A Study On Effect Of Life Style Risk Factors On Prevalence Of Hypertension Among White Collar Job People Of Surat
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Abstract

Objectives: 1) To study magnitude of the problem of hypertension among bank employees.2) To study the effect of body mass index (BMI) and body fat distribution as measured by waist-to-hip ratio (WHR) on prevalence of hypertension among bank employees of Surat city.3) To study the effect of different types of food habits and exercise on prevalence of hypertension.4) To study the effect of smoking, tobacco chewing and alcohol drinking on prevalence of hypertension.

Materials and Methods: It was a cross sectional study carried out from August, 2004 to September, 2005. Study was carried out among bank employees of all sectors like Government, Private and Co-operative, situated within Surat city limits, an urban area of South Gujarat. Total 1493 bank employees were studied (1177 males and 316 females). The survey had two principal components: the administration of a questionnaire and clinical examination. A pre-tested semi structured questionnaire was used, which collected information on demographic characteristics and risk factors for hypertension. Hypertension was defined on the basis of 7th report of Joint National Committee. Data on lifestyle habits (smoking and physical activity), body weight, body height, waist and hip circumferences and blood pressure measured using standardized protocols. Chi-square test was applied wherever necessary. Data was analyzed using window excel & epi 6.

Results: Overall prevalence of hypertension was found to be 30.4% (455/1493). Among 455 (30.4%) hypertensives, only 197 (43%) were aware about their hypertensive status. And among these known hypertensives, 139 (70.5%) were on regular treatment. 71 (51%) were having controlled hypertension among the employees who were on regular treatment. As age increased, prevalence of hypertension also increased significantly in both sexes significantly (p<.001). Prevalence of hypertension was significantly higher among male employees 382 (32.5%) as compared to female employees 73 (23.1%), (p<.01). Prevalence of hypertension was noted highest among higher socio economic group. Thirty two percent (32%) of the total employees were overweight. Consistent decline in prevalence of hypertension was seen with decreasing BMI. Prevalence of hypertension was 42.4% (203) among over weight employees. Association between BMI and hypertension was statistically significant (p<.01). Among 1177 male employees 77 (6.5%) were having WHR >1 and among 316 female employees 106 (33.5%) female were having WHR > 0.85. Prevalence of hypertension was significantly (Z=2.7) higher, i.e. 53.2% (41), among male employees having WHR >1 and 25.4% (27) among female employees having WHR >0.85. Prevalence of hypertension was significantly higher 35.7% (148) among employees consuming mixed food as compared to those who reported vegetarian food 21.3% (230). Prevalence of hypertension was higher 35.53% (81) among smoker than non-smoker 29.57% (374). Prevalence of hypertension was higher 37.8% (114), in tobacco chewer than non- chewer 28.6% (341). Prevalence of hypertension was higher 40.1% (149) among alcohol consumer than non- drinker 27.2% (306). Prevalence of hypertension found significantly higher among employees who was not having any healthy habit like walking, jogging, exercise; it was found to be 28.7% (122) excluding patient on treatment (p<.01). Conclusion: Here it was observed that one third of the employees are hypertensive which suggests that white collar job people should be screened regularly. Life style affects blood presser which can be seen from this study that’s why healthy habits should be promoted among this type of group by different types of interventions.

INTRODUCTION

Hypertension is a modern day’s epidemic and it is becoming a public health emergency worldwide, especially in the developing countries. It has been observed that cardiovascular diseases are increasing in developing countries and it has been estimated that CVD will be the major cause of morbidity and mortality in these countries by the year 2020. They account for nearly a third of all deaths.
It is seen that majority of the hypertensive patients remain asymptomatic, only few of them develop some symptoms like headache, giddiness and irritability. That’s why hypertension is known as silent killer. When symptomatic, its diagnosis is easy but in asymptomatic cases search of hypertensive is possible only through routine health check-ups, active surveys or screening programmes. If majority of the hypertensive are asymptomatic, it is a matter of concern, because such patients are unaware of the disease and are at equal risk for developing complications.

Further more, if hypertension is not controlled or prevented chances of heart attack, heart failure, stroke and kidney diseases increases. The relationship between blood pressure and risk of CVD events is continuous, consistent, and independent of other risk factors.\(^5,6\)

According to Indian studies it is noted that the prevalence of hypertension has increased by 30 times among the urban population over a period of 55 years and about 10 times among the rural population over a period of 36 years.\(^7\)

It is further more common amongst people from upper social class because of the presence of multiple factors such as sedentary jobs, lack of physical activity, rich diet, alcohol intake, smoking, obesity and disease like diabetes mellitus. People in this group often experience the mental stress. Increasing urbanization, small or nuclear family norms, working couples and problems of affluence also contribute to mental stress.

