21 | 74 | 15 |
| Female | 28 | 09 | 28 | 09 | 28 | 08 |
| Total | 94 | 31 | 95 | 30 | 102 | 23 |

- The above table shows that 66 male students out of 87 shows normal blood pressure while as 22 students having blood pressure >120 mmHg.
- Table shows that 28 out 38 female students shows normal blood pressure while as 09 students having blood pressure on higher side.
- Total 67 male medical students out of 87 shows normal BMI, while as 21 students shows BMI on higher side i.e. ≥ 25 .
- Total 28 female medical students out of 38 shows normal BMI, while as 09 students shows BMI on higher side i.e. ≥ 25 .
- Total 74 male medical students out of 87 shows normal WHR (<1), while as 15 students shows WHR on higher side i.e. >1 .
- Total 28 female medical students out of 38 shows normal WHR (<0.9), while as 08 students shows WHR on higher side i.e. >0.9 .

Table-2: Correlation between fat body mass index (FMI) and systolic blood pressure (for males):

| Fat Mass index (FMI) | Systolic blood pressure, ≤ 120 mmHg | Systolic blood pressure, >120 mmHg | Chi Square Test | P Value |
|----------------------|--|--------------------------------------|-----------------|---------|
| Normal (1.8-8.3) | 55 | 17 | 6.415 | 0.0113 |
| High (>8.3) | 06 | 09 | | |
| Total (n=87) | 61 | 26 | | |

Chi squared equals 6.415 with 1 degree of freedom. The two-tailed P value equals 0.0113. The association is considered to be statistically significant

- The above table shows that out of 87 male medical students, 55 students having blood

pressure ≤ 120 mmHg and fat mass index (FMI) is in normal range (1.8 to 8.3).

- The 06 students having blood pressure ≤ 120 mmHg but their fat mass index (FMI) is >8.3 .
- The 17 male students having blood pressure >120 mmHg but their fat mass index (FMI) is in normal range (1.8 to 8.3).

Table 3: Correlation between body fat mass index (FMI) and systolic blood pressure (for females):

| Fat Mass index (FMI) | Systolic blood pressure, ≤ 120 mmHg | Systolic blood pressure, >120 mmHg | Chi Square Test | P Value |
|----------------------|--|--------------------------------------|-----------------|---------|
| Normal (3.9-11.8) | 17 | 05 | 5.041 | 0.0247 |
| High (>11.8) | 09 | 07 | | |
| Total (n=38) | 26 | 12 | | |

Chi squared equals 5.041 with 1 degree of freedom. The two-tailed P value equals 0.0247. The association is considered to be statistically significant.

- The above table shows that out of 38 female medical students, 17 students having blood

pressure ≤ 120 mmHg and their fat mass index (FMI) is in normal range (3.9 to 11.8).

- The 09 students having blood pressure ≤ 120 mmHg but their fat mass index (FMI) is >11.8 .

Table-4: Correlation between body mass index (BMI) and systolic blood pressure (for males):

| Body Mass index (BMI) | Systolic blood pressure, ≤ 120 mmHg | Systolic blood pressure, >120 mmHg | Chi Square Test | P Value |
|-------------------------|--|--------------------------------------|-----------------|---------|
| Normal (≤ 24.99) | 55 | 11 | 13.097 | 0.0003 |
| High, (>25) | 11 | 10 | | |
| Total (87) | 66 | 21 | | |

Chi squared equals 13.097 with 1 degree of freedom. The two-tailed P value equals 0.0003. The association is considered to be extremely statistically significant.

- The above table shows that out of 87 male medical students, 55 students having blood

pressure ≤ 120 mmHg and body mass index ≤ 24.99 i.e. in normal range.

- The 11 students having blood pressure ≤ 120 mmHg but their body mass index is >25 .
- The 11 male students having blood pressure >120 mmHg and body mass index ≤ 24.99 i.e. in normal range.

