

Prevalence and socioeconomic determinants of prehypertension and hypertension in Aligarh

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Abstract

Introduction: High blood pressure is the commonest risk factor for cardiovascular disease and is a major contributor to avoidable death and disease in India. The present study was carried out with an objective to study the prevalence of hypertension and prehypertension and sociodemographic correlates in rural and urban areas.

Materials and Methods: The present community based cross sectional study was conducted in the field practice areas of the Urban Health Training Centre (UHTC) and Rural Health Training Centre (RHTC), Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India. Systemic random sampling to include subjects was used. Six hundred and forty subjects were chosen for the study. The study was carried out for one year. Data were analyzed with SPSS version 13.

Results: The overall prevalence of hypertension and prehypertension in our study was 19.7% and 53.7% respectively. The prevalence of high blood pressure showed a significantly increasing trend with increasing age in both males and females. Significant association of hypertension with sociodemographic variables such as occupation, income, locality and social class was noted.

Conclusion: High prevalence of prehypertension and hypertension calls for urgent preventive and treatment measures which are cost effective for early diagnosis and improve the availability of basic diagnostics at primary health care level.

Keywords: Hypertension, Pre-hypertension, Prevalence, Socio-demographic factors.

Introduction

Hypertension is a major risk factor for cardiovascular disease and is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke.¹ According to World Health Organization, the worldwide burden of hypertension may be as much as 1 billion individuals and approximately 7.1 million deaths per year may be attributed to hypertension. In addition, suboptimal blood pressure (>115mm Hg of SBP) is number one attributable risk factor about 62% of cerebrovascular diseases and 49% of ischemic heart disease.² The prevalence of hypertension in the last six decades has increased from 2% to 25% among urban residents and from 2% to 15% among the rural residents in India. According to Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, the overall prevalence of hypertension in India by 2020 will be 159.46/1000 population.³

Blood pressure (BP) is directly associated with risks of several types of cardiovascular disease, and the associations of BP with disease risk are continuous; indicating that large proportions of most populations have nonoptimal BP values.⁴ The seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) defines hypertension as blood pressure >140/90 mmHg. Persons with blood pressure above optimal levels, but not clinical hypertension (systolic blood pressure of 120-139 mm Hg or diastolic blood pressure of 80-89 mm Hg), are

defined as having “prehypertension”.⁵ Persons with prehypertension have a greater risk of developing hypertension than do those with lower blood pressure levels.⁶ Patients with Prehypertension (120–139/80–89 mmHg) have an increased risk of cardiovascular morbidity and mortality compared with patients who have normal blood pressure.^{7,8} Recent epidemiological studies carried out using above criteria show increased prevalence of prehypertension and hypertension in both urban and rural areas of India.⁹⁻¹² 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.¹³ In developing countries, preventability of prehypertension deteriorating into hypertension could have substantial positive impact on burden of cardiovascular diseases and socioeconomic domain of the country. Hence this study therefore attempts to study the prevalence of hypertension and prehypertension and its sociodemographic correlates in rural and urban areas of Aligarh.

Materials and Methods

The present community based study was conducted in the field practice area of the Urban Health Training Centre and Rural Health training Centre, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh. The urban health training center (U.H.T.C) has four registered peri-urban localities with 1670 households and a registered

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population of 10,250. The rural health training center (R.H.T.C.) has seven registered villages having 2400 households with a registered population of 14,600. Approval for study was passed from the institutional board of study meeting. The estimated sample size was calculated according to the formula: $N = 4pq/d^2$ where p is the prevalence of hypertension, $q = 1 - p$ and d is absolute error. Taking the prevalence of hypertension,¹² as 32% and 15% nonresponsive rate, the sample size was approximated to 640. The sample included all individuals aged between 18 to 65 years. Systematic random sampling was done in the respective areas and sample was drawn from each area. We drew 60% and 40 % of the sample size from the rural population and urban population respectively. Proportionate to population size we had a sample of 340 subjects from the RHTC and 256 subjects from the UHTC. A preformed proforma questionnaire was filled up by house to house visit till 640 subjects were enrolled in the study. Blood pressure (systolic and diastolic phase V of Korotkoff) was measured using a standard mercury sphygmomanometer in the right arm in a sitting posture, after at least 5 min of rest. It was repeated after 5 min and the second reading was used for analysis. Blood pressure variation was between 2-4 mm of Hg. Hypertension was diagnosed according to JNC 7 criteria.[5] Normal blood pressure was defined as systolic blood pressure <120 mm Hg and diastolic blood pressure <80 mm Hg and pre-hypertension as systolic

blood pressure between 120 to 139 mm Hg or diastolic blood pressure between 80 to 89 mm Hg. Hypertension was defined as systolic blood pressure >140 mm Hg or diastolic blood pressure >90 mm Hg. All subjects currently on anti-hypertensive medications, or having written prescriptions of anti-hypertensive drugs, were classified as "hypertensive", irrespective of their current blood pressure reading. The social class of the subject was determined using the Modified Prasad Scale. Social classes I and II were categorized into upper class, class III as middle class and class IV and V of Modified Prasad's classification were categorized into lower class.¹⁴ Analysis was performed using SPSS version 13.0 (SPSS, Chicago, IL). Chi-square test was applied wherever applicable.

Results

The overall prevalence of hypertension and prehypertension in our study was 19.7% and 53.7% respectively. Prevalence of hypertension was higher in males (22.0%) than females (17.6%). About 53% of the subjects were of the both sexes were found to be in prehypertension category. Table 1 and Table 2 show the distribution of hypertension, mean SBP and mean DBP in different age groups in males and females respectively.

Table 1: Prevalence of hypertension among male subjects in different age groups

Criteria	Age groups						P
	18-25 (n=65)	26-35 (n=63)	36-45 (n=57)	46-55 (n=37)	56-65 (n=78)	Total (300)	
Normal	21(32.3)	16(25.4)	11(19.3)	10(27.0)	18(23.1)	76(25.3)	χ^2 - 37.95 P value <0.05
Prehypertension	43(66.2)	34(54.0)	33(57.9)	17(45.9)	31(39.8)	158(52.7)	
Stage 1 hypertension	1(1.5)	13(20.6)	11(19.3)	10(27.0)	29(37.2)	64(21.3)	
Stage 2 hypertension	0(0.0)	0(0.0)	2(3.5)	0 (0.0)	0(0.0)	2(0.7)	
Mean SBP \pm SD	124.4 \pm 11.3	126.2 \pm 11.7	127.5 \pm 13.5	133 \pm 16.5	135 \pm 14.7	129 \pm 13.8	0.007
Mean DBP \pm SD	81.2 \pm 9.3	85.2 \pm 9.7	86.0 \pm 11.1	89.2 \pm 11.1	90.2 \pm 9.5	87.1 \pm 10.5	0.001

Table 2: Hypertension among female subjects in different age groups

Criteria	Age groups						P
	18-25 (n=73)	26-35 (n=75)	36-45 (n=69)	46-55 (n=73)	56-65 (n=50)	Total (N=340)	
Normal	30(41.1)	18(24.0)	22(31.9)	19(26.0)	6(12.0)	95(27.9)	χ^2 - 43.91 P value <0.05
Prehypertension	39(53.4)	48(64.0)	39(56.5)	32(43.8)	27(54.0)	185(54.4)	
Stage 1 hypertension	1(1.4)	9(12.0)	8(11.6)	16(21.9)	15(30.0)	49(14.4)	
Stage 2 hypertension	3(4.10)	0(0.0)	0(0.0)	6(8.2)	2(4.0)	11(3.2)	
Mean SBP \pm SD	119.5 \pm 12.3	121.2 \pm 14.2	125.3 \pm 14.5	134.3 \pm 16.5	140.1 \pm 14.7	124.2 \pm 11.2	0.001
Mean DBP \pm SD	81.2 \pm 9.3	85.2 \pm 9.7	86.0 \pm 11.1	89.2 \pm 11.1	90.2 \pm 9.5	84.1 \pm 10.4	0.001

In the current study, the prevalence of hypertension increased significantly from age group 18-25 to 56-65yr. The Mean SBP and DBP reported in males was 129 \pm 13.8 and 87.1 \pm 10.5 respectively, and in females it was 124.2 \pm 11.2 and 84.1 \pm 10.4 respectively. Mean SBP and Mean DBP showed a predominant rising trend with increasing trend with age which was found to be highly significant. However, the mean SBP and DBP were lowest in the age group 18-25 years and increased with age.

Blood pressure and sociodemographic factors

Based on blood pressure, subjects were dichotomized as hypertensives (BP \geq 140/90 mm Hg) and nonhypertensives (<140/90 mm Hg) and studied with respect to different socio-demographic factors. The prevalence of hypertension was significantly associated with sociodemographic variables as shown in Table 3. The prevalence was more in male subjects who were semiprofessionals or professionals (55.5%) and who had better qualification (51.7%), whereas in case of females, it was more in unemployed (52.4%) mostly elderly followed by unskilled laborers (41.7%). Regarding the type of family there was no significant statistical association with raised blood pressure. Prevalence of high blood pressure is directly related to socioeconomic status. It was 53.6% in males belonging to upper SES compared to 18.4% in lower SES males. It follows the similar trends in females also.

Table 3: Hypertension by socio-demographic factors

Criteria	Males		Females	
	n	(%)	n	(%)
Occupation				
Unemployed	40	7(17.5)	21	11(52.4)
Unskilled	109	15(13.8)	12	5(41.7)
Semiskilled/Skilled	46	1(2.2)	2	0(0.0)
Clerical	69	23(33.3)	-	-
Semiprofessional/Professional	36	20(55.5)	20	2(10.0)
Housewife	-	-	285	42(14.7)
$\chi^2=79.58$, p-value-< 0.05		$\chi^2=48.69$, p-value < 0.05		
Education				
No formal education	79	7(8.9)	173	26(15.0)
Primary/Middle	45	9(20.0)	37	15(40.5)
High / Intermediate	118	20(16.9)	86	12(13.9)
Graduate/Above graduate	58	30(51.7)	44	7(15.9)
$\chi^2=82.70$, p-value-<0.05		$\chi^2=66.76$, p-value-<0.05		
Religion				
Hindu	128	31(24.2)	112	24(21.4)
Muslim	170	35(20.6)	226	36(15.9)
Christian	2	0(0.0)	2	0(0.0)
$\chi^2=13.58$, p-value-<0.05		$\chi^2=3.41$, p-value->0.05		
Family type				
Nuclear	109	24(22.0)	143	27(18.9)
Joint	191	42(22.0)	197	33(16.8)
$\chi^2=3.82$, p-value-<0.05		$\chi^2=18.91$, p-value-<0.05		
Social class				
Upper	28	15(53.6)	50	11(22.0)
Middle	39	8(20.5)	59	11(18.6)
Lower	233	43(18.4)	231	38(16.4)
$\chi^2=32.8$, p-value-<0.05		$\chi^2=19.41$, p-value-<0.05		

Discussion

The results of present study reveal high prevalence of hypertension and its significant association with sociodemographic correlates and are corroborated by other studies.¹⁵⁻¹⁷ In Indians, studies conducted among urban population of Jaipur, hypertension was reported as 31% (men 30%; women 34%) and 36.9% (men 36.4%; women 37.5%).¹⁶⁻¹⁷ The prevalence reported by our study was low compared to above studies, as these studies were carried out only in urban areas. It is noted the prevalence in men was higher than in women as reported by studies conducted elsewhere.¹⁸⁻²⁰

JNC 7 has created a new designation of prehypertension to identify those individuals in whom early intervention by applying healthy lifestyles could reduce BP, decrease rate of

progression of BP of hypertensive levels with age, or prevent hypertension entirely. Our study revealed high prevalence of pre-hypertension (53.7%). This was similar to that reported by other studies conducted in industrialized economies as well as from India.^{12,21,23} Even in the rural population in Assam, 54% subjects had pre-hypertension and one-third had hypertension.²³

On statistical analysis hypertension was found to show a positive association with education and income in the respondents, in both males and females, in our study (Table 3). This finding is opposite to the findings of researchers in developed countries. For example, a study in Chicago, observed trends in different age groups and reported an inverse relation between hypertension and education in a sample of 27,000 respondents aged 25-64 years. The above

study also mentioned various other studies conducted in US which report similar findings.²⁴

In India, a study on coronary risk factors with respect to social classes. Has found high prevalence of coronary risk factors (obesity, sedentary lifestyle and hypertension) exists in high social classes (people with better income, occupation and education).¹⁸ Lower risk in high social classes in developed countries appears to be because of better health education and increased spare time physical activity. In developing countries however, the situation is reverse because people in lower social classes are too poor to buy foods with high fat content, therefore eat less expensive foods like fruits and vegetables. Also they usually have physically demanding occupations, low serum cholesterol and other factors which may be protective.

Conclusion

Hypertension and prehypertension has emerged as a fairly important risk factor for target organ damage, and cardiovascular-related morbidity and mortality. In our study large numbers of young adults are in the prehypertension group and therefore are potential candidates for becoming hypertensive with advancing age. Despite advances in the prevention, detection, and treatment of prehypertension and hypertension, it remains an important public health challenge that adopts appropriate treatments in different degrees effectively. Integrated programmes must be established at the primary care level for management of these patients. Operational research is need of the hour to identify the gaps in implementing cost effective interventions available for addressing prehypertension and hypertension even in low resource settings at primary care level.

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Conflict of Interest

None.

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Ethical Approval

Permission for the study was obtained from the College authorities prior to commencement

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