The problem which lies with the hypertension is that it can not be cured completely. And its management requires life long medication with some life-style modifications. The only way to curb the problem of hypertension is by its prevention. Decreased physical activities coupled with increased mental tension are important contributors of hypertension. They are commonly seen amongst employees of the profession where working is mostly sedentary. Therefore, higher prevalence of hypertension is reported from employees of such profession. Bank employees fit in this picture and that’s why present study was carried out among bank employees.

**MATERIALS AND METHODS**

Study was carried out among bank employees of Surat city, an urban area of south Gujarat region, from August, 2004 to September, 2005. In this cross sectional study, banks from all sectors were covered including Government, Private and Co-operative. Total 8 banks were selected from different sectors which were having near about 123 branches with 1632 employees. Prior permission was sought from the regional office. The survey had two principal components: the administration of a questionnaire and clinical examination. Informed consent was obtained verbally from all the participants after explaining the purpose of the study. A pre-tested semi structured questionnaire was used, which collected information on demographic characteristics like age, sex, caste, religion. Information regarding habits of Alcohol, Tobacco chewing and Smoking with their frequency, duration was elicited.

**DIET HISTORY OF EMPLOYEE**

Oral questioner method was adopted. Employees were asked about frequency of food item in one month and actual amount consumed on each day.

**MEASUREMENTS**

For anthropometric measurement help of paramedical worker was taken for female employee.

1. **Weight:**

   Employee was instructed to be bare foot and then to stand on weighing scale. Weight was measured in kilograms on a Personal Weighing scale which was standardized. It was measured to the nearest kilogram.

2. **Height:**

   It was measured with the employee bare foot and heels together, standing erect on a flat surface, heels, buttocks and back pressed against the vertical wall and the head positioned in the Frankfort horizontal plane. With the mass distributed evenly across both the feet, and the arms hanging freely to the sides, flat measuring scale was kept at superior most part of the head, pressing firm enough to compress the hair.

   BMI was calculated by weight (Kg) divided by the square of height in meter.

   \[ \text{BMI} = \frac{\text{Weight (Kg)}}{\left(\text{height in meter}\right)^2} \]

3. **Waist-Hip ratio:**

   The measuring tape was used which was 1 cm wide and non stretchable.
Waist Circumference was measured at a level half way between the costal margin and iliac crest at the level of umbilicus, measured in horizontal plane, with the subject standing. Hip circumference was measured with employee in the standing position, the maximum circumference in the horizontal plane was measured over the buttocks. The ratio of the former to the latter provides an index of proportion of intra-abdominal fat. Blood pressure was measured with the help of mercurial type sphygmomanometer. Three readings of blood pressure were taken at the interval of 5 minutes, and average of these three readings was considered as a final reading. Hypertension was defined on the basis of 7th report of Joint National Committee of Hypertension which provides a classification of Blood pressure for adults aged 18 years or older. They defined Hypertension as person having Diastolic blood pressure ≥140 mmHg or Diastolic blood pressure ≥100 mmHg. A new category designated prehypertension are at increased risk for progression to hypertension. Chi-square test was applied wherever necessary. Data was analyzed using window excel & epi 6.

RESULTS
Out of total 1632 employees 1493(91.4%) employees were available at the time of survey. Amongst 139 employees who could not be studied, majority (128) were on casual leave. 9 employees refused to be included in the study as they had gone through complete medical check up in near past. Remaining 2 were on sick leave.

Overall prevalence of hypertension was found to be 30.4%(455/1493). Out of remaining 1038 (69.6%), another half of them were prehypertensive, 516(34.5%). So almost two third of them were either suffering from or at risk of hypertension. (Figure-1)

Figure 1
Figure-1: Distribution of employees according to class of blood pressure.

As age increased, prevalence of hypertension also increased in both sexes significantly (P<0.001). Prevalence of hypertension was significantly higher among male employees 382(32.5%) as compared to female employees 73(23.1%), (P<0.01) (Table-1) & (Figure-2).

Figure 2
Table: 1 Age and sex wise prevalence of hypertension among bank employees.

