

ORIGINAL ARTICLE

PREVALENCE OF PREHYPERTENSION AND HYPERTENSION IN RURAL BAREILLY

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ABSTRACT

Objectives: To find the prevalence of prehypertension and hypertension in rural Bareilly.

Methods: The cross-sectional study involved a survey of 504 individuals residing in rural areas of District Bareilly. A structured pretested schedule was used to collect data regarding demographic characteristics and blood pressure pattern. Chi-square test and ANOVA were used to analyze data.

Results: The prevalence of prehypertension and hypertension was found to be 27.2% and 27.4% respectively. The proportion of hypertension showed an increasing trend with age. The mean systolic as well as diastolic blood pressure patterns were found to be higher with the increase in age. Insignificant differences were found with gender and religion.

Conclusion: The prevalence of prehypertension and hypertension was found to be high in rural Bareilly. Early detection of hypertension can be facilitated by periodic screening of the people regularly.

Key words: Prevalence, Pre hypertension, Hypertension, rural study, screening

INTRODUCTION

Hypertension is responsible for 57% of stroke deaths and 24% of coronary heart disease deaths in India.¹ Cardiovascular disease will be the largest cause of death and disability in India by 2020. Hypertension is emerging as a major health problem. The prevalence of hypertension has increased in urban communities as well as in rural people.²

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".³ Persons with pre-hypertension have a greater risk of developing hypertension than do those with lower blood pressure levels.⁴ In addition, pre-hypertension is associated with increased risk of major cardiovascular events, independent of other cardiovascular risk factors.⁵ Recently, Chennai Urban Rural Epidemiology Study reported prevalence of hypertension to be 20% as per US Seventh Joint National Committee on Prevention, Detection, Evaluation and Treatment of Hypertension criteria.⁶ There are only a few studies from India on the prevalence for prehypertension especially from

rural areas. Epidemiological studies to assess the prevalence of prehypertension and hypertension are urgently needed to determine the baseline against which future trends in risk factor levels can be assessed and preventive strategies planned to promote health among the populations.

The literature on prevalence of prehypertension and hypertension in Bareilly was scarce, thereby the present study was undertaken to provide the data on the prevalence of prehypertension and hypertension amongst individuals aged 15 years and above residing in rural areas of District Bareilly.

MATERIALS AND METHOD

Study design and the participants:

This six months cross-sectional study was carried out amongst individuals aged 15 years and above residing in Bithri Chainpur block of District Bareilly. Stratified random sampling and Probability Proportionate to Size technique was used to select the study subjects. All villages in the study area were primary sample units (PSU) i.e. strata. All adults aged 15 years and above from the PSUs selected formed sampling units.

Data collection:

This study was conducted between 1st October 2011 to 31st March 2012. A total of 504 individuals gave consent and participated in the study. A structured pretested schedule was used to collect data regarding socio-demographic characteristics (age, gender, religion and socioeconomic status) and blood pressure pattern. Modified Prasad's classification was applied to measure the individual's socioeconomic status.⁷

Two measurements of blood pressure on each study participant with a mercury column sphygmomanometer were made 30 minutes apart in sitting position. Blood pressure measurements were made on the subject's left arm using a cuff of appropriate size at the level of the heart. The cuff pressure was inflated 30 mm Hg above the level at which radial pulse disappeared, then deflated slowly at the rate of about 2mm per sec and the readings were recorded to the nearest 2 mm Hg.

In case where the two readings differed by over 10 mm of Hg, a third reading was obtained, and the three measurements were averaged. The pressures at which sound appeared and disappeared were taken as systolic blood pressure (SBP) and diastolic blood pressure (DBP) respectively. The measurements were taken by the first and second authors themselves.

Blood pressure was graded as normal (SBP <120 and DBP <80 mmHg), pre-hypertension (SBP = 120-139 and/or DBP = 80-89 mmHg), stage I hypertension (SBP = 140-159 and/or DBP = 90-99 mmHg), and stage II hypertension (SBP > 160 and/or DBP > 100 mmHg) as per US Seventh Joint National Committee on Detection, Evaluation and Treatment of Hypertension (JNC VII) criteria.⁸

Hypertension was diagnosed when systolic BP was \geq 140mmHg and/or mean diastolic BP \geq 90mmHg or when a person had history of anti hypertensive treatment fifteen days before the survey. Isolated systolic hypertension was defined as a systolic BP \geq 140mmHg and a diastolic BP < 90mmHg.

Inclusion criteria:

All individuals aged 15 years and above, who resided in the villages situated near the Rural Health Training Centre of the Department of Community Medicine, Rohilkhand Medical College and Hospital, Bareilly.

Exclusion criteria:

Patients who were non cooperative or refused to provide the necessary information were excluded from the study. Those individuals who were already diagnosed hypertensives and were taking anti hypertensive therapy were excluded.

Sample size calculation:

Considering the prevalence rate of hypertension approximately 20 per cent⁹ from a prior study by the same principal author the sample size was calculated. The following formula was used: Sample size = $4PQ/L^2$. Where, P is Prevalence = 20%, Q = 100 – P = 80% and L is absolute error = 4%. Sample size came out to be 400. A total of 504 individuals gave consent and participated in the study.

Ethical approval for the study was obtained from the institutional ethical committee.

Data entry and statistical analysis were performed using the Microsoft Excel and Statistical Package of Social Sciences (SPSS) windows version 14.0 software. Tests of significance like Pearson's Chi-square test, Student's t test and ANOVA were applied to find out the results. A two tailed p value < 0.05 was taken for statistical significance.

