



## A Study of Prevalence of Hypertension Among Rural Adult Population

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### Abstract

*Hypertension is one the most common diseases which is easily detectable and readily treatable and often leading to fatal complications if left untreated. A community based cross-sectional study was conducted to estimate the prevalence of hypertension in the Primary Health Centre (Naravarikuppam) area using cluster sampling technique among 810 adult population of 20 years and above. A pre-tested structured questionnaire, followed by anthropometric measurement (height, weight) and blood pressure monitoring were used to collect the data. Statistical analysis was done using EPI 6 and SPSS packages. Totally, 24.3 % had hypertension, prevalence was high among male, mean diastolic blood pressure was increasing with age, also the study population did not show any relation to the occupation or socio-economic status. It was observed that the prevalence of hypertension was different for different educational status, high in the illiterate people and fairly low in the professionals. Among the unmarried, only 4 (4.3%) had hypertension, among the married was 23.3% whereas it was 48.04% among the single. It was concluded that there is a need to reduce blood pressure in this population with mild hypertension to reduce complications in this community, at the same time, protecting the individuals with severely elevated blood pressure from developing complications.*

### Introduction

Chronic non-communicable diseases are assuming increasing importance among the adult population both in developed and developing countries. The most common and problematic non-communicable diseases encountered in the developing countries is hypertension. Hypertension refers to high blood pressure and defined as persistent elevation of both systolic and diastolic levels of pressure.

Hypertension is the major risk factor in the development of Coronary Heart Disease, Congestive Cardiac Failure, Stroke, Peripheral Arterial Disease and Renal Failure with mortality that in some countries, exceeds 50% of the total death. Globally, the overall prevalence of raised blood pressure in adults aged 25 and over was around 40% in 2008. Hypertensives, when compared to normotensives, develop twice as much peripheral arterial occlusive disease, three times as much arterial coronary heart disease, four

times as much congestive heart failure and seven times as much stroke.

The added morbidity and the personal and societal burden of treatment contribute further to an immense cost in compromised duration and quality of human life as well as economic cost. In spite of effective treatment, the detection and long-term management of those at risk pose substantial challenges for public health authorities and medical practitioners in the control of hypertension worldwide both in individual patient and in the population.

Hence this community based study on prevalence of hypertension, associated risk factors and awareness of hypertension was taken up which would help in understanding the distribution of blood pressure among the adult population and in planning the remedial measures.

### Objectives

- To estimate the prevalence of hypertension in adult population aged 20 years and above in a Primary Health Centre area.

### Review of literature

Gilbert et al. did a cross-sectional survey in K.V.Kuppam panchayat North Arcot District and found the prevalence of hypertension in highest socio-economic group (22.5%) was more than twice that in the lowest socio-economic group (8.8%) Singh.R.B. et al. found social class I, II, II (high & middle) in an urban population of India has higher prevalence of C.A.D. (Coronary Artery Disease) and coronary risk factors in both sexes. Social class was positively associated CAD.

Jajoo U.N. et al. detected the prevalence of hypertension in an asymptomatic rural community from Central India, being higher in women and the level of physical activity, economic status, body mass index showed a real association with hypertension Singh R.B. et al found Coronary Artery Disease and coronary risk factors were 2 to 3 times higher among the urban compared with their rural subjects, