



## An Epidemiological Study of Hypertension in a Rural Household Community in one of the Districts of Punjab

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### Abstract

**BACKGROUND:** Hypertension is the third leading killer in the world and is responsible for one in every eighth death. Hypertension is estimated to cause 4.5% of current global disease burden. Presently 23 % men and 22% women above 25 years of age are Hypertensive in India. Hence the study was undertaken, to measure the extent of hypertension and identify the risk factors. **MATERIAL & METHODS:** A cross sectional study was carried out among the adults in the age group of 30 years and above, residing under Primary Health Centre (PHC) area of Pathankot District, Punjab. The mid-year population for 2014 covered in this PHC area was 29862 out of which 8958 were adults in the age group of 30 years and above (29.5%). Data entry was made using SPSS. **RESULTS:** 280 individuals (25%) were found to have hypertension including 143 known hypertensives. Among 534 adult males, 123 (23%) and among 579 adult females 157(27%) were found to have hypertension. The odds ratio for hypertension among Smokers were 2.23 and was statistically significant ( $P < 0.001$ ), similarly alcohol use, obesity, tobacco chewing, diabetes and oral contraceptive use were statistically significant. **CONCLUSION:** The prevalence rate of hypertension was 25.2%. The prevalence rate was higher (27%) among females. Increase in age, family size, occupation, alcohol, smoking, obesity, oral contraceptives use and diabetes mellitus have been found to have association. Hence healthcare providers should take note and institute appropriate preventive measures.

**Keywords:** Hypertension, Cross sectional study, Rural population

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### INTRODUCTION

Although blood pressure is easily measurable it has taken several decades to realize that hypertension is a frequent worldwide health disorder.<sup>1</sup> Chronic Non-Communicable diseases are assuming greater importance among adult population in developed as well as developing countries. The prevalence of chronic diseases such as hypertension, diabetes mellitus etc, is showing an upward trend in most countries. The main factors responsible for this rising trend are changing life styles, obesity, and behaviour pattern of people etc.<sup>2</sup> The Joint National Committee reports on

prevention, detection, evaluation and treatment of high blood pressure (JNC – VI & VII) emphasized the necessity of clinicians' appropriate judgment of their patients in diagnosis and treatment. Further, these guidelines for primary care physicians have been specified in the report. Therefore this national guideline should serve as a tool to be adopted and implemented in local and individual situation.<sup>3</sup> Even though 72.2 % of Indian populations live in rural areas<sup>4</sup>, many studies have not been carried out to determine the prevalence of hypertension among rural folks and the contributing risk factors, if any. The present study was undertaken, to

measure the prevalence of hypertension and to identify the risk factors responsible with reference to medical, social and individual characteristics, with a view to formulate preventive measures especially applicable to rural population.

## MATERIAL & METHODS:

**Place of study:** The study was conducted in areas under the jurisdiction of Primary Health Centre, Taragarh covering six sub centers in district Pathankot.

**Study population:** The study population comprised of adult individuals in the age group of 30 years and above residing under Taragarh Primary Health Centre area of Pathankot District, Punjab. The midyear population for 2014 covered in this Primary Health Centre area was 29, 862, out of which 8,958 (30%) were adults in the age group of 30 years and above residing in this area.

**Sampling methods & Sample size:** The sampling methods used in the study were cluster-sampling method. This method was used according to their sub divisions of "Nagar" and colony were identified and 30 cluster sampling technique were applied.

The sample size will be decided taking into account the

- a) Prevalence of hypertension.
- b) Confidence limit of 95%
- c) Margin of sampling error 5%

Literature review reveals that the prevalence of hypertension in India is 24%.<sup>5</sup> The sample size will be calculated by presuming the prevalence of hypertension to be 24%. The sample size came out to be 1113 individuals.

### Data collection:

Data for this study was collected from the community after taking the written consent from the individuals, by visiting the households in the selected area. Since the sampling was done during the day time, there may be a sampling bias. It was a household based study and questionnaires were administered to those in the household and the necessary information were collected to meet the objectives of the study. The data were collected from the selected 30 clusters as designated by the probability proportionate to size (PPS) method.<sup>6</sup> So, 38 individuals from the each cluster were selected randomly to attain the adjusted sample size of 1113 for the study. On an average, three families were examined during each day of the visit. The medico social history and other required detailed were filled up in the Proforma.

