

## Prevalence and predictors of Hypertension: A cross sectional study among people coming to a tertiary health care facility in Garhwal-Uttarakhand.

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### Abstract

**Background:** The size of the elderly segment of the population is increasing in developing countries. Developing countries are thus likely to face an enormous burden of chronic non-communicable diseases in the near future. Of these diseases, hypertension is one of the most important treatable causes of mortality and morbidity in the elderly population. According to World Health Report 2002, cardiovascular diseases (CVDs) will be the largest cause of death and disability by 2020 in India.

**Methods:** This cross sectional study was done over a period of six months (November 2011-April 2012) in a tertiary care hospital in Garhwal, Uttarakhand. 1344 patients aged 30-75 years, coming to OPD were screened for the presence of hypertension (JNC-7 criterion). All the cases were interviewed for various risk factors on a preformed pretested proforma. Data analysis has been done using SPSS version 15.0 and Microsoft Office Excel 2007. To test significance of risk factors chi square test have been used as applicable. All p values were two tailed and values of <0.05 were considered to indicate statistical significance

**Results:** The Prevalence of hypertension in the present study was 13.83% (males=7.6%, females=6.23%). Gender specific prevalence of hypertension was 14.65% for males and 12.96% for females. High BMI, sedentary to moderate work profile, non-veg/mixed diet and alcohol and tobacco consumption were significantly associated risk factors.

**Conclusions:** The risk factors as predicted in the study are modifiable. Health promotion, health education and behavior change communication can prove valuable tool for effective control.

**Key words:** Hypertension, risk factors, Hilly region

### Introduction:

The size of the elderly segment of the population is increasing in developing countries as the later undergo a demographic transition, with a concomitant increase in life expectancy. Indeed, it is estimated that by the year 2025 the majority of the elderly people worldwide will reside in developing countries<sup>1,2</sup>. Developing countries are thus likely to face an enormous burden of chronic non-communicable diseases in the near future. Of these diseases, hypertension is one of the most important treatable causes of mortality and morbidity in the elderly population<sup>3</sup> and accounts for a large proportion of cardiovascular diseases in the elderly population<sup>4,5</sup>. By the year 2020, non-communicable diseases such as cardiovascular diseases (CVD) will be the major causes of morbidity and mortality in developing countries, accounting for almost four times as many deaths as from communicable diseases<sup>6</sup>. In 2020 AD, 2.6 million Indians are predicted to die due to coronary heart disease which constitutes 54.1 % of all CVD deaths. The situation in India is more alarming. It

was reported that of a total of 9.4 million deaths in India in 1990, cardiovascular diseases caused 2.3 million deaths (25%). A total of 1.2 million deaths were due to coronary heart disease and 0.5 million due to stroke<sup>7</sup>. Control of the predicted increase in cardiovascular diseases will require modification of risk factors that have two characteristics. First, the risk factors must have a high attributable risk or high prevalence, or both. Second, most or all of the risks must be reversible cost effectively. Blood pressure (BP) is directly associated with risks of several types of cardiovascular disease, and the associations of BP with disease risk are continuous<sup>8</sup>. Moreover, most or all BP-related risk appears to be reversible within a few years with inexpensive interventions. This fact is important because hypertension is a controllable disease and a 2 mmHg population-wide decrease in BP can prevent 151,000 stroke and 153,000 coronary heart disease deaths in India<sup>9</sup>. Keeping all the points in mind, this study was done to assess prevalence and predictors of hypertension in Garhwal region of Uttarakhand.

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## Methodology:

This cross sectional study was done over a period of six months (November 2011-April 2012) in a tertiary care hospital in Garhwal, Uttarakhand. 1344 of the individuals aged 30-75 years, coming to OPD were screened for the presence of hypertension. Sample size was decided based on 14.3 % prevalence, as seen in the pilot study in the same hospital, with absolute error of 2 %. The sample size was further increased to 1344 to undergird the validity. A person was included as study subject if he/she was under treatment for hypertensive illness or if systolic blood pressure was more than 140 or diastolic blood pressure more than 90 mm Hg or both as per Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) classification on the day of survey. All these cases were interviewed for various risk factors for hypertension on a preformed pretested proforma. During the course of the interview, two measurements of blood pressure on each study participant with a mercury column sphygmomanometer were made using a standardized technique, 30 minutes apart, in sitting position. In case where the two readings differed by over 10 mm of Hg, a third reading was obtained, and the three measurements were averaged. Body Mass Index was calculated as weight in kilograms divided by height in meters squared. Based on their BMI, individuals were classified into four groups: thin (BMI <18.5), normal (BMI=18.5-24.9), overweight (BMI = 25.0-29.9) and obese (BMI > 30.0)<sup>20</sup>. For measurement of height, the subject was asked to stand with the back against the wall and heels touching the ground, arms on the side and eyes in front parallel to ground. Readings coinciding the occipital edge was noted in cm. with the help of standard measuring tape. Weight measurement was done with minimum clothes on the body and was recorded in kilograms with the help of standard ISI marked weighing machine which was adjusted to 'zero' weight while measuring it. A total of 1344 individuals were screened. Data analysis has been done using SPSS version 15.0 and Microsoft Office Excel 2007. To test significance of correlates of contraceptive use, chi square test have been used as applicable. All p values were two tailed and values of <0.05 were considered to indicate statistical significance.

