

Prevalence of Hypertension and Its Association with Selected Socio-Demographic Factors in a Rural Area of Jharkhand

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Abstract:

Background: Hypertension is a major public health problem affecting people from all socio-economic strata across the globe. Hypertension causes considerable mortality, morbidities and disability worldwide. Over the years, raising prevalence of hypertension has been reported not only from urban area, but also from rural areas of India.

Aims and Objectives: 1) To determine prevalence of hypertension in a rural area of Jharkhand, and 2) To find the association between hypertension and selected socio-demographic variables.

Materials and Methods: A cross sectional study was conducted in a rural area of Jharkhand. Total 500 study subjects were included in the study. Sample size was determined by n-master software. Pre tested semi-structured questionnaire was used for data collection. Data entry was done in MS excel and analysed in SPSS software. Frequency distribution was done and chi square test was used to find the association between hypertension and selected sociodemographic factors.

Results: Out of 500 study subjects, 263 (52.6%) were male and 237 (47.4%) were female. 326 (65.2%) subjects were in the age group of 30-59 years. About 30.0% of the subjects were tribal. Majority (90.0%) subjects were from class IV and V as per modified BG Prasad's classification. Prevalence of hypertension in the population was found to be 19.8%. Hypertension was significantly associated with age (p -value < 0.001), ethnicity (p -value = 0.017) and educational status (p -value = 0.005) of study subjects. Significant association was not found with sex (p -value = 0.075) and occupation (p -value = 0.167) of the subjects.

Conclusion: Hypertension was found to be significantly associated with age, ethnicity and education of subjects in the present study.

Keywords: Hypertension, Prevalence, Socio-demographic factors, Rural area.

I. Introduction

Once considered a disease of affluent society and developed countries hypertension now silently and rapidly spreading in developing countries, affecting people irrespective of their socioeconomic status and habitation. The increasing prevalence of hypertension is attributable to rapid transition of life style practices in developing countries including India, as well as increased elderly population due to an increase in life expectancy.¹ Hypertension is a major risk factor for the development of cardiovascular disease (CVD).² Apart from CVD it has also an impact on stroke and renal failure. While there is no critical value for blood pressure, the risk of CVD increases progressively with the level of BP.³

As per World Health Statistics 2012, prevalence of raised blood pressure among adults aged 25 years and more in India is 23.1% and 22.6% for males and females respectively.⁴ A recent meta analysis has shown prevalence of hypertension as 40.8% and 17.9% in urban and rural population of India.⁵ Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart diseases deaths in India.⁶ Sex and age are the important non modifiable risk factor for hypertension. In general, average blood pressure level of men is higher than female. However, this difference becomes smaller or even gets reversed once women attains menopause.⁷ There is linear relation between age and blood pressure and risk of development of hypertension increases with age in both sexes. Almost all Indian studies have found increasing levels of blood pressure with increasing age.

There is no established baseline data available on prevalence of hypertension in the state of Jharkhand. 75.9% of the total population lives in rural areas. Tribal population, constitute a significant proportion (26.2%) of state's total population.⁸ Agricultural work and manual labour are main occupation of people of Jharkhand especially those living in rural areas. This study was undertaken to determine prevalence of hypertension its socio-demographic correlates among adults in a rural area of Ranchi district of Jharkhand.

Aims and Objectives: 1) To determine prevalence of hypertension in a rural area of Jharkhand. 2) To describe the association of selected socio-demographic factors with hypertension.

II. Materials And Methods

A cross sectional study was conducted in one of the rural field practice area, Ormanjhi of Rajendra Institute of Medical Sciences (RIMS), Ranchi from January 2013 to September 2014. Sample size was calculated by n-Master software 2.0 developed at CMC, Vellore, India. Cluster design of sampling was adopted for study. Based on literature search, expected prevalence of hypertension was assumed as 0.2 (20%), absolute precision of 5%, design effect 2 and 95% confidence interval and a sample size of 492 was calculated for the present study.

There are three health sub centres associated with rural field practice area, Ormanjhi of RIMS, Ranchi. These three health sub centres cater health need of 21 villages in the area. For study purpose, one village was considered as one cluster. Out of 21 villages, 10 villages were chosen randomly by lottery method for study. From each village 50 subjects were taken for study. For this, each house in selected village was assigned a number and one house was chosen randomly by lottery method. Then subsequent houses were visited to collect data from subjects until a sample size of 50 was achieved in that village. All willing eligible subjects from a household were enrolled for study. Thus, total 500 subjects were included in the study. Informed consent was taken from study subjects. A pre-tested, semi-structured questionnaire was used for data collection.

A person was considered hypertensive if he/she has a systolic BP of ≥ 140 mm Hg and/or a diastolic BP of ≥ 90 mm Hg measured on two separate occasions with a minimum interval of at least 5 minutes between the two measurements OR a self reported history of taking anti-hypertensive medications.² Blood pressure was measured in sitting position by diamond mercury sphygmomanometer (IS: 3390/CM/L-0196043). Average of two measurements was taken for study.

Inclusion and exclusion criteria: All willing adults aged 20 years and above from both genders were eligible for study. People aged less than 20 years, pregnant female and nursing mothers in postpartum period were excluded from study. Person suffering from acute painful conditions and critically ill person who were unable to comprehend questions were also not considered eligible for present study. Study was approved by Institutional ethical committee of RIMS, Ranchi.

Statistical analysis: Data entry was done in MS excel spreadsheet. Data analysis was done using SPSS software. Chi square test was used to find the association between categorical variables. Analysis of Variance (ANOVA) was used to see the difference of mean systolic as well as diastolic blood pressure in more than two different groups of subjects.

III. Results

There were 263 (52.6%) male and 237 (47.4%) female subjects in the present study. Of 500 subjects, 326 (65.2%) were in the age group of 30-59 years. Mean age of study subjects was 44.12 years (SD-13.64 years). Minimum age of subjects was 20 years where as maximum age was 90 years. Nearly half of the study subjects were Hindus (224; 44.8%) and only few (11; 2.2%) were Christians. Among all study subjects 148 (29.6%) were tribal whereas remaining 352 (70.4%) were non tribal. Among all 500 subjects, 221 (44.2%) were illiterate. 170 (34.0%) subjects were educated below 10th standard and remaining 109 (21.8%) were educated 10th standard or above. Out of 500 subjects, 117 (23.4%) were daily wage labourer, 77(15.4%) farmer, 50 (10.0%) in service, and 49 (9.8%) were doing business. Amongst all women, 188 (79.3%) were housewife. Maximum subjects belonged to class V (244; 48.8%) and class IV (206; 41.2%) as per modified Prasad's classification for socio-economic status. Only 50 (10.0%) were from class I, class II and class III. (Table - 1)

Table 1: Selected socio-demographic profile of study subjects (n=500).

Socio-demographic Variables		Frequency	Percentage
Sex	Male	263	52.6
	Female	237	47.4
Age (in years)	20-29	90	18.0
	30-39	109	21.8
	40-49	125	25.0
	50-59	92	18.4
	60 and above	84	16.8
Religion	Hindu	224	44.8
	Muslim	128	25.6
	Christian	11	2.2
	Sarna	137	27.4
Ethnicity	Tribal	148	29.6
	Non tribal	352	70.4
Education	Illiterate	221	44.2
	Less than 10th std	170	34.0

	10th std or above	109	21.8
Occupation	Service	50	10.0
	Business	49	9.8
	Daily wage labourer	117	23.4
	House wife	188	37.6
	Farmer	77	15.4
	Nonworking	19	3.8
Socio-economic status*	Class I	2	0.4
	Class II	17	3.4
	Class III	31	6.2
	Class IV	206	41.2
	Class V	244	48.8

*As per modified Prasad's classification for May 2014

Out of 500 subjects, 263 (52.6%) subjects had normal blood pressure reading. 138 (27.6%) subjects were pre-hypertensive. There were 83 (16.6%) subjects in stage I and 16 (3.2%) in stage II hypertension. Hence, total 99 (19.8%) subjects were hypertensive. (Table - 2) For further data analysis, two broad categories of blood pressure was considered as 'no hypertension' and 'pre hypertension'. Normal and pre hypertension was considered together as no hypertension (401). Both stage I and stage II hypertension was considered as hypertension (99).

Table 2: Status of blood pressure of subjects under study (n = 500)

Blood pressure status		Number	Percentage
Normal		263	52.6
Pre Hypertension		138	27.6
Hypertension	Stage I	83	16.6
	Stage II	16	3.2
Total		500	100.0

Mean SBP- 122.83, SD – 15.83, Mean DBP – 79.24, SD - 8.73

In the present study, hypertension was found to be significantly associated with age (p-value < 0.001), religion (p-value = 0.001), ethnicity (p-value = 0.017) and education (p-value = 0.005) of the subjects. However, was not found to be significantly associated with sex (p-value = 0.075) and occupation (p-value = 0.167) of the study subjects. Findings of present study show higher prevalence of hypertension among subjects of higher socio-economic status. (Table - 3)

Table 3: Prevalence of hypertension in relation to selected socio-demographic factors

Socio-demographic factors		Blood pressure status		Chi square test results
		No hypertension	Hypertension	
Sex	Male (263)	203 (77.2%)	60 (22.8%)	$\chi^2 = 3.17$, df = 1, p-value = 0.075
	Female (237)	198 (83.5%)	39 (16.5%)	
Age	20-29 (90)	85(94.4%)	5 (5.6%)	$\chi^2 = 43.54$, df = 4, p-value < 0.001
	30-39 (109)	99 (90.8%)	10 (9.2%)	
	40-49 (125)	101 (80.8%)	24 (19.2%)	
	50-59 (92)	64 (69.6%)	28 (30.4%)	
	≥ 60 (84)	52 (61.9%)	32 (38.1%)	
Religion	Hindu (224)	193 (86.2%)	31 (13.8%)	$\chi^2 = 15.17$, df = 3, p-value = 0.001
	Muslim (128)	99 (77.4%)	29 (22.7%)	
	Christian (11)	5 (45.5%)	6 (54.5%)	
	Sarna (137)	104 (75.9%)	33 (24.1%)	
Ethnicity	Tribal (148)	109 (73.6%)	39 (26.4%)	$\chi^2 = 5.68$, df = 1, p-value = 0.017
	Non tribal (352)	292 (83.0%)	60 (17.0%)	
Education	Illiterate (221)	163 (73.8%)	58 (26.2%)	$\chi^2 = 10.74$, df = 1, p-value = 0.005
	< 10 th std (170)	143 (84.1%)	27 (15.9%)	
	≥ 10 th std (109)	95 (87.2%)	14 (12.8%)	
Occupation	Service (50)	39 (78.0%)	11 (22.0%)	$\chi^2 = 7.18$, df = 5, p-value = 0.167
	Business (49)	38 (77.6%)	11 (22.4%)	
	Daily wage labourer (117)	99 (86.6%)	18 (15.4%)	
	House wife (188)	152 (80.9%)	36 (19.1%)	
	Farmer (77)	62 (80.5%)	15 (19.5%)	
	Nonworking (19)	11 (57.9%)	8 (42.1%)	
Socio-economic status	Class I (2)	1 (50.0%)	1 (50.0%)	----
	Class II (17)	11 (64.7%)	6 (35.3%)	
	Class III (31)	21 (67.7%)	10 (32.3%)	
	Class IV (206)	160 (78.7%)	46 (22.3%)	
	Class V (244)	208 (85.2%)	36 (14.8%)	

Both mean systolic and diastolic blood pressure among male was higher than female. This difference in mean systolic and diastolic blood pressure in both sexes was found to be statistically significant (p-value < 0.001). Present study also found that mean systolic blood pressure was lowest in younger age group and highest in elder age group. Finding also suggests similar trend for diastolic blood pressure. Difference in mean systolic and diastolic blood pressure among subjects in different age group was also found to be statistically significant (p-value < 0.001). (Table – 4, Table - 5)

Table 4: Comparison of mean systolic and diastolic blood pressure of subjects from both sex

Blood pressure	Sex	Mean	SD
Systolic BP*	Male	125.06	14.28
	Female	120.03	17.08
Diastolic BP**	Male	81.14	7.92
	Female	77.12	9.12

*t-value = 3.316, p-value = 0.001; ** t-value = 5.231, p-value < 0.001

Table 5: Comparison of mean systolic and diastolic blood pressure of subjects from different age group

Blood pressure	Age group	Mean	SD
Systolic BP*	20-29	114.17	9.92
	30-39	118.19	10.81
	40-49	123.99	15.87
	50-59	125.77	15.30
	60 and above	133.20	19.63
Diastolic BP**	20-29	74.91	7.73
	30-39	77.85	6.86
	40-49	80.32	8.79
	50-59	80.85	8.85
	60 and above	82.29	9.75

*F-value = 22.306, p-value < 0.001; ** F-value = 10.834, p-value < 0.001

IV. Discussion

Earlier Indian studies have found that prevalence of hypertension among adults in rural area ranges from 7.2% to 35.9 %.^{9,10,11-16} Present study revealed that overall prevalence of hypertension among adults aged 20 years and above was 19.8%. Prevalence of hypertension among adults in this study was similar to study done by Kokiwar et al¹⁷ in a rural area (19.04%) and little higher than another Indian study by Yuvraj et al¹⁸ in a rural area (18.3%) and a meta-analysis⁵ (17.9%) in India. Overall prevalence of pre hypertension in the present study was 27.6%. This finding is important from public health point of view as there is impending risk of becoming hypertensive for more than one quarter of people. Intervention at this level may either delay the onset of hypertension or prevent them from hypertension. Persons with pre-hypertension have a greater risk of developing hypertension than do those with lower blood pressure levels.¹⁹ In addition, pre-hypertension is associated with increased risk of major cardiovascular events, independent of other cardiovascular risk factors.²⁰

Sex is one of the important non modifiable risk factor for hypertension. Earlier studies done in India have shown varying results about hypertension in both sexes. Prevalence of hypertension in the present study was found to be higher in male (22.8%) than in female (16.5%) although not significant. Study conducted by Bansal et al¹⁵ in a north Indian community revealed similar finding (Male – 30.9% and Female – 27.8%). Other studies done by Agrawal VK et al²¹, Singh R et al²² and Yuvraj et al¹⁸ have shown similar results. Higher prevalence of hypertension in female was reported by Todkar et al⁹ and Jajoo et al²³ in their studies.

Present study support the linear relation between age and hypertension as higher prevalence was found among elder subjects and lower prevalence among younger subjects with significant statistical difference. This is in concordance with findings of some other Indian studies which has supported the relation between age and hypertension.^{6,9,15,17,23,24}

This study also revealed the higher prevalence of hypertension in tribal population (26.0%) in comparison to non tribal population (19.8%). Other Indian studies have revealed higher prevalence of hypertension in different tribal population. Study by Sachdev²⁵ among tribal population of Rajasthan has showed 16% to 30% prevalence of hypertension among different tribes. Meshram et al⁶ in their study has described prevalence of hypertension as 45% and 36% among adult tribal men and women respectively. Another study conducted in Car Nicobar Islands showed a higher prevalence (50.5%) of hypertension in tribal population.²⁶ Study conducted by Kusuma et al²⁷ in Odisha state in 2008 showed 25% and 13% prevalence among tribal men and women, respectively.

Present study also found the association of blood pressure with education and occupation. This study revealed highest prevalence among illiterate and lowest among those who have studied 10th standard or above. Nonworking adults, business personnel and those who were in service showed higher prevalence of hypertension in the present study. Although prevalence was found to be higher among subjects from higher

socio-economic status, relation of blood pressure with socio-economic status could not be established because the fact that 90.0% subjects in this study were from class IV and class V. Earlier studies have also described such association with varying results. Meshram et al⁶ in their study found lower prevalence of hypertension among educated and high socio-economic groups. Study conducted by Dutta A and Ray MR²⁸ in West Bengal too found the association of hypertension with education and average family income. Singh R et al²² in their study found higher prevalence of hypertension among business personnel, professionals and those who are in service, similar to present study. However, in same study highest prevalence was found to be among subjects with higher education. This difference from present study may be attributable to the fact that in their study nearly half (47%) subjects were from urban area.

V. Conclusion

Nearly one fifth (19.8%) of study subjects were hypertensive. More than one fourth (27.6%) of the subjects were pre hypertensive. Age, religion, ethnicity and education of study subjects were significantly associated with hypertension in the present study. Mean systolic as well as diastolic blood pressure were directly related to sex and age of the study subjects.

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