<table>
<thead>
<tr>
<th>CLASS</th>
<th>M</th>
<th>F</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRE-HYPERTENSIVE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HYPERTENSIVE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>33</td>
<td>154</td>
</tr>
<tr>
<td>Female</td>
<td>53</td>
<td>76</td>
<td>129</td>
</tr>
<tr>
<td>30-39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>94</td>
<td>46</td>
<td>140</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>46</td>
<td>103</td>
</tr>
<tr>
<td>40-49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>130</td>
<td>77</td>
<td>207</td>
</tr>
<tr>
<td>Female</td>
<td>74</td>
<td>41</td>
<td>115</td>
</tr>
<tr>
<td>50-59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>71</td>
<td>23</td>
<td>94</td>
</tr>
<tr>
<td>Female</td>
<td>51</td>
<td>34</td>
<td>85</td>
</tr>
<tr>
<td>TOTAL</td>
<td>522</td>
<td>356</td>
<td>878</td>
</tr>
</tbody>
</table>

As per Modified Prasad classification, taking AICPI=538 (July, 2005), it was seen that 91.8% (1370) employees were in socio-economic class I & II. Prevalence of hypertension was noted highest among higher socio economic group; SEC I (35.0%) followed by class II (20.4%). There was
significant decline in prevalence of hypertension with declining per capita income ($P<0.01$).

Half of the employees (53.1% male and 40.8% female) were in normal BMI group. 32% of the total employees were overweight (32.6% male and 29.7% female). 7.4% of the total employees were obese (5.7% male and 13.2% female). Prevalence of hypertension was 42.4% (203) among overweight employees (BMI 25.0-29.9). Prevalence of hypertension was highest, i.e. 53.1% (59), among employees having BMI $\geq$30.0. Association between BMI and hypertension was statistically significant ($P<0.01$). (Table-2) & (Figure-3)

**Figure 4**
Table: 2 Distribution of employees according to their BMI status and prevalence of hypertension in both sexes.

![Table 2](image)

Prevalence of hypertension was significantly higher 35.7% (148) among employees consuming mixed food as compared to those who reported vegetarian food 21.3% (230). Risk of having hypertension was more than twice among employees consuming mixed diet than others.

Risk of getting hypertension among smoker was 1.3 times higher than non smoker. Risk of getting hypertension among past smoker was 1.8 times higher than current smoker. Risk of getting hypertension among regular smoker was 1.6 times higher than occasional smoker. Risk of getting hypertension among heavy ($\geq$ 36 cigarette / week) smoker was 1.8 times higher than light (7-35 cigarette / week) smoker. Risk of getting hypertension among employees who were smoking since long duration (> 10 year) was 2.2 times higher than smokers of short duration ($\leq$10 year). (Table-4)

Among 1177 male employees 77 (6.5%) were having WHR >1 and 1100 (93.5%) were having WHR $\leq$ 1. Among 316 female employees 106 (33.5%) female were having WHR >0.85 and 210 (66.6%) female were having WHR $\leq$ 0.85. Prevalence of hypertension was significantly ($Z=2.7$) higher, i.e. 53.2% (41), among male employees having WHR >1 than employees who were having WHR $\leq$1; i.e. 31.0% (341). Prevalence of hypertension was higher, i.e. 25.4% (27), among female employees having WHR $>0.85$ than employees having WHR $\leq 0.85$; i.e. 21.9% (46) (statistically not significant) ($Z=0.34$). Effect of WHR was more in male as compared to female. (Table-3)
Figure 7
Table: 4 Distribution of employees according to their smoking habit and prevalence of hypertension.

<table>
<thead>
<tr>
<th>SMOKING</th>
<th>NORMAL</th>
<th>PREHYPERTENSION</th>
<th>HYPERTENSIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>454</td>
<td>35.8</td>
<td>437</td>
</tr>
<tr>
<td>CURRENT</td>
<td>59</td>
<td>31.0</td>
<td>68</td>
</tr>
<tr>
<td>PAST</td>
<td>9</td>
<td>23.8</td>
<td>11</td>
</tr>
<tr>
<td>REGULAR</td>
<td>48</td>
<td>28.7</td>
<td>55</td>
</tr>
<tr>
<td>OCCASIONAL</td>
<td>20</td>
<td>32.7</td>
<td>24</td>
</tr>
<tr>
<td>LIGHT 7.35 CIG/WEEK</td>
<td>45</td>
<td>29.8</td>
<td>55</td>
</tr>
<tr>
<td>HEAVY ≥36 CIG/WEEK</td>
<td>10</td>
<td>24.3</td>
<td>11</td>
</tr>
<tr>
<td>DURATION ≤10 YEAR</td>
<td>53</td>
<td>33.1</td>
<td>59</td>
</tr>
<tr>
<td>DURATION &gt;10 YEAR</td>
<td>15</td>
<td>22.0</td>
<td>20</td>
</tr>
</tbody>
</table>

The effect of tobacco was almost similar as seen with the smoker. (Table-5)

Figure 8
Table: 5 Distribution of employees according to their tobacco chewing habit and prevalence of hypertension.

