Prevalence and Risk Factors of Hypertension and Prehypertension among Young Adults

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INTRODUCTION

Hypertension is one of the main risk factors for cardiovascular diseases such as stroke, myocardial infarction, kidney diseases and premature mortality.1 It is one of the major causes of death in India also. 52% of the Indians below 70 years of age have died due to CVD, while the rate is 23% in the developing countries.4 Due to treatment and control, there has been a decline in the rate of morbidity and mortality among the developed countries. Hence, hypertension is considered to be a modifiable risk factor for CVD.5,6

Of late, more number of the younger generations are complaining of high blood pressure, especially those between 18 - 39 years of age and this is attributed to the increase in obesity due to unhealthy diet.7 High blood pressure and prehypertension among the younger generation predict the future hypertension condition and cardiovascular diseases of the individual8. Earlier studies have reported 20% in males and 15% in females to have hypertension, mainly due to higher obesity rates.9

Prehypertension was introduced in the seventh report of Joint National Committee (JNC-7) and is said to be when the systolic blood pressure is 120-139 mmHg and diastolic blood pressure is 80-89mmHg. This condition, among youngsters is considered to be a precursor to hypertension in the future, thereby being a risk for CVD and early death.10 It has been seen that the world wide estimate of prehypertension is up to 30-50%. 90% of the patients with prehypertension have shown to have another risk factor associated with CVD.11

There has been a significant increase in the incidence of hypertension and prehypertension due to the increase in urbanization and economic development, which has led to more tensions and stress, aging population and change in the lifestyle and diet.12,13 It has been estimated that there would be a rise of deaths due to prehypertension especially in the poor and the developing countries.14 In India the estimate is...
around 45% in males.18-20

The rates of prehypertension in the young adults varies with different geographical areas and hence this study was taken to assess the prevalence of prehypertension among the young adults in our area.

**MATERIAL AND METHODS**

This cross sectional study was done by the department of General Medicine in RVM institute of Medical sciences and research Centre, Telangana. 1783 patients between the ages 18 – 39 years who had come to our OPD for various ailments were studied over a period of two years. Patients who already had established hypertension and were on drugs were excluded from the study.

This study was cleared by the institutional ethical committee and the nature of the study was explained to the patients for informed consent. Those patients who did not give the consent were also excluded from the study. A thorough demographic details were collected from all the patients and complete physical and medical examination was done on all of them. A history of hypertension in the family was also enquired and noted.

The blood pressure was collected twice from all the patients, while they were in the sitting position, with a 10 minute gap. An average of the two was taken and was considered to be the blood pressure of the patient. A full blood workup was done for all of them, such as Complete blood picture, Hemoglobin estimation, Erythrocyte sedimentation rate, blood glucose test, biochemical tests for Urea and creatinine and lipid levels.

Body mass index was calculated based on the height and weight of the patient. Waist to hip ratio also was measured for all the patients. The results were analyzed using Microsoft Excel in the form of graphs and tables.

**RESULTS**

Out of the 1783 patients, 228 (12.7%) of them had elevated blood pressure. Out of these 228 patients, 76 (4.3%) had established hypertension i.e with systolic above 139 mmHg and diastolic above 89 mmHg, while 152 (8.5%) had prehypertension (Fig: 1).

There were more number of females than males in the present study. The number of females were 982 (55.1%) and 801 (44.9%) were males (Fig:2)

The mean age of the patients with established hypertension was 32.6 ± 4.6 years and for prehypertension it was 28.8 ± 3.1. The weight was 62.8 ± 4.4 and 55.6 ± 3.9 kgs for hypertensive and prehypertensive patients. Over 90% of the patients with hypertension were overweight or obese, while it was around 82% for prehypertensive patients. In case of the normal patients, less than 30% of them were overweight or obese. Many of the patients had a family history of hypertension. A total of 178 patients out of 228 (79.1%), who had elevated blood pressure had either their mother or father with hypertension. Around 80% of these patients were either smokers or had alcohol on a regular basis or both (table:1).

The cholesterol and the triglyceride levels for the prehypertensive and the hypertensive patients was elevated. The mean triglyceride levels for the patients with hypertension was 148.3 ± 7.2mg/dL and for prehypertension it was 145.2 ± 3.9 mg/dL. Patients with hypertension had 201.7 ± 9.4 mg/dL, 110.4 ± 5.3 mg/dL, 33.2 ± 2.9 mg/dL of Total cholesterol, LDL nd HDL cholesterol respectively while those with prehypertension had 193.5 ± 6.8 mg/dL, 106.8 ± 4.6 mg/dL, 36.7 ± 8.1 mg/dL respectively (Table 2).

**DISCUSSION**

High blood pressure in youngsters and its subsequent  

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Hypertension (n=76)</th>
<th>Prehypertension (n=152)</th>
<th>No hypertension (n=1555)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>148.3 ± 7.2</td>
<td>145.2 ± 3.9</td>
<td>140.6 ± 5.5</td>
</tr>
<tr>
<td>LDL (mg/dL)</td>
<td>110.4 ± 5.3</td>
<td>106.8 ± 4.6</td>
<td>101.7 ± 9.1</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>33.2 ± 2.9</td>
<td>36.7 ± 8.1</td>
<td>38.6 ± 6.6</td>
</tr>
<tr>
<td>Total Cholesterol (mg/dL)</td>
<td>201.7 ± 9.4</td>
<td>193.5 ± 6.8</td>
<td>186.7 ± 6.5</td>
</tr>
<tr>
<td>Random Blood Sugar</td>
<td>112 ± 7.7</td>
<td>101.4 ± 3.8</td>
<td>95.6 ± 4.7</td>
</tr>
</tbody>
</table>

Table-2: Lipid profile and Blood sugar levels
Among the prehypertensive patients, around 88% of them were either overweight or obese. There have been several studies which associated obesity and hypertension. Sorof and Daniels reported that there is a 3 fold increase in hypertension among obese children compared to those having normal weight.\textsuperscript{21} A study by Muntner et al also concluded that there was a considerable increase in the systolic and diastolic blood pressure among the young, which was attributed to them being overweight.\textsuperscript{22} Lipowicz et al reported that hypertension was seen more in single persons than in married people.\textsuperscript{33} Smoking and alcohol consumption was found to be prominent in the patients with elevated blood pressure. Most of the patients also had a parental history of hypertension. Jayaprasad et al, in their study also found an association between alcohol consumption, smoking, addition of salt and obesity and hypertension.\textsuperscript{25} Similar results were observed by Gupta et al and Madhu et al.\textsuperscript{34,35} Obesity is known to cause hypertension due to the activation of the sympathetic nervous system causing systemic resistance thereby increasing insulin resistance and vascular dysfunction.

**CONCLUSION**

We hence conclude that prehypertension is very common among the young adults and is increasing in rate. The risk factors are smoking, alcohol consumption, family history and obesity. Early detection is of utmost importance so that treatment can be started at the earliest resulting in reduction in morbidity and mortality. Moreover, proper health education must be given to the people in the community to create an awareness of hypertension, its association with lifestyle changes and improper nutrition. Importance of regular checkups, especially in the persons who have the risk factors must be emphasized.

**REFERENCES**


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