Table 5: Correlation between body mass index (BMI) and systolic blood pressure (for females):

| Body Mass index (BMI) | Systolic blood pressure, ≤ 120 mmHg | Systolic blood pressure, >120 mmHg | Chi Square Test | P Value |
|-------------------------|--|--------------------------------------|-----------------|---------|
| Normal (≤ 24.99) | 23 | 05 | 1.935 | 0.1643 |
| High, (>25) | 06 | 04 | | |
| Total (38) | 29 | 09 | | |

Chi squared equals 1.935 with 1 degree of freedom. The two-tailed P value equals 0.164. The association is considered to be not statistically significant.

- The above table shows that out of 38 female medical students, 23 students having blood pressure ≤ 120 mmHg and body mass index ≤ 24.99 i.e. in normal range.
- The 06 students having blood pressure ≤ 120 mmHg but their body mass index is >25 .
- The 05 female students having blood pressure >120 mmHg and body mass index ≤ 24.99 i.e. in normal range.

Discussion

On doing study between Fat Mass Index and Systolic Blood Pressure for male medical students the shows that Chi squared equals 6.415 with one degree of freedom and the two tailed P value equals 0.0113, which is <0.05 , thus the association between fat mass index and systolic blood pressure for young medical students is considered to be

statistically significant. It have been also seen that those male medical students who usually do not do aerobic exercises having high fat mass index and their blood pressure is also >120 mmHg [6].

These results suggest that a relative preponderance of fat in the upper body, including abdominal fat, is an important determinant of cardiovascular risk factor status in children and adolescents. This is of particular importance in this young population because they had, on average, relatively normal weight with relatively low truncal fat mass. In the study it have been observed that those young male students whom truncal body fat distribution was more along with high body fat percentage the systolic blood pressure was found high (>120 mmHg) accordingly.

On doing the study between Fat Mass Index (FMI) and Systolic Blood Pressure for female medical students, the Chi squared equals 5.041 with one degree of freedom and the two tailed P value equals 0.0247, which is <0.05 , thus the association between fat mass index and systolic blood pressure for young female medical students is considered to

be statistically significant. The 21 students having systolic blood pressure and fat mass index both on higher side.

Mehdad S et al had done their study in a total of 167 subjects, out of which 29.3% and 12.6% were overweight and obese respectively [7].

On doing the study between Body Mass Index (BMI) and blood shows that chi-squared equals 1.397 with one degree of freedom and the two tailed P value is 0.2372 which is >0.05 , it means that there is no statistically significant correlation between body mass index and systolic blood pressure of young female students.

The Tromsa study done by Wilsgaard *et al* showed the relation between BMI and blood pressure was stronger in females than males [8]. However, in our study, the increased blood pressure was more positively correlated with BMI in males while in females it was not significantly associated (p value is 0.2372 which is >0.005).

On doing the study of correlation between Body Mass Index (BMI) and systolic blood pressure the shows that chi squared equals 13.097 with one degree of freedom and the two tailed P value is 0.0003 which is <0.05 , it means that there is extremely statistically significant correlation between body mass index and systolic blood pressure of young male students. Out of 175 male students, 19 having BMI >25 and their systolic blood pressure is >120 mmHg so these are having risk of developing cardiovascular problems [9].

Body mass index (BMI) is positively and independently associated with morbidity and mortality from hypertension, cardiovascular disease, type II diabetes mellitus and other chronic diseases [10].

Conclusion

The systolic blood pressure was found to be strongly associated with lean body mass index than to the fat mass index in male medical students. The systolic blood pressure was not to be found statistically significant with lean body mass index while it was significantly associated with fat mass index in female students. Body Mass Index was found significantly correlated with systolic blood pressure in male medical students while in female students it was not associated with systolic blood pressure in my study. Waist circumference was significantly associated with systolic blood pressure in both male as well as female medical students. Prevalence of high Systolic Blood Pressure i.e. Pre-

hypertension is approximately same in both male as well as female subjects while as obesity is more prevalent in female subjects.

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