

Prevalence of Hypertension and Its Risk Factors among Adults in a Rural Community of Hooghly District

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Abstract

Hypertension (HTN) is an important public health problem in both economically developed and developing nations. As per NFHS-4 prevalence rates for hypertension in rural India is 9.8% in men and 6.5% in women, and in rural West Bengal it is 8.8% in men and 7.2% in women (In the Age group 15-49 years). Hypertension is thought to be less common in rural areas, though data is limited and estimates vary widely depending on the methodology used. Hence such, community based studies on hypertension has now become an utmost necessity to not only assess the prevalence of hypertension & its risk factors among adults, but also to plan preventive strategies & promote the health of population in the rural communities of Bengal. To estimate the prevalence of hypertension, and to identify the risk factors of hypertension in the population, a study among adults of the rural community of Singur Block, Hooghly District of West Bengal was conducted.

Method: It was a community based cross sectional study, where 300 adults from 120 randomly selected households from one of the randomly selected villages, under the service area of Rural Health Unit and Training Centre Singur were studied for 6 months.

Results: Using the JNC VII criteria, Out of 300 study population, 45% were found to be hypertensive with 54.8% male and 45.2% female. Significant association was found with age, tobacco and alcohol addiction, extra salt intake, low fruit consumption, positive family history, stress, low physical activity, BMI and abdominal obesity while association with marital status, religion, caste, SES, educational qualification and nature of work was insignificant.

Conclusions: The prevalence of hypertension was found to be on the higher side compared to some previous reports of India and other Asian studies. It is therefore necessary to create awareness among the study population regarding adoption of healthy lifestyle measures for control of blood pressure.

Keywords: Hypertension • JNC VII • Risk factor • WHO

Introduction

Hypertension (HTN) is an important public health problem in both economically developed and developing nations [1]. As per World Health Organization report, about 40% of people aged more than 25 years had hypertension in 2008 [2]. Worldwide, 7.6 million premature deaths (about 13.5% of the global total) were attributed to high blood pressure. About 54% of stroke and 47% of ischemic heart disease worldwide were attributable to high blood pressure [3]. Hypertension has been associated with increased risk of coronary artery disease and is an independent risk factor for cardiovascular and cerebro-vascular diseases [4,5]. Hypertension is a major risk factor for CVDs, including stroke and myocardial infarction, and its burden is increasing disproportionately in developing countries as they undergo demographic transition [6-9]. As per NFHS-4 prevalence rates for hypertension in rural India is 9.8% in men and 6.5% in women, and in rural West Bengal it is 8.8% in men and 7.2% in women (In the Age group 15-49 years). Hypertension is thought to be less common in rural areas, though data is limited and estimates vary widely depending on the methodology used [10-14]. Previously identified risk factors for hypertension in Indians including higher body mass index (BMI), abdominal obesity, greater age, greater alcohol consumption, sedentary lifestyle and stress [10,12,14] and also Chronic diseases, high salt intake, lack of fruits (low potassium),

Positive family history etc., together with hypertension itself, have been identified as risk factors [6,7].

The study was carried out to find prevalence of hypertension and its risk factors in a rural community of Singur Block.

Objectives

- To determine the prevalence of hypertension among adults (≥ 18 years) in the selected rural community of Hooghly District.
- To identify the risk factors of hypertension in the population.

Methodology

Study settings

The study was conducted in a rural community of Singur block, Hooghly district of West Bengal which is the rural field practice area of All India Institute of Hygiene & Public Health, Kolkata.

Time line

The study was conducted for 6 months starting from April 2017 to September 2017.

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Study population

People aged 18 years and more, residing at the study area.

Inclusion criteria

All the inhabitants aged 18 years and more.

Exclusion criteria

Unwilling individuals and severely ill patients.

Study variables

Dependent variables:

Prevalence of hypertension (Known hypertensive or found to be hypertensive during study as per JNC 7 criteria.)

Independent variables:

Demographic factors (Age, sex, religion, marital status, caste, type of family.)

Socio-economic factors (Education, occupation, income).

Behavioral factors (smoking, alcoholism, physical activity, Stress, dietary habit including salt intake)

BMI and Waist Circumference

Family history of hypertension

Study tools

- Pre-designed structured schedule.
- Stethoscope
- Blood pressure measuring apparatus (aneroid type)
- Non-stretchable Measuring tape
- Weighing Machine calibrated.

Sample size

Considering the prevalence of hypertension 10% [15-18] among rural adult people in India with the Confidence level as 99% and absolute error 5%, the sample size calculated was 240 after applying the formula-

Sample size = $(2.58) 2pq / d^2$ (p=prevalence, q=1-p & d= absolute error 5%)

Sampling design

Out of the 64 villages under Rural Health Unit and Training Center Singur (RHU&TC), one village was selected by simple random sampling. The selected village was Dearah.

The total population at Dearah was 2347 and the number of household was 560. (Records of RHU&TC Singur and Nasibpur union health center, Dearah)

Assuming number of adults on an average in each household is 2, One hundred and twenty (120) households were selected by simple random sampling using random number table, for obtaining the calculated sample size of 240.

All adults in 120 households were considered in the study as per inclusion criteria and a total of 300 adults were obtained.

Method of data collection

All the participants were explained about the purpose of the study that this was an academic research in nature and all data provided by the participants would be kept confidential. After obtaining their approval regarding participation in this study the consent paper was duly signed by them. Then information was obtained about their socio-demographic character, dietary pattern, salt intake, alcohol consumption smoking habit and physical activity. Each participant was examined for Blood Pressure (using JNC VII Guidelines) along with height, weight and waist circumference following WHO standard techniques. History regarding preexisting Hypertension was obtained and previous records like prescription or OPD tickets, if any was also analyzed. Information was recorded in a predesigned and pretested schedule for data collection.

Data analysis

Data were analysed using the SPSS statistical software program (version 20).

Descriptive statistics were performed.

Results

A person was considered as suffering from hypertension if systolic blood pressure (SBP) was 140 mm Hg or above and/or diastolic blood pressure (DBP) 90 mm Hg and above or was already under treatment for hypertension (Table 1-7).

Table 1: Distribution of participants according to Socio-demographic Characteristics (n=300).

	Sex		Total
	Female	Male	
Age (in years)			
<21	15(8.88%)	11(8.40%)	26(8.7%)
21 – 30	20(11.83%)	6(4.58%)	26(8.7%)
31 - 40	56(33.14%)	30(22.9%)	86(28.7%)
41 - 50	33(19.53%)	46(35.11%)	79(26.3%)
51 – 60	28(16.57%)	27(20.61%)	55(18.3%)
61 – 70	15(8.88%)	11(8.4%)	26(8.7%)
>71	2(1.18%)	0(0%)	2(0.7%)

Marital Status	Currently Married	156(92.31%)	129(98.47%)	285(95%)
	Divorced or Separated	3(1.78%)	1(0.76%)	4(1.3%)
	Widower/widow	10(5.92%)	1(0.76%)	11(3.7%)
Religion	Hindu	152(89.94%)	116(88.55%)	268(89.3%)
	Muslim	17(10.06%)	15(11.45%)	32(10.7%)
Caste	SC	43(25.44%)	29(22.14%)	72(24%)
	General	126(74.56%)	102(77.86%)	228(76%)
Education	Illiterate	7(4.14%)	6(4.58%)	13(4.3%)
	Literate	15(8.88%)	16(12.21%)	31(10.3%)
	Primary	90(53.25%)	59(45.04%)	149(49.7%)
	Middle	44(26.04%)	39(29.77%)	83(27.7%)
	Secondary	8(4.73%)	7(5.34%)	15(5%)
	Higher secondary and above	5(2.96%)	4(3.05%)	9(3%)
Nature of Work	Unemployed	34(20.12%)	23(17.56%)	57(19%)
	Unskilled labour	64(37.87%)	51(38.93%)	115(38.3%)
	Semiskilled labour	14(8.28%)	14(10.69%)	28(9.3%)
	Skilled labour	13(7.69%)	8(6.11%)	21(7%)
	Technical or Office staff	5(2.96%)	8(6.11%)	13(4.3%)
	Business	39(23.08%)	27(20.61%)	66(22%)
Per Capita Income (In Rs.) (Modified B.G.Prasad scale- 2014)	Lower Middle Class (812-1569)	33(19.53%)	25(19.08%)	58(19.3%)
	Middle Class (1570-2651)	105(62.13%)	80(61.07%)	185(61.7%)
	Upper Middle Class (2652-5356)	31(18.34%)	26(19.85%)	57(19%)
Type of Family	Nuclear	42(24.85%)	39(29.77%)	81(27%)
	Joint	127(75.15%)	92(70.23%)	219(73%)
Total		169(56.3%)	131(43.7%)	300(100%)

Table 2: Distribution of Hypertensive Population as per Age and Sex (n=300).

Age in Years		Hypertension*		Total
		No	Yes	
<21	Female	15(100%)	0(0%)	15
	Male	11(100%)	0(0%)	11
21 - 30	Female	13(65%)	7(35%)	20
	Male	2(33.3%)	4(66.7%)	6

31 - 40	Female	44(78.6%)	12(21.4%)	56
	Male	13(43.3%)	17(56.7%)	30
41 - 50	Female	20(60.6%)	13(39.4%)	33
	Male	18(39.1%)	28(60.9%)	46
51 - 61	Female	14(50%)	14(50%)	28
	Male	13(48.1%)	14(51.9%)	27
61 - 70	Female	0(0%)	15(100%)	15
	Male	0(0%)	11(100%)	11
>71	Female	2(100%)	0(0%)	2
	Male	0(0%)	0(0%)	0
Total	Female	108(63.9%)	61(36.1%)	169
	Male	57(43.5%)	74(56.5%)	131
	Total	165(55%)	135(45%)	300

Table 3: Distribution of Hypertensive Population as per Sex and previously diagnosed hypertensive status (n=300).

Sex		Hypertension*		TOTAL	
		No	Yes		
Female	Diagnosed Hypertensive	Yes	0(0%)	19(100%)	19(100%)
		Don't Know	66(84.6%)	12(15.4%)	78(100%)
		No	42(58.3%)	30(41.7%)	72(100%)
	Total	108(63.9%)	61(36.1%)	169(100%)	
Male	Diagnosed Hypertensive	Yes	0(0%)	8(100%)	8(100%)
		Don't Know	44(78.6%)	12(21.4%)	56(100%)
		No	13(19.4%)	54(80.6%)	67(100%)
	Total	57(43.5%)	74(56.5%)	131(100%)	
Total	Diagnosed Hypertensive	Yes	0(0%)	27(100%)	27(100%)
		Don't Know	110(82.1%)	24(17.9%)	134(100%)
		No	55(39.6%)	84(60.4%)	139(100%)
	Total	165(55%)	135(45%)	300(100%)	

*A person was considered as suffering from hypertension if systolic blood pressure (SBP) was 140 mm Hg or above and/or diastolic blood pressure (DBP) 90 mm Hg and above or was already under treatment for hypertension.

Table 4: Distribution of Hypertensive and non-hypertensive study subjects according to socio-demographic characteristics (n=300).

Characteristic	Hypertension	Total	Chi-Square, p-Value
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		No	Yes		
Age (in Years)	< 60	161	107	268	26.142, p<0.0001
		60.1%	39.9%		
	≥60	4	28	32	
		12.5%	87.5%		
Sex	Female	108	61	169	12.401, p<0.0001
		63.9%	36.1%		
	Male	57	74	131	
		43.5%	56.5%		
Marital Status	Currently Married	159	126	285	1.931, p=0.381
		55.8%	44.2%		
	Divorced or separated	1	3	4	
		25%	75%		
	Widower or widow	5	6	11	
		45.5%	54.5%		
Religion	Hindu	143	125	268	2.736, p=0.098
		53.4%	46.6%		
	Muslim	22	10	32	
		68.8%	31.2%		
Caste	SC	46	26	72	3.024, p=0.082
		63.9%	36.1%		
	General	119	109	228	
		52.2%	47.8%		
Educational Qualification	Below Primary	22	22	44	0.521, p=0.47
		50%	50%		
	Primary & Above	143	113	256	
		55.9%	44.1%		
Nature of Work	Unemployed	29	28	57	0.483, p=0.487
		50.9%	49.1%		
	Employed	136	107	243	
		56%	44%		
Socio-Economic Status	Below Middle Class(<1570)	35	23	58	0.83, p=0.362

	60.3%	39.7%	
Middle Class & Above(≥1570)	130	112	242
	53.7%	46.3%	

Table 5: Distribution of Hypertensive and non-hypertensive study subjects according to addiction (n=300).

Characteristic		Hypertension		Total	Chi-square, p-value
		No	Yes		
Current Tobacco Use	Yes	36	79	115	42.307, p<0.0001
		31.3%	68.7%		
	No	129	56	185	
		69.7%	30.3%		
Past Tobacco Use	Yes	9	28	37	45.174, p<0.0001
		24.3%	75.7%		
	No	120	28	148	
		81.1%	28.9%		
Current Alcohol consumption	Yes	11	72	83	63.932, p<0.0001
		13.3%	86.7%		
	No	154	63	217	
		70.9%	29.1%		
Past Alcohol consumption	Yes	5	41	46	176.51, p<0.0001
		10.9%	89.1%		
	No	169	2	171	
		98.8%	1.2%		

Table 6: Distribution of Hypertensive and non-hypertensive study subjects on basis of consumption of fruits, fruit juice and extra salt (n=300).

Characteristic		Hypertension		Total	Chi-Square, p-Value
		NO	YES		
Fruits	Taken	51	6	57	33.79, p<0.0001
		89.4%	10.6%		
	Not Taken	114	129	243	
		46.9%	53.1%		
Fruit Juice	Taken	50	14	64	17.58, p<0.0001
		78.1%	21.9%		

	Not Taken	115 48.7%	121 51.3%	236	
	Taken	36 21.1%	135 78.9%	171	
Extra salt	Not Taken	129 100%	0 0	129	185.167, p<0.0001

Table 7: Distribution of Hypertensive and non-hypertensive study subjects according to some risk factors (n=300).

Risk Factors	Hypertension		Total	Chi-Square, p-Value	
	No	Yes			
Family History of Hypertension	Absent	0 0%	8 100%	16.057, p<0.0001	
	Present	131 68.6%	60 31.4%		
Total		131	68	199*	
OCP Use	Yes	94 74.6%	32 25.4%	24.570, p<0.0001	
	No	14 32.5%	29 67.5%		
Total		108	61	169#	
Stress	Stress	85 38.6%	135 61.4%	89.256, p<0.0001	
	No Stress	80 100%	0 0%		
Physical Activity	Low	21 18.9%	90 81.1%	92.676, p<0.0001	
	Moderate & Above	144 76.2%	45 23.8%		
Waist Circumference	Risk	28 17.9%	128 82.1%	180.266, p<0.0001	
	No Risk	137 95.1%	7 4.9%		
B.M.I. Category	Normal	106	3	109	123.465, p<0.0001

	97.2%	2.8%	
Over Weight & Above	59	132	191
	30.9%	69.1%	

*101 person don't Know about their family history of hypertension

#Total number of Female study subject was 169

Discussion

The findings of this study showed that a 43.7% of the study population was Male and 56.3% was Female. Out of the total study population, 28.7% were in the age group of 31-40 years followed by 26.3% in the age group of 41-50 years. They were mostly currently married (95%), Hindu religion (89.3%), general caste (76%) with majority (49.7%) having Primary education, and mostly (38.3%) working as Unskilled labour and 61.7% belonging to Middle Class (as per Modified B.G. Prasad Scale).

Overall 45% of the study population was found to be hypertensive with majority (54.8%) male and 45.2% female.

Using the JNC VII Criteria in our study we found a prevalence of hypertension was 45%. The proportion of hypertension (56.5%) was found among male and 36.1% among female. The prevalence of hypertension in India was reported as ranging from 10 to 30.9 % [19].

Some studies like Rao et al (4.89%), Madhu kumar et al (8.06%), Thrift et al (11.40%), Ghosh et al (11.43%) Kumar et al (13.17%), vinay et al (12.75%). Midha et al (14.50%). Parekh et al (20.40%), Basu and Biswas (21.90%), Yuvaraj et al (18.30%), Bhardwaj et al (15.40%), study by Pooja & Mittal (33.20%) and Meshram et al (23%) showed lower prevalence than present study [20-32].

In the present study the prevalence of hypertension was more among male than females (56.5% & 36.1%). Similar finding reported by Yuvaraj et al greater proportion of hypertension was observed among males (19.10%) as compared to females (17.50%) among rural population of Davanagere [29] Bhardwaj, et al reported 41.60% in male & 34.60% in female and Meshram, et al reported (27.70% & 19.30%) [30-32].

So it is clear that in some regions of India hypertension is more prevalent among males than females. Blood pressure rises with age in both sexes. Age probably represents an accumulation of environmental influences and the effects of genetically programmed senescence in body systems.

On the other hand among rural adults, the highest prevalence (50.50%) of hypertension was reported in the population of Nicobar Island [33] and the lowest (4.50%) in the population of Haryana [34]. These differences in the prevalence of hypertension in these studies might be due to the variation in socio-economic status, lifestyle, genetic make-up and biological diversity.

It can be concluded from the present study that the prevalence of hypertension in both sexes and in rural populations is increasing at an alarming rate. If this increasing trend in the prevalence of hypertension would go with the same pace then after few years more than fifty per cent population of India would be under the trap of cardiovascular diseases. The effective control and hypertension in India will require a centralized campaign with policy strategies applied at multiple levels. Thus, there is an urgent need to develop suitable strategies for prevention of hypertension in India.

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 [35].

In our study we found that increased body mass index was significantly associated with hypertension. Similar findings were reported by Yadav S et al [36]. Also tobacco and alcohol was significantly associated with hypertension in the study population. Similar finding was reported by Malhotra P et al [37].

Conclusion

The prevalence of hypertension in the rural population was found to be on the higher side compared to some previous reports of India and other Asian studies. It shall be important to follow this population in the future to see the trend of BP in the rural India. The study also has indirectly pointed out that even though there is existing programme, there is inadequacy from the perspective of public health and that we have not been able to do enough to prevent the problem.

More detailed research is recommended to identify the other associated lifestyle and environmental factors, which might be involved in inducing these conditions. Lifestyle modifications should be used as initial therapy to control BP in all patients with hypertension. Prevention of tobacco and alcohol consumption would be an important intervention in preventing the ongoing upswing in prevalence of chronic heart disease.

Adoption of healthy lifestyle in regard to behavioral risk factors may improve the situation and thus by taking initiative in arranging health awareness campaign in grassroots level in collaboration with local administrative authority at regular interval, lifestyle of the respondents may improve.

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