RESULTS

Majority of respondents were aged between 40-60 years of age (62.9%) and were males (57.3%). All of the respondents belonged to lower socioeconomic class applying Modified Prasad's classification. As per JNC VII criteria, 45.4% respondents were normotensives, 27.2% respondents were found to be pre-hypertensive while 19.2% and 8.1% respondents were in stage I and II of hypertension respectively, p value <0.05. (Table 1)

Table 1: Gender wise distribution of respondents according to blood pressures as per JNC-VII criteria

Gender	Normal	Pre Hypertension	Stage I Hypertension	Stage II Hypertension
	No. (%)	No. (%)	No. (%)	No. (%)
Male (n=289)	124 (24.6)	89 (17.7)	59 (11.7)	17 (3.4)
Female (n=215)	105 (20.8)	48 (9.5)	38 (7.5)	24 (4.8)
Total (n=504)	229 (45.4)	137 (27.2)	97 (19.2)	41 (8.1)

Chi-Square (df) 8.915(3) P-value.030

Overall 27.4% respondents were found hypertensive. The overall, mean blood pressures were $128.12 \pm 20.80/76.98 \pm 10.97$ mm Hg respectively. The proportion of hypertension showed an increasing trend with the increase in age. The Mean SBP and DBP also showed an increasing trend with age. (Table 2)

The proportion of hypertension (28.83%) was found to

be slightly higher among females as compared to that in males (26.29%), the difference being statistically insignificant. The Mean SBP and DBP observed in men was $127.16 \pm 18.13/77.16 \pm 10.46$ mm Hg and in women $129.41 \pm 23.91/76.74 \pm 11.63$ mmHg respectively, the difference being statistically insignificant. (Table 3)

Table 2: Age wise distribution of individuals identified with hypertension:

Age group (years)	No.	Hypertensives (%)	Mean SBP mmHg		Mean DBP mmHg	
			Mean	± SD	Mean	± SD
15-18	21	2 (9.5)	116.90	13.50	72.90	9.82
18-30	66	9 (13.6)	120.65	11.80	74.45	10.71
31-40	100	15 (15.0)	123.76	17.14	76.81	9.90
41-50	89	29 (32.58)	130.00	21.29	77.78	10.83
51-60	102	30 (29.41)	127.74	17.48	78.25	10.15
>60	126	53 (42.06)	135.11	20.49	80.34	10.79
Total	504	138 (27.4)	128.12	20.80	76.98	10.97
F -value			8.480		1.727	
P-value			0.000		0.127	

Table 3: Distribution of hypertensive according to mean systolic & diastolic blood pressure

Gender	Subjects	Hypertensives (%)	Mean SBP mmHg		Mean DBP mmHg	
			Mean	± SD	Mean	± SD
Males	289	76 (26.29%)	127.16	18.13	77.16	10.46
Females	215	62 (28.83%)	129.41	23.91	76.74	11.63
Total	504	138 (27.4%)	128.12	20.80	76.98	10.97
t-value			1.199		0.424	
P-value			0.231		0.671	

Higher prevalence of hypertension was found among Hindus as compared to Muslims, the difference being statistically insignificant. (Table 4)

Table 4: Hypertension in relation to religion:

Religion	Total (n=504)		χ^2 (df), P-value
	Participant	Hypertensive	
Hindus	194	55 (28.3)	0.149(1),
Muslims	310	83 (26.7)	0.699

DISCUSSION

Distribution of respondents according to blood pressure pattern

The prevalence of hypertension in India is reported as ranging from 10 to 30.9%.¹⁰ The average prevalence of hypertension in India is 25% in urban and 10% in rural inhabitants.² The prevalence of hypertension has increased during the last decade. The high prevalence of prehypertension (27.2%) and hypertension (27.4%) in the current study, confirms this increasing trend. Rapid urbanization, lifestyle changes, dietary changes and increased life expectancy are factors attributable to this rising trend. Prevalence of hypertension in this study is compatible to the prevalences reported in previous studies.^{6, 11, 12} Similar prevalence of prehypertension (24.5 per cent) has also been reported in the study by Bhardwaj et al (2010) carried in adult population of rural areas of Himachal Pradesh.¹³

Prevalence of prehypertension was also found to be high (18.8%) in a rural community of central India.¹⁴

Age wise distribution of the hypertensives

The proportion of hypertension as well as mean systolic and diastolic blood pressures were found to increase steadily with the increase in age. These

findings are coherent with those reported in the study conducted among urban and rural adults of Lucknow.¹⁵ Such changes of blood pressure with age might be due to changes in vascular system. Cross-sectional surveys, as well as prospective observational cohort studies, have consistently demonstrated a positive relation between age and blood pressure in most populations with diverse geographical, cultural and socioeconomic characteristics.¹⁶

Gender wise distribution of the hypertensives

The proportion of hypertension was slightly higher among females compared to that in males but the difference was not statistically significant. In contrast greater proportion of hypertension was observed among males (42.9%) as compared to females (34.2%) among rural population of Davanagere.¹⁷

Limitation

A major limitation of the study was that the blood pressure pattern estimates were based on measurement of blood pressure on a single day and were not repeated again for practical reasons.

Conclusion

Prevalence of Prehypertension and Hypertension was found to be highly prevalent in rural Bareilly. This study projects the need of early detection of hypertension which can be facilitated by periodic screening of the people regularly at hospital as well as community level. Counseling of the pre-hypertensives on lifestyle modification and its role in controlling hypertension should also be emphasized.

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