The following techniques were used as per the Recommendation of Joint National Committee (JNC) VI Criteria.<sup>3</sup>

1. The individual was seated in a chair with his back supported and his arms bared and supported at heart level and was refrained from the use of tobacco in any form or ingestion of caffeine during the 30 minutes preceding the measurement.
2. Under special circumstances measuring blood pressure in the supine and standing position were indicated. The appropriate (RIVA-ROCCI) cuff size was used to ensure an accurate measurement. The inflatable rubber bag within the cuff was encircling at least 80% of the arm. Many adults required a large adult cuff. Measurements were taken preferably with mercury sphygmomanometer. Both systolic and diastolic blood pressure was recorded.
3. The first appearance of sound [phase I] is used to define systolic blood pressure. The disappearance of sound [phase V] is used to define diastolic blood pressure. Two or more reading was be repeated after 3-5 minutes interval. If the first two readings differ by more than 5 mm of Hg, additional readings were obtained and averaged.

After following the measurement guidelines of blood pressure prescribed by JNC-VI criteria, the classification of hypertension was done as per the JNC-VIII guidelines,<sup>7</sup> as there was no proper cut-off point for deciding the category of pre hypertensives in JNC-VI.

The individuals were not informed of the results of the previous screening. However the newly diagnosed hypertensive individuals were referred to the primary health centre for further investigations and management. The known hypertensive cases were emphasized to continue their regular treatment.

### Statistical analysis:

Method of data analysis was done by using SPSS software 20.Version between the two gender groups in relationship to different stages of hypertension and normal individuals, by using appropriate test of significance (Chi Square) with 95% Confidence level and  $p < 0.05$  level. In case of

associated risk factor, subgroup analysis was done for different groups like family size, occupation, smoking, tobacco chewers, alcohol use, obesity, diabetes and oral contraceptive use was done by using appropriate test of significance (Chi Square) with 95% Confidence level and  $p < 0.05$  level.

## RESULTS

Out of 8958 adults in the age group of 30 years and above residing under Primary Health Centre, Taragarh, 1113 individuals (12.4%) were studied. Out of 1113 adults surveyed, 280 individuals (25.2%) were found to be suffering from hypertension including 143 known hypertensive. Among 534 adult males, 123 (23%) and among 579 adult females, 157 (27%) were found to be

suffering from hypertension (stage I and II).

Among 534 males studied, 347 (65%) were pre hypertensive (systolic pressure 120-139 mm of Hg and diastolic pressure 80-89) followed by 91 (17%) who were stage I hypertensive (systolic pressure 140-159 mm of Hg and diastolic pressure 90-99 mm of Hg) and 32 (6%) were stage II (systolic pressure  $>160$  mm of Hg and diastolic blood pressure  $>100$  mm of Hg) hypertensives. Of the 579 females, 290 (50%) were pre hypertensive followed by 98 (17.04%) in stage I hypertension (systolic pressure 140-159 mm of Hg and diastolic pressure 90-100 mm of Hg) and 59 (10.4%) were stage II (systolic pressure  $>160$  mm of Hg and diastolic blood pressure  $>100$  mm of Hg) hypertensive (**Table1**). It has been observed from

Table 1: Distribution of subjects according to Grade of Hypertension(JNC- VIII)<sup>7</sup>

Sex	NORMAL	PRE HYPERTENSIVE	STAGE I HYPERTENSIVE	STAGE II HYPERTENSIVE	TOTAL
MALE	64	347	91	32	534
FEMALE	132	290	98	59	579
TOTAL	196	637	189	91	1113

