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An epidemiological study of hypertension in a rural population of Barabanki, Uttar Pradesh

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Abstract

Background: Non-Communicable diseases (NCDs) like hypertension are nowadays emerging as threatening public health issues affecting about each and every individual worldwide. Prevalence of hypertension has shown an uprising trend over recent past few decades.

Objectives: The present cross-sectional study was therefore undertaken to study the various risk factors associated with hypertension in a rural population of eastern Uttar Pradesh.

Material & Methods: A community based cross-sectional study was conducted among 796 adult individuals (≥18 years) in rural population of Barabanki district of Uttar Pradesh. Multistage sampling was used for the enrolment of study participants. A pre-designed, pre-tested semi structured questionnaire was used to collect data about basicsocio-demographic information. Anthropometry and blood pressure were measured with standard instruments and appropriate procedures for all the study subjects.

Results: Prevalence of hypertension was 24.1%. Proportion of individuals affected was comparatively higher in males (25.1%) than females (22.4%). Numbers of hypertensive subjects were found to increase with increase in age group. Proportion of pre-hypertensive subjects was even quite high (11.9%). Body mass index (BMI) and waist hip ratio were found significantly more in hypertensive than among normotensive. Variables like upper socio-economic status, sedentary type life style and consumption of tobacco along with alcohol were found to be significantly associated with hypertension.

Conclusion: Prevalence of hypertension was found to be quite high, which emphasizes the need for promoting community based comprehensive primordial prevention strategies on large scale at grass root level with provision of basic screening health approaches services.

Keywords: Hypertension, Cross Sectional Study, Rural.

Introduction

Hypertension, also known as a silent killer is a modern day's epidemic and is becoming a public health emergency all over the world spanning its domain over both developed and developing countries. Globally cardiovascular disease (CVDs) account for approximately 17 million deaths a year.(1) Of these, complications of hypertension results in about 9.4 million deaths globally every year.(2) Hypertension has caused about 7% of the disease burden as measured in disability-adjusted life years in 2010.(3) Hypertension continue to show increase in its trend both incidence and prevalence all around the world.(4) It is further estimated that number of hypertensive in developing countries out-weighed double as compared to that of developed. Based on current trends it is estimated that burden of hypertension would increase by to approximately 1.56 billion in the year 2025.(5) CVDs will be the major cause of morbidity and mortality in these countries by the year 2020 accounting for nearly one third of all deaths worldwide.(6) As hypertension cannot be cured completely, it requires lifelong medication along with some life-style modifications. As reported in various Indian studies it has been found that the prevalence of hypertension has increased by 30 times in urban population over a period of 55 years and about 10 times in rural population over a period of 36 years.(7,8) Changes in basic lifestyle, environment conditions, and urbanization, has perhaps lead hypertension towards rising trends. Although several prevalence studies of hypertension have been performed over the past few years but very few of them have focussed on rural population in Uttar Pradesh and elaborated the prevalence of hypertension in the age group of 18 years or above. Thus, the present study was carried out with the objective to study the prevalence of hypertension and associated risk factors in a rural population of Barabanki district, Uttar Pradesh.

Material and Methods

Study area: Catchment area of Rural Health Training Centre (RHTC), Satrikh, Hind Institute of Medical Sciences, Barabanki, Uttar Pradesh.

Study Design: Cross sectional descriptive study.

Study Population: Individuals aged ≥ 18 years of both the sexes.

Study Period: December 2015 to May 2016

Sample Size: The sample size for the present study was calculated using formula $4pq/l^2$ for estimation of proportion taking into account the prevalence of hypertension (p) as 20%;(9) and as the permissible margin of error in the estimated value, which is taken as

15% with 95% confidence limit. The required sample size was calculated to be about 796.

Sampling technique: Enrolment of study participant was done using multistage sampling from all the 16 villages under RHTC, Satrikh. In a village, all the houses were numbered serially. The first house was selected randomly and the subsequent houses were selected using a table of random numbers. From each house one eligible participant was selected. Approximately 50 participants were selected from each village. In the similar manner participants from all the 16 villages were selected and a sample size of 796 was obtained. Pregnant females or those subjects having any acute medical illness were excluded from study.

Data Collection: The subjects were interviewed using a predesigned, pretested, semi structured questionnaire containing items on general information i.e. age, sex, marital status, religion, caste, area of residence, socio-economic status of the family etc. and risk factors for hypertension i.e. body mass index, occupation, stress, life style, smoking, alcohol, family history, dietary habits etc.

Blood pressure measurement: The blood pressure was measured three times using an appropriate cuff for at least 3 minutes and the lowest reading was recorded in sitting position with feet on the floor and arm supported at heart level using a mercury sphygmomanometer at the level of heart. The cuff pressure was inflated 30 mmHg above the level at which the radial pulse disappears and then deflated slowly at the rate of 2 mmHg. The first and the fifth Korotkoff's sounds were taken as indicative of the systolic and diastolic blood pressure respectively. The JNC 8 guidelines were used in the present study for classifying subjects as hypertensives and non hypertensives.[10]

Ethical Considerations: This study was approved by the Institutional Human Ethics Committee of Hind Institute of Medical Sciences, Safedabad, Barabanki. Informed written consent was taken from all study subjects. Confidentiality and privacy was ensured at all stages (females were examined only in presence of other female attendant). People who are found to be hypertensive were counselled and referred to the nearest health centre.

Data Analysis: The data collected was entered in MS-Excel with subsequent proper checks and then analysed and statistically evaluated using SPSS-16 version. Association between various risk factors and hypertension was studied by applying appropriate statistical test. Qualitative data was expressed by the percentages and difference between the proportions was observed by Chi- square test or Fischer exact test. The risk factors for the disease significant in univariate analysis were considered in the multivariate analysis. Value of $p < 0.05$ was considered significant.

Results

Biosocial Characteristics of Study Population: In the present study, a total of 796 subjects were analysed. In all age groups males were more than females. In the age group of 50-59 years, 128 (88.9%) were males and 16 (11.1%) were females. The maximum number 207 (26.0%) of respondents were in 30-39 years of age group. Overall, 119 (14.9%) of the respondents were illiterate, of whom 56 (47.1%) were males and 63 (52.9%) were females. Among 796 respondents, 367 (46.1%) were educated up to secondary school followed by 206 (25.1%) educated up to primary school followed by 104 (13.1%) graduate & above. Overall, 50.9% respondents were unskilled workers, of whom 366 (90.4%) males were unskilled workers. 166 (20.9%) females were housewives. More than one third (44.2%) of the respondents belonged to lower SES followed by lower middle (22.0%), middle (21.7%), upper middle (9.0%) and upper class (3.0%).More than three fourth of males (77.1%) belonged to lower middle SES and more than one third of females (45.1%) belonged to middle SES. **[Table 1]**

Association between bio-social characteristics and hypertension: Out of the 796 subjects, 192 suffered from hypertension and in those, 64 (44.4%) were in the age group of 50-59 yrs. Among the hypertensive subjects, illiterate comprised of 40 (33.6%) followed by educated up to secondary school 88 (24.0%). Only 16 (15.4%) were educated up to graduate & above. Of the hypertensive study subjects, majority were professional 16 (66.7%) followed by 112 (27.7%) who were unskilled. 40 (24.1%) females were housewives. Out of 192 hypertensive respondents, 16 (66.7%) belonged to upper socio economic status followed by 80 (45.7%) to lower middle socio economic status according to Modified BG Prasad classification, 2015. Prevalence of hypertension was statistically significant for age group, occupational status, educational status and socio economic status ($p = 0.00$). Prevalence of hypertension among study subjects according to non-modifiable risk factors was found to increase with increasing age. In the age group of 30-39 years, the prevalence of hypertension was 15.5% which was increasing with age ($\chi^2 = 1.27$, $p = 0.00$). Prevalence of hypertension was significantly high in subjects with positive family history of hypertension (45.0%) and statistically significant with positive family history of hypertension ($\chi^2 = 47.69$, $p = 0.00$). **[Table 2]**

Association between modifiable risk factor & hypertension: Prevalence of hypertension was higher in non-vegetarian (28.6%) as compared to vegetarian (15.2%) andstatistically significant with hypertension ($\chi^2 = 17.36$, $p = 0.00$). Prevalence of hypertension was higher in person who had taken extra added salt (40.0%) and extra fat (33.5%) as compared to less salt and fat in their diet respectively and statistically significant with the hypertension ($\chi^2 = 47.33$, $p =$ & $\chi^2 = 14.12$, $p = 0.00$). Prevalence of hypertension was

higher among those who had taken less green vegetables in their diet (27.7%) as compared to more green vegetables (20.5%) and was statistically significant with hypertension (χ^2 =5.62, p =0.00). Prevalence of hypertension was significantly higher in obese person (31.5%) as compared to non-obese (20.1%) and statistically significant with BMI (χ^2 =12.92, p =0.00). Prevalence of hypertension was significantly higher in sedentary worker (37.3%) as compared to moderate (24.1%) and vigorous worker (14.9%) and statistically significant with physical activity and exercise (χ^2 =24.33, p =0.00). Prevalence of hypertension was higher in person with addiction (33.5%) as compared to non-addicted (15.5%) and statistically significant with addiction (χ^2 =35.36, p =0.00). Prevalence of hypertension was higher in Tobacco chewer (39.1%) as compared to non-tobacco chewer (19.6%) and the difference was statistically significant. Prevalence of hypertension was higher in smoker (29.1%) as compared to non-smoker (23.7%) and the difference was not statistically significant. **[Table 3]**

Table 1: Distribution of Study Population according on the basis of bio-social characteristic (N=796)

Characteristics	Sex		Total No. (%)
	Male No. [%]	Female No. [%]	
Age group (years)			
18-29	96 [50.3%]	95 [49.7%]	191 (24.0%)
30-39	135 [65.2%]	72 [34.5%]	207 (26.0%)
40-49	96 [63.2%]	56 [36.8%]	152 (19.1%)
50-59	128 [88.9%]	16 [11.1%]	144 (18.1%)
≥ 60	55 [53.9%]	47 [46.1%]	102 (12.8%)
Total	510 [64.1%]	286 [35.9%]	796 (100%)
Educational Status			
Illiterate	56 [47.1%]	63 [52.9%]	119 (14.9%)
Primary school	127 [61.7%]	79 [38.3%]	206 (25.9%)
Secondary school	239 [65.1%]	128 [34.9%]	367 (46.1%)
Graduate & above	88 [84.6%]	16 [15.4%]	104 (13.1%)
Total	510 [64.1%]	286 [35.9%]	796 (100%)
Occupational Status			
Unskilled	366 [90.4%]	39 [9.6%]	405 (50.9%)
Housewives	**Not Applicable**	166 [100%]	166 (20.9%)
Semi-skilled	88 [68.2%]	41 [31.8%]	129 (16.2%)
Skilled	40 [55.6%]	32 [44.4%]	72 (9.0%)
Professional	16 [66.7%]	8 [33.3%]	24 (3.0%)
Total	510 [64.1%]	286 [35.9%]	796 (100%)
Socio-Economic Status#			
Upper class	16 [66.7%]	8 [33.3%]	24 (3.0%)
Upper middle	40 [55.6%]	32 [44.4%]	72 (9.0%)
Middle	95 [54.9%]	78 [45.1%]	173 (21.7%)
Lower middle	135 [77.1%]	40 [22.9%]	175 (22.0%)
Lower	224 [63.6%]	128 [36.4%]	352 (44.2%)
Total	510 [64.1%]	286 [35.9%]	796 (100%)

#Modified B G Prasad Socioeconomic scale 2015

( ) Column percentage; [ ] Row total percentage

Table 2: Association between bio-social characteristic with hypertension (N=796)

Characteristics	Subjects screened (N=796)	Hypertension (n=192)	χ^2, d.f,p value
Age group (years)			
18-29	191 (24.0%)	0	χ^2 =1.27, d.f=4 p = **0.00**
30-39	207 (26.0%)	32 [15.5%]	
40-49	152 (19.1%)	56 [36.8%]	
50-59	144 (18.1%)	64 [44.4%]	
≥ 60	102 (12.8%)	40 [39.2%]	
Gender			

Male	510 (64.1%)	128 [25.1%]	χ^2= 0.74, d.f=1 p=**0.38**
Female	286 (35.9%)	64 [22.4%]	
Family History of HTN			
Present	160 (20.1%)	72 [45.0%]	χ^2= 47.69, d.f=1 p = **0.00**
Absent	636 (79.9%)	120 [18.9%]	
Educational Status			
Illiterate	119 (14.9%)	40 [33.6%]	χ^2 =10.27, d.f=3 p =**0.01**
Primary school	206 (25.9%)	48 [23.3%]	
Secondary school	367 (46.1%)	88 [24.0%]	
Graduate & above	104 (13.1%)	16 [15.4%]	
Occupational Status			
Unskilled	405 (50.9%)	112 [27.7%]	χ^2= 42.83, d.f=4 p = **0.00**
Housewife	166 (20.9%)	40 [24.1%]	
Semi-skilled	129 (16.2%)	16 [12.4%]	
skilled	72 (9.0%)	8 [11.1%]	
Professional	24 (3.0%)	16 [66.7%]	
Socio-Economic Status			
Upper	24 (3.0%)	16 [66.7%]	χ^2= 1.05, d.f=4 p = **0.00**
Upper middle	72 (9.0%)	24 [33.3%]	
Middle	173 (21.7%)	16 [9.2%]	
Lower middle	175 (22.0%)	80 [45.7%]	
Lower	352 (44.2%)	56 [15.9%]	

#Modified B G Prasad Socioeconomic scale 2015

( ) Column percentage; [ ] Row total percentage

Table 3: Association between modifiable risk factors and hypertension (N=796)