<table>
<thead>
<tr>
<th>TOBACCO</th>
<th>NORMAL</th>
<th>PREHYPERTENSION</th>
<th>HYPERTENSIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>428</td>
<td>35.9</td>
<td>423</td>
</tr>
<tr>
<td>CURRENT</td>
<td>85</td>
<td>32.0</td>
<td>84</td>
</tr>
<tr>
<td>PAST</td>
<td>9</td>
<td>25.0</td>
<td>9</td>
</tr>
<tr>
<td>REGULAR SAME</td>
<td>83</td>
<td>30.5</td>
<td>86</td>
</tr>
<tr>
<td>OCCASIONAL</td>
<td>11</td>
<td>37.9</td>
<td>7</td>
</tr>
<tr>
<td>LIGHT 7.35 PKT/WEEK</td>
<td>73</td>
<td>33.4</td>
<td>65</td>
</tr>
<tr>
<td>HEAVY ≥36 PKT/WEEK</td>
<td>17</td>
<td>26.1</td>
<td>19</td>
</tr>
<tr>
<td>DURATION ≤10 YEAR</td>
<td>65</td>
<td>32.0</td>
<td>70</td>
</tr>
<tr>
<td>DURATION &gt;10 YEAR</td>
<td>29</td>
<td>29.5</td>
<td>23</td>
</tr>
</tbody>
</table>

The effect of alcohol can be seen from the table. (Table-6)
Prevalence of hypertension was lower among employees observing healthy habit like walking, jogging, swimming, sports etc. This group comprised of 16.4% (176) excluding patient on treatment. Prevalence of hypertension found significantly higher among employees who was not having any healthy habit like walking, jogging, exercise; it was found to be 28.7% (122) excluding patient on treatment (P<0.01). Chances of getting hypertension were 1.56 times higher among employees who were not doing any kind of exercise than others.

**DISCUSSION**

Here the present study shows that prevalence of hypertension among bank employees of an urban area of south Gujarat found to be 30.4 % (455). In an epidemiological study conducted by Solanki in Surat city in 1986, prevalence of hypertension was 13.5% in middle and high income group, which is lower than the present study, which indicates the rising trend of hypertension in Surat city in last two decades. In another study done by Chor D et al (1998) among 1183 employees in a government-owned bank in the state of Rio de Janeiro found 18% prevalence of hypertension. In remaining 70% of the employees, half of them were in prehypertensive stage.

It shows that almost 2/3 rd of the employees are either suffering from or at risk of hypertension. More than half of the employees were detected as hypertensive for the first time by this study which indicates that 6 out of 10 hypertensive were asymptomatic or ignorant about their hypertensive status. This situation may be worst if the employees of prehypertensive phase also be considered. This emphasizes the need for screening of hypertensives among high risk group. In a study conducted by Manu G Z et al (2003) in Thiruvanthapuram city, Kerala, awareness of hypertensive status among hypertension was 39% and study conducted by Bharucha et al (2003) among Parsi community of Bombay, 47% male and 56% female were aware of their hypertensive status. Though the participants of the present study belonged to elite, literate, high income group, their knowledge about their blood pressure profile was poor. They were ignorant about benefit of regular medical treatment, and monitoring in case of hypertension. This indicates higher impending threat of serious consequences of uncontrolled hypertension in the study group and a need for information, education, communication and behavior change for prevention of hypertension and its consequences.

In present study significant positive association was found between age and prevalence of hypertension. Prevalence of hypertension increased as age increased, it was highest in more than 50 years of age group. In a study done by Desai and P.Kumar (1994) amongst 985 employees at KRIBHCO, Hazira, in Surat, they also reported increase in prevalence of hypertension with increasing age. Many other studies in India and abroad have reported positive correlation between blood pressure and age.

Overall prevalence of hypertension was found significantly higher in men than women. In a recent study done by Mion jr D et al (2004) among 810 employees of a University General Hospital in Brazil, it was found that overall prevalence of hypertension was higher (32%) in men than women (22%). There was higher proportion of female employees in younger age group than male employees and lower hypertension prevalence rate can be attributed to it. But when the age and sex specific prevalence of hypertension was compared, it was seen that in each age group, prevalence of hypertension was lower in female than male except in more than 50 years of age group where it was
Higher in female.

