

**Original Article**

# EFFECT OF LIFE STYLE RISK FACTORS ON PREVALENCE OF HYPERTENSION IN A DEFINED URBAN POPULATION OF REWA

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## ABSTRACT

**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<sup>1,2</sup> and it has been estimated that CVD will be the major cause of morbidity and mortality in these countries by the year 2020.<sup>3</sup>

**Materials and Methods:** Cross sectional study carried out from July 2010- June 2011 in general population of Rewa city. Total 300 were studied (171 males and 129 females). The study had two principal components: the administration of a questionnaire and clinical examination. Information was collected on demographic characteristics and risk factors for hypertension. Chi-square test was applied wherever necessary.

**Results:** Overall prevalence of hypertension was found to be 21.3% (64/300). Among 64(21.3%) hypertensive's, only 23(35.9%) were aware about their hypertensive status & among these known hypertensive 17(73.9%) were on regular treatment. Association between BMI and hypertension was statistically significant (p<.0001). Among 171 males 15 (8.8%) were having WHR >1 and among 129 females 42 (32.5%) were having WHR > 0.85. Prevalence of hypertension was significantly (p<.0001) higher, i.e. 40% (06), among males having WHR >1 and 21.4% (09) among females having WHR >0.85.

**Conclusion:** Here it was observed that one fifth of general public's are hypertensive which suggests that peoples should be screened regularly. Life style affects blood pressure which can be seen from this study that's why healthy habits should be promoted amongst general public by different types of interventions.

**Keywords:** Hypertension, Lifestyle factors, Obesity, Tobacco, Smoking, Alcohol

## 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<sup>1, 2</sup> and it has been estimated that CVD will be the major cause of morbidity and mortality in these countries by the year 2020.<sup>3</sup> They account for nearly a third of all deaths worldwide.<sup>4</sup> 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. The relationship between blood pressure and risk of CVD events is continuous, consistent, and independent of other risk factors.<sup>5,6</sup>

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.<sup>7</sup> The National Nutrition Monitoring Bureau (NNMB), which monitors the nutritional status of the population in nine states of India has estimated the prevalence of hypertension among rural adult (aged 18 and above) population of India to be 25% during 2004-2005. The problem which lies with the hypertension is that it cannot be cured completely and its management requires lifelong medication with some life-style modifications. The only way to curb the problem of hypertension is by its prevention.

The present study was planned with the objective 1) To study magnitude of the problem of hypertension. 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 .3) To study the effect of smoking, tobacco chewing and alcohol drinking on prevalence of hypertension.

## MATERIALS AND METHODS

**Study Design, period, place & subject:** This was a Cross -Sectional study on General Population of Rewa city within eastern region of Madhya Pradesh India between July 2010- June 2011.

**Sampling Technique & Sample Size:** Two stage sampling method was used to reach the study subjects. In first stage, cluster-sampling method was used to identify 30-clusters to be studied. Then in the second stage, systematic random sampling method was used to select the households. All the people of 20 years and above from the selected households were

included in the study. As there is no estimate of hypertension among the Rewa city, the prevalence of hypertension i.e. 25% estimated by NNMB among the rural adult population of main land India was taken as reference for arriving at the projected sample size. Assuming a prevalence of 25 % and absolute precision of 5 % with 95% confidence, the required sample size was estimated to be 288. Thus we need  $288/30 = 8-9$  Persons / clusters. Pregnant women and those who were unable to stand erect were excluded from the study. The study 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. There is not any ethical issue in this study.

**Measurements:** For anthropometric measurement help of female paramedical workers was taken for females.

(1) **Weight:** - By bare foot stand on standardized weighing scale. It was measured to the nearest kilogram.

(2) **Height:** - It was measured with the subject 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. BMI was calculated by weight (Kg) divided by the square of height in meter.  $BMI = \text{Weight (Kg)} / (\text{height in meter})^2$ .

(3) **Waist-Hip ratio:** - By 1 cm wide and non stretchable measuring tape. 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.<sup>8</sup> Hip circumference was measured in the standing position; the maximum circumference in the horizontal plane was measured over the buttocks.<sup>8</sup> The ratio of the former to the latter provides an index of proportion of intra-abdominal fat.<sup>9</sup>

**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<sup>10</sup> on Hypertension which provides a classification of Blood pressure for adults aged 18 years or older. They defined Hypertension as person having Systolic blood pressure  $\geq 140$  mmHg or Diastolic blood pressure  $\geq 90$  mmHg. A new category designated pre-hypertension are at increased risk for progression to hypertension

**Statistical analysis:** Chi-square test was applied wherever necessary. Data was analyzed using window excel & statistical calculator.