Characteristics	Subjects screened (N=796)	Hypertension (n=192)	χ^2, d.f,p value
Diet			
Vegetarian	264 (33.2%)	40 [15.2%]	χ^2 =17.36, d.f=1 p=**0.00**
Non- Vegetarian	532 (66.8%)	152 [28.6%]	
Extra added Salt			
Yes	240 (30.2%)	96 [40.0%]	χ^2= 47.33, d.f=1 p =**0.00**
No	556 (69.8%)	96 [17.3%]	
Extra added Fat			
Yes	215 (27.0%)	72 [33.5%]	χ^2 =14.12, d.f=1 p =**0.00**
No	581 (73.0%)	120 [20.7%]	
Green Vegetables Intake			
Daily	391 (49.1%)	80 [20.5%]	χ^2= 5.62, d.f=1 p =**0.01**
Weekly	405 (50.9%)	112 [27.7%]	
Fruits intake			
Weekly	104 (13.1%)	24 [23.1%]	χ^2= 1.39, d.f=2 p = **0.49**
Monthly	573 (72.0%)	144 [25.1%]	
Never	119 (14.9%)	24 [20.2%]	
BMI			
Non obese	517 (64.9%)	104 [20.1%]	χ^2 =12.92, d.f=1 p = **0.00**
Obese	279 (35.1%)	88 [31.5%]	
Physical activity			
Sedentary	150 (18.8%)	56 [37.3%]	χ^2 =24.33, d.f=2 p =**0.00**
Moderate	431 (54.1%)	104 [24.1%]	
vigorous	215 (27.0%)	32 [14.9%]	
Tobacco chewing			
Yes	184 (23.1%)	72 [39.1%]	χ^2=15.93, d.f=1

No	612 (76.9%)	120 [19.6%]	p = **0.00**
Smoking			
Yes	55 (6.9%)	16 [29.1%]	χ^2=0.28, d.f=1 p=0.59
No	741 (93.1%)	176 [23.7%]	
Alcohol			
Yes	32 (4.0%)	8 [25.0%]	χ^2=0.09, d.f=1 p=0.91
No	764 (96.0%)	184 [24.0%]	
Smoking & Alcohol			
Yes	111 (13.9%)	32 [28.8%]	χ^2=0.6,d.f=1 p=0.42
No	685 (86.1%)	162 [23.7%]	

( ) Column percentage; [ ] Row total percentage

Discussion

The overall prevalence of hypertension in our study subjects was 24.5%. This was much higher as compared to other Indian studies in which the prevalence of hypertension was found to vary between 3.41% to 14.1%.[11,12,13,14] However the result are quite comparable to Gupta *et. al*., who reported the prevalence of hypertension in rural west India to be about 21.0%.[15] These variation might be due to difference in baseline biosocial characteristics of study population and their basic lifestyle which generally varies from state to state in Indian subcontinent. As reported in other Indian studies the prevalence of hypertension was found to increase gradually in subsequent higher age groups.[13,14,15] The well-known fact that the hypertension increases with the age justifies this finding. The proportions of males were higher as compared to females with respect to hypertension (25.1% & 22.4% respectively). Similar finding was also reported by Madhukumar *et. al.,* who conducted their study in rural areas of Karnataka.[13] As reported by Kishore J *et.al*., significant difference was observed in prevalence of hypertension with respect to educational status.[14] In the present study the prevalence of hypertension was comparatively much lower among those who were educated up to graduation and above. Wang *et. al.,* opined that education makes the people aware about the disease and the preventive measures which might be the reason for these variations, this is similar to the findings reported in other studies in which occupation was found to be significantly associated with hypertension.[14,18] Also the proportion of individuals belonging to Upper socio-economic strata were significantly more affected with hypertension as compared to the other lower socio-economic groups. This variation in prevalence of hypertension in respect to socio-economic status and occupation might be attributed to level of stress in respective groups. Similar to other studies, the present study also revealed significantly higher proportion of hypertension in obese subject as compare to non-obese subjects (31.5% and 20.1% respectively).[11,12,13,14,19] Similar to the findings reported by Madhukumar *et. al.,* and Singh *et. al*., additional salt intake in diet and family history of hypertension was found to be significantly associated with hypertension.[13,20] With respect to alcohol & smoking no significant association was observed with hypertension, similar findings were also reported by Kishore J *et.al.,* in their study.[14] However similar to other studies tobacco chewing was found to be significantly associated with hypertension. In contradiction to the findings reported by Madhukumar *et. al*., and Singh *et. al.,* significant association was observed in vegetarian & non-vegetarian groups.[13,20]

Limitations

However the study has some limitations as the study was conducted in a selected block under catchment area of RHTC, the result can`t be generalized. Apart from that any causal relationship could not be established as the study was cross-sectional.

Conclusions

The present study revealed quite high prevalence of hypertension among the study subjects which emphasizes the need of periodic screening programmes for early diagnosis and prevention of complications due to hypertension. Apart from that community based IEC (Information Education Community) programme should be strengthened at the grass-root level so as to have a check over modifiable risk factors of hypertension.

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