## Definitions :<sup>(18,19)</sup>

**Smoker:** A person who has been smoking at least a bidi or cigarette or any other form for at least six months before the start of study period.

**Alcoholic:** A person who has been taking alcohol at least 30 ml. per day for at least six months before the start of study period.

**Vegetarian:** Defined as a person who derives his food from fruits, vegetable, wheat, rice, pulses, milk and milk products.

**Mixed diet:** A person who consumes eggs and meat, in addition to vegetarian diet.

**Sedentary worker:** Teacher, tailor, barber, priest, executive, peon, retired personnel, shoe maker, housewife, maid, nurse, doctor, clerk, shopkeeper, manager, goldsmith etc.

**Moderate worker:** Potter, basket maker, carpenter, mason, electrician, fitter, turner, driver, welder, fisherman, coolie, site supervisor, post man etc.

**Heavy worker:** Stone cutter, blacksmith, mine worker, wood cutter, farm labourer, army soldier etc.

## Ethical considerations:

Informed consent was obtained from each of the study participants. All entry forms were kept in the office of the Principal Investigator and completed questionnaires were only viewed by approved study personnel.

## Results:

Out of 1344 individuals screened for hypertension, 696 were males and 648 were females. 186 subjects were found having hypertension as per JNC-7 criterion. Out of them 102 were males and 84 were females. Overall prevalence thus seen in the study was 13.83%. Among males, the prevalence was 14.65% and for females this figure was 12.96% (Figure-1). The mean blood pressure for males was  $118.53 \pm 14.8 / 79.21 \pm 11.67$  mm Hg and for females it was  $110 \pm 16.9 / 78.45 \pm 8.35$ .mm Hg (table-1). Most of the hypertensives were literate and literacy came to be a significant predictor of hypertension in the present study. Maximum numbers of hypertensives were seen in 50-70 year age group. When compared with other age groups this association was found to be significant. 121 of the hypertensives were residing in urban areas and rest 65 belonged to rural communities. This relation was also nonsignificant on statistical analysis. Marital status was significantly contributing to hypertension. 174 of the hypertensives were married and rest 12 were either unmarried, widowed or divorced.(Table-2)

Figure-1 Gender wise prevalence of hypertension

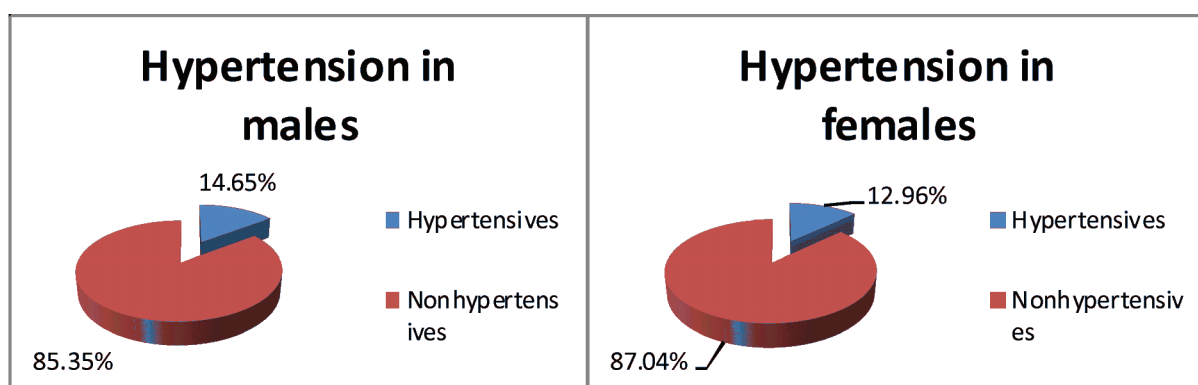


Table-1 Mean blood pressure in study population

	Systolic BP (mm Hg) Mean $\pm$ SD	Diastolic BP (mm Hg) Mean $\pm$ SD
Male	118.53 $\pm$ 14.8	79.21 $\pm$ 11.67
Female	110 $\pm$ 16.9	78.45 $\pm$ 8.35

Table -2 Distribution of various variables in study population

S. no.	Study variable		Hypertension		
			Yes (n=186)	No (n=1158)	P value
1	Age Group	30-40	07	286	$\chi^2=85.704$ df=4 p <.05
		40-50	39	264	
		50-60	47	354	
		60-70	61	185	
		>70	32	69	
2	Residence	Urban	121	688	$\chi^2=2.128$ df=1p >.05
		Rural	65	470	
3	Education	Illiterate	52	201	$\chi^2=50.02$ df=3 p <.05
		Primary	32	341	
		Up to 12th	41	423	
		Graduate or higher	61	193	
4	Marital status	Married	174	989	$\chi^2=9.118$ df=1 p <.05
		Unmarried /Divorced /widowed	12	169	

Body mass index was found to have a significant association with hypertensive status. Out of 186 hypertensives 109 were having BMI  $\geq 25$ . Individuals who were using any of the substance (including tobacco, alcohol or other) were found having higher prevalence of hypertension. This relation was significant on statistical analysis too. Individuals with a sedentary or

moderate type of work profile were having hypertension in maximal proportion. On statistical analysis with chi square test this association was found significant. Differentials in type of diet were found significant risk factor for hypertension. (Table-3)

**Table-3 Risk factors for hypertension**

S. no.	Study variable		Hypertension		
			Yes (n=186)	No (n=1158)	P value
1	BMI	$\leq 24.9$	77	690	$\chi^2=20.417$ df=1 p <.05
		$\geq 25$	109	478	
2	Addiction	Tobacco/Alcohol/Any	74	327	$\chi^2=10.206$ df=1 p <.05
		None	112	831	
3	Food Habit	Pure Veg	63	761	$\chi^2=68.51$ df=1 p <.05
		Non Veg/Mixed	123	397	
4	Occupation/work profile	Sedentary	44	164	$\chi^2=13.477$ df=2 p <.05
		Moderate	121	789	
		Heavy	21	205	

**Discussion:**

The prevalence of hypertension in the present study was 13.83% (males 7.6%, females 6.23%). Gender specific prevalence of hypertension was 14.65% for males and 12.96% for females. This prevalence is low in comparison to study by Gupta et al<sup>10</sup> who reported hypertension in 44% men and 45% women in Mumbai, Joseph et al (2000)<sup>11</sup> reported it in 31% men and 41% women in Trivandrum. In hills, better environmental conditions, demand of more physical work for movement up and down the hill may be the possible explanation to the low prevalence in hilly areas. Hypertension was found to have a significant association with marital status. The study shows that with increasing age the number of hypertensives is also increasing. This finding is consistent with the find of Deshmukh et al<sup>12</sup> in Wardha. Atherosclerotic changes in blood vessels with increasing age may be the possible explanation to such finding. Education was a significant predictor of hypertension in the present study. The possible

explanation to such finding is that with higher education there are more chances of a sedentary work profile. Health education must be provided, so as to adopt a healthy life style including spending some hours in exercise, to decrease chances of hypertension. BMI and sedentary life style found significantly associated with hypertension. These findings are consistent with other findings<sup>12,13,14</sup>. Any form of substance use was found significantly associated with hypertension. This finding is in contrast with finding of Manimunda et al<sup>15</sup> who found no such association although prevalence of substance use was high in study population. But some other studies substantiates the findings of our study in which tobacco and alcohol were significantly associated with hypertension<sup>16,17</sup>. Most of the hypertensives were taking nonveg/mixed diet, this relation was significant on statistical analysis. The finding is in concordance with the findings by Sagare et al<sup>18</sup> who found a significant association between such diet and hypertension.

## **Conclusion:**

Prevalence of hypertension is lower in Garhwal region as compared to other studies across the nation. Risk factors like High BMI, substance use, sedentary life style and nonveg/mixed diets contribute significantly to the causation of hypertension. These risk factors are modifiable and health promotion and health education can prove valuable tool for effective control. Behavior change communication should target the high risk individuals as predicted in the study.

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