## RESULTS

Overall prevalence of hypertension was found to be 21.3 % (64/300). Out of remaining 236 (78.7%), another one third of them were pre-hypertensive, 75(31.8%) so almost half of them were either suffering from or at risk of hypertension. As age increased, prevalence of hypertension also increased in both sexes significantly ( $P < 0.0001$ ). Prevalence of hypertension was slightly higher in males 37(21.6%) as compared to female 73(20.9%), ( $P < 0.882$ ) (Table-1)

**Table 1: Age and sex wise prevalence of hypertension**

Age in years		Normal (%)	Pre-hypertensive (%)	Hypertensive (%)	Total (%)
20-29	Male	14 (66.7)	6 (28.6)	1 (4.7)	21 (100)
	Female	16 (84.2)	3 (15.8)	0 (0.0)	19(100)
30-39	Male	23 (57.5)	14 (35.0)	3 (7.5)	40(100)
	Female	24 (80.0)	5 (16.7)	1 (3.3)	30(100)
40-49	Male	28 (48.3)	14 (24.1)	16 (27.6)	58(100)
	Female	21 (48.8)	10 (23.2)	12 (27.9)	43(100)
>50	Male	23 (44.2)	12 (23.1)	17 (32.7)	52(100)
	Female	12 (32.5)	11 (29.7)	14 (37.8)	37(100)
<b>Total</b>		161 (53.4)	75 (25.0)	64 (21.3)	300(100)

**Table 2 Distribution according to their BMI status and prevalence of hypertension in both sexes**

BMI Group	Male			Female		
	Normal (%)	Pre-Hypertensive (%)	Hypertensive (%)	Normal (%)	Pre-Hypertensive (%)	Hypertensive (%)
<18.5 (Underweight)	23 (79.3)	5 (17.2)	1 (3.5)	18(81.8)	3(13.6)	1(4.6)
18.5-24.9 (Normal)	47 (50.5)	28 (30.0)	18 (19.4)	38 (66.7)	11 (19.3)	8 (14.0)
25.0-29.9 (Overweight)	15 (38.5)	10 (25.6)	14 (35.9)	16 (40.0)	13 (32.5)	11 (27.5)
>30 (obese)	3 (30.0)	3 (30.0)	4 (40.0)	1 (10.0)	2 (20.0)	7 (70.0)
<b>Total</b>	88 (51.5)	46 (26.9)	37 (21.6)	73 (56.6)	29 (22.5)	27 (20.9)

Among 171 males 15 (8.8%) were having WHR > 1 & 156 (91.2%) having WHR <1. Among 129 females 87 (67.4%) females were having WHR $\leq 0.85$  and 42 (32.6%) were having WHR > 0.85. Prevalence of hypertension was significantly ( $p < .001$ ) higher, i.e. 40.0% (6), among males having WHR>1. Prevalence of hypertension was higher, i.e. 21.4% (09), among females having WHR >0.85 than females having WHR  $\leq 0.85$ ; i.e. 14.9% (13) (statistically not significant) ( $p = .71$ ). Effect of WHR was more in male as compared to female. (Table-3)

**Table 3: Distribution according to their waist hip ratio and prevalence of hypertension**

WHR	Normal (%)	Pre-hypertensive (%)	Hypertensive (%)
<b>Male</b>			
>1	4 (26.7)	5(33.3)	6 (40.0)
<1	79 (50.6)	41(26.3)	36 (23.0)
<b>Female</b>			
>0.85	23 (54.8)	10 (23.8)	9 (21.5)
<0.85	55 (63.3)	19(21.8)	13(14.9)

Risk of getting hypertension among smoker was 1.9 (relative risk) times higher than non smoker.

Risk of getting hypertension among past smoker was 1.8 (relative risk) times higher than current smoker. Risk of getting hypertension among regular smoker was 1.3 (relative risk) times higher than occasional smoker. Risk of getting hypertension among heavy ( $\geq 36$  cigarette / week) smoker was 1.5 (relative risk) times

higher than light (7-35 cigarette / week) smoker. Risk of getting hypertension among study subjects who were smoking since long duration ( $> 10$  year) was 1.7 (relative risk) times higher than smokers of short duration ( $\leq 10$  year). (Table-4 A & B) Effect of alcohol can be seen from the table 5.

**Table: 4 (A) Distribution according to their smoking habit and prevalence of hypertension.**

Smoking		Normal (%)	Pre-hypertensive (%)	Hypertensive (%)
Smoking	Yes	17 (31.5)	18 (33.3)	19 (35.2)
	No	144 (58.5)	57 (23.2)	45 (18.3)
Current		15 (31.9)	17 (36.2)	15 (31.9)
Past		02 (28.6)	01 (14.3)	04 (57.1)
Regular		12 (30.0)	13 (32.5)	15 (37.5)
Occasional		05 (35.7)	05 (35.7)	04 (28.6)
Light (7-35 cig/wk)		10 (28.6)	13 (37.1)	12 (34.3)
Heavy ( $>36$ cig/wk)		02 (20.0)	03 (30.0)	05 (50.0)
Duration $<10$ year		13 (34.2)	14 (36.8)	11 (29.0)
Duration $>10$ year		04 (25.0)	04 (25.0)	08 (50.0)

**Table: 4 (B) Distribution according to their Tobacco chewing habit and prevalence of hypertension**

Tobacco Chewing		Normal (%)	Pre-hypertensive (%)	Hypertensive (%)
Tobacco	Yes	20(30.8)	21 (32.3)	24 (36.9)
	No	141 (60.0)	54 (22.9)	40 (17.1)
Current		19 (32.8)	18 (31.0)	21 (36.2)
Past		1 (14.3)	3 (42.8)	3 (42.9)
Regular same		18 (30.0)	19 (31.7)	23 (38.3)
Occasional		2 (40.0)	2 (40.0)	1 (20.0)
Light (7-35 pkt/wk)		16 (34.0)	14 (29.8)	17 (36.2)
Heavy ( $\geq 36$ pkt/wk)		4 (28.6)	4 (28.6)	6 (42.8)
Duration $\leq 10$ year		14 (31.8)	15 (34.1)	15 (34.1)
Duration $\geq 10$ year		6 (28.6)	5 (23.8)	10 (47.6)

**Table: 5 Distribution according to their alcohol drinking habit and prevalence of hypertension**

Alcohol		Normal (%)	Pre-hypertensive (%)	Hypertensive (%)
Alcohol	Yes	16 (29.1)	18 (32.7)	21 (38.2)
	No	145 (59.2)	57 (23.3)	43 (17.5)
Current		12 (24.5)	17 (34.7)	20 (40.8)
Past		4 (66.7)	1 (16.7)	1 (16.6)
Regular		2 (15.4)	4 (30.8)	7 (53.8)
Occasional		14 (33.3)	14 (33.3)	14 (33.3)
$< 30$ Peg/month		14 (26.9)	18 (34.6)	20 (38.5)
$\geq 30$ Peg/month		2 (66.7)	00 (0.0)	1 (33.3)
Duration $\leq 10$ year		11 (27.5)	15 (37.5)	14 (35.0)
Duration $\geq 10$ year		5 (33.3)	3 (20.0)	7 (46.7)

## DISCUSSION

The present study shows that prevalence of hypertension among urban area of Rewa city found to be 21.3 % ( 64). 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 last two decades.[12 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.<sup>[13]</sup>

In remaining 78.7% of the study subjects, about one third of them were in pre-hypertensive stage. It shows that about 47% of the study population is either suffering from or at risk of hypertension. More than half of the study subjects were detected as hypertensive for the first time by this study & they were asymptomatic or ignorant about their hypertensive status. This situation may be worst if the study subjects of pre-hypertensive phase also be considered. This emphasizes the need for screening of hypertensives among general populations. Study conducted by Manu G Z et al (2003)<sup>[14]</sup> in Thiruvanthapuram city, Kerala, awareness of hypertensive status among hypertension was 39% and study conducted by Bharucha et al (2003)<sup>[15]</sup> among Parsi community of Bombay, 47% male and 56% female were aware of their hypertensive status. 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.<sup>16</sup>

Overall prevalence of hypertension was found significantly higher in men than women. Study done by Mion jr D et al (2004) among 810 employees of a University General Hospital in Brazil, found that overall prevalence of hypertension was higher (32%) in men than women (22%).<sup>17</sup>

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 well as female. One-fifth of the males were hypertensive at normal BMI level. 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. A study done by Kaushik Bose et al (2003) among 150 adult

Bengalee Hindu male jute mill workers in Belur, 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).<sup>18</sup>

### Smoking & Tobacco chewing

Harmful effect of smoking, tobacco chewing and alcohol intake is linked with their chemical contents. The nicotine content in cigarette smoke acutely raises blood pressure, even in addicted smokers.<sup>19</sup> No tolerance develops, so the blood pressure remains high as long as the individual continues to smoke.<sup>20</sup> This is supported by the present study that prevalence of hypertension was significantly higher who were smoking regularly and since long duration. 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.<sup>21</sup> Amongst tobacco chewer's 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.<sup>22</sup>

### Alcohol

Amongst alcoholics risk of hypertension was higher in past, heavy and regular alcoholics. 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  $\geq 300$  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  $\geq 300$  g/week than in non-drinkers after adjustment for age and weight change ( $P < 0.001$ ).<sup>23</sup>

In the present study probability of hypertension was higher in study subjects 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.

### CONCLUSION

Here it was observed that one fifth of the study subjects are hypertensive which suggests that peoples should be screened regularly. Life style

affects blood pressure which can be seen from this study that's why healthy habits should be promoted among general public by different types of interventions. This study may help in identifying the common profile of hypertensive or persons at risk amongst general public, which may further help in identifying the risk group and planning the group specific IEC interventions.

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