Table 2: Distribution of hypertensive subjects as per age among both sexes

Sex	Age in years	Total surveyed	Hypertension No (%)	p- value
Male	30-39	219	13 (6%)	Chi sq-16.95935 p- value $<0.001$
	40-49	144	25 (17%)	
	50-59	85	32 (38%)	
	60-69	64	37 (57%)	
	$>70$	22	16 (71%)	
	Total	534	123 (23%)	
Female	30-39	255	33 (13%)	Chi sq 20.64968 p- value $<0.001$
	40-49	127	36 (28.2%)	
	50-59	104	32 (31.8%)	
	60-69	75	45 (60%)	
	$>70$	18	11 (61.5%)	
	Total	579	157 (27%)	

Table 3:Prevalence of hypertension

Variables		Hypertensive N=280	Non- Hypertensives N=833	Odds ratio	P- value
Family size	<5	212	733	0.4253	<0.000
	>6	68	100		
Occupation	Unemployed	115	250	3.8002	<0.000
	Professional	19	83		
	Semi professional	20	75		
	Skilled	73	317		
	Unskilled	53	108		
Smoking	Smokers	70	108	2.237	<0.000
	Non- Smokers	210	725		
Alcohol	Alcoholic	62	58	3.8002	<0.000
	Non- Alcoholic	218	775		
Obesity	Obese	59	75	2.6981	<0.000
	Non- Obese	221	758		
Diabetic	Diabetic	70	58	4.4540	<0.000
	Non- Diabetic	210	775		
OCPs	Users	31	33	3.0181	<0.000
	Non- users	249	800		

Table 2 that the prevalence rate of hypertension shows an upward trend as age advances in males as well as in females. The difference was found to be statistically significant ( $p < 0.001$ ), which indicates that age and sex have some influence in the association of hypertension. Table 3 shows that the prevalence of hypertension was higher (40%) among those living in households having 6 or more members compared to individuals living in households having 5 or less members (29%). Greater prevalence of hypertension was observed in unemployed (41%) and skilled (23%) category of occupation followed by unskilled (19%), Professional (7%) and semi professional labourers (7%) of the selected population. The results comes out to be statistically significant.

#### RISK FACTORS ASSOCIATION WITH HYPERTENSION

Table 3 shows the prevalence of hypertension to be higher among smokers 70 (39%) and 210(23%) in non smokers. These differences were found to be statistically significant. It has been found that out of 1113 individuals, 120 (11%) were found to be consuming alcohol. Among the drinkers 62 (52%)

had hypertension and 58 (48%) who had normal blood pressure. Out of 1113 individuals 134 were obese with BMI more than 30 and out of 134 obese individual , 59(44%) were hypertensive while 75(56%) were having normal blood pressure and the difference were highly significant  $p < 0.001$ ). Among the diabetics, a majority of 70 (26.46%) individuals were found to be in stage I and II of hypertension and were followed by 58(6.99%) who were having normal blood pressure. Among 579 females studied, only 64(11%) were taking oral contraceptives and among these the prevalence of hypertension was 31(48%) among those who were taken oral contraceptive pills. Smokers were 2.2 times at a greater risk for hypertension compared to non-smokers (Table 3) and the difference was statistically significant, similarly alcohol use, obesity, diabetes and oral contraceptive use were found to have statistically significant higher risk for hypertension.

#### DISCUSSION

Hypertension was considered to be one of the important public health problems in the developed and industrialized countries only. In the developing

countries, its impact was not fully felt due to presence of rampant communicable diseases. However with control of communicable disease and increased life expectancy with life style changes, hypertension is becoming one of the emerging problems with its implications for concomitant increase in risk of cardiovascular and renal disease. In the present study, out of 1113 individuals examined 280 individuals (including 143 old hypertensive cases) were found to be suffering from hypertension and over all prevalence rate of hypertension was found to be 25 percent among both sexes. However the prevalence of hypertension was 23 percent among males (123 cases in 534 males) and 27 percent was among females (157 cases in 579 females). The prevalence rate of hypertension reported in the present study 25.2% was the highest as compared to other studies in rural populations of India. The high prevalence may be due to the criteria taken for labelling hypertension (that is  $> 140 / 90$  mm of Hg.), the increasing global trend in high prevalence of hypertension including rural areas due to changing life styles, stress and strain of life. The awareness of the problem and the co-operation of rural population for subjecting themselves readily for medical examination might be some of the factors for finding the high prevalence of hypertension in the present study. According to WHO scientific group 10-20 percent of adults in the world have hypertension based on the criteria suggested by their expert committee.<sup>8</sup> In the developing countries<sup>3</sup> the prevalence rate of hypertension varied from 15 to 33 percent.<sup>9</sup> Thus the prevalence rate of hypertension differs from population to population depending upon the cut off point used. The prevalence rate of hypertension as shown in Table 2 showed an upward trend as age advances in both sexes. This proportionate increase of prevalence of hypertension as age advances in both sexes has been observed in many other studies. Joshi et al<sup>2</sup> observed in a study in Mumbai that there was an increasing trend of hypertension as age advances and even in post menopausal women, as the prevalence rate rose from 4% among young to 17.2% in 60 years of age group and similar findings was also contributed by Shakuntala Chockalingam<sup>10</sup> among both sexes. Increased family size has got a positive association with hypertension. The difference was found to be highly significant and similar finding was also contributed by L. Kannana and T.S.Satyamoorthy.<sup>11</sup> The occupational status has been found to have association with hypertension in the present study. Those who were in

professional group had lesser prevalence rate as compared to other category of occupation. similar results was found by the study carried out by L. Kannana and T.S.Satyamoorthy<sup>11</sup> while on the contrary Padmavathi and Guptha<sup>12</sup> at Delhi, Gosh & Joshi et al<sup>13</sup> at Simla found that hypertension was more common in professional group as compared to unskilled and semiskilled groups, but Mill et al<sup>14</sup> did not find any significant association between occupational status and hypertension. Probably, the financial and job security in professional occupation have role in hypertension. In the present study among hypertensives, smoking and alcohol had important risk factor for the association of hypertension and the difference was statistically significant compared to non-smokers and non alcoholic. Studies done by Benovitz Neal L<sup>15</sup> observed that sodium absorption was higher (107 mmol/day) among tobacco users compared to non-tobacco users. This increased sodium absorption in the body due to tobacco use, has got some role in association of hypertension. Among the overall alcoholics, 58(48%) were normotensives and remaining 62(52%) were having hypertension. Statistical analysis was found to be significant indicating that alcohol is one of the risk factors in association with hypertension compared to non-alcoholics. Friedman<sup>16</sup> reported similar finding that excessive alcohol intake is related to development of hypertension. Obesity is one of the risk factors for hypertension, and this has been observed in this study, as increased BMI was resulting in hypertension in the selected subjects. Similarly, Friedman et al<sup>16</sup> carried out a 6-year follow-up study on hypertension and obesity and found that obesity and weight gain were clear precursors of hypertension. In the present study (Table 3) among hypertensive, 70(25.3%) were suffering from diabetes mellitus. Among the overall diabetics, 58 (45%) were normotensives and 70 (55%) were in stage I and stage II hypertension. On statistical analysis the difference was found to be significant indicating that hypertension and diabetes mellitus have got an association, similarly Raj B singh<sup>17</sup> et al carried out a study among ethnic groups of rural and urban population of North India and revealed that the diabetes mellitus was risk factor for hypertension. Oral contraceptive usage was found to be a significant risk factor in causation of hypertension. Among female hypertensive, 64(40.7%) were using oral contraceptives. The difference was statistically significant indicating that usage of oral contraceptive had an association with hypertension. similar results were found in studies

carried out in China<sup>18</sup> revealed that prevalence rate of hypertension was significantly higher with usage of oral contraceptive and the mean systolic pressure and diastolic pressure in groups on oral contraceptive pills were higher by 6.5 mm of Hg and 3.24 mm of Hg respectively as compared to blood pressure readings in control group.

## CONCLUSION

The overall prevalence rate of hypertension in the rural community studied, among the age group 30 years and above in both sexes was 25.2 percent. The prevalence rate was higher (27%) among females than males (23%). Increase in age, large family size, occupation, alcohol, smoking, obesity, use of oral contraceptives and diabetes mellitus were found to be associated with hypertension. There is a necessity for the health care providers to take note of this trend and institute appropriate preventive measures, including changing life style modifications.

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