BMI is widely used in adults to assess overweight and obesity, which is a known risk factor in hypertension and other lifestyle related diseases. In present study higher number of female was in overweight and obese group as compared to men. Prevalence of hypertension was noted higher at every level of BMI in male as compared to female employees except in obesity group. One-fourth of the male employees were hypertensive at normal BMI level. So risk of hypertension starts at lower BMI level in male than female employees and goes on increasing with increase in BMI.

Risk was almost equal in male and female in obesity group. Significant influence of central obesity on hypertension was seen only in male employees in present study. Studies carried out by Setalwad (1976) Srivastava (1980), Rao (1984), Solanki, Desai (1986); and Desai and P.Kumar (1994) reported a positive relationship between hypertension and BMI.

In a recent study carried out by Mion jr D et al (2004) among 810 employees of a University General Hospital in Brazil, prevalence of hypertension was found higher (P <0.05) whose BMI was in the range of overweight and obesity levels.17

A study done by Kaushik Bose et al (2003) among 150 adult Bengalee Hindu male jute mill workers in Belur, a suburb of Kolkata, West Bengal, showed that none of the centrally non-obese subjects was mild hypertensive (SBP? 140 mmHg and/or DBP? 90 mmHg) while 85 of the centrally obese subjects (82.5%) were mild hypertensive, the difference being statistically significant (chi-square=9.33; p<0.0025).18

Non-vegetarian recipes in India are associated with high level of fats and salt, which is known dietary hazard in condition like hypertension. In this study bank employee with history of non-vegetarian diet habit were having double risk of hypertension than those on vegetarian diet.

In another study done by Paul et al (2002) among 57500 participants in the Oxford cohort of the European Prospective Investigation into Cancer and Nutrition (EPIC–Oxford) it was found that prevalence of hypertension was higher (12-15%) in meat eaters than in vegetarians (6-8%). While fish eaters and vegetarians were having similar and intermediate prevalence. He also found that BMI was higher in the meat eaters than the vegetarians.

Harmful effect of smoking, tobacco chewing and alcohol intake is linked with their chemical contents. But such habits also indicate anxiety or stress and health consequences can be attributed to their cumulative effects.

**SMOKING:**

The nicotine content in cigarette smoke acutely raises blood pressure, even in addicted smokers.19 No tolerance develops, so the blood pressure remains high as long as the individual continues to smoke.20 This is supported by the present study that prevalence of hypertension was significantly higher who were smoking regularly and since long duration. Higher level of hypertension among past smokers may be due to stopping smoking after diagnosis of established hypertension. In a similar study done by Gupta R et al (1995) among 2122 subjects from the urban population of Jaipur have found higher prevalence of hypertension among smokers.21

**TOBACCO CHEWING:**

Amongst tobacco chewers risk of hypertension was higher among past, heavy and regular tobacco chewers. Williams DE et al (1998) found that the higher prevalence of hypertension (22.4%) was associated with snuff, (ground tobacco), smoking tobacco leaf.22

**ALCOHOL:**

Amongst alcoholics risk of hypertension was higher in past, heavy and regular alcoholics. This information can be effectively used for preventive intervention of hypertension. Yoshita et al (2005) measured blood pressure among 3900 men aged 20-59 years annually for 7 years. The baseline systolic BP was higher in drinkers consuming 200-299 and >= 300 g alcohol/week, respectively, than in non-drinkers (P <0.001). The annual increase in systolic BP was 0.44 mmHg greater in drinkers consuming >= 300 g/week than in non-drinkers after adjustment for age and weight change (P < 0.001).23 In the present study probability of hypertension was higher in employees who were having one or more of the habits like smoking, alcohol, tobacco chewing etc., particularly with longer duration, in higher dose, regular intake or past history of any of these habits, which indicates dose and effect relationship.

**HEALTHY HABITS:**

Here role of healthy habits like yoga, jogging, walking and swimming etc. is as a stress relieving factor in improving blood circulation and reduce body weight. This knowledge
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indicates that those who adopt healthy life style and do regular exercise of any kind will naturally have lower risk of hypertension. In a study done by Kokinos P F et al (1995) among African-American men found that people who were physically active and fit may develop less hypertension, and those who are hypertensive may lower their blood pressure by regular isotonic exercise. In another study done by Lowry et al (1995) among 959 medical students followed for up to 40 years found that the risk of developing hypertension was reduced almost by half in those who engaged in regular sweat inducing physical activity.

CONCLUSION

Here it was observed that one third of the employees are hypertensive which suggests that white collar job people should be screened regularly. Life style affects blood presser which can be seen from this study that’s why healthy habits should be promoted among this type of group by different types of interventions. This study may help in identifying the common profile of hypertensive or persons at risk amongst bank employee, which may further help in identifying the risk group and planning the group specific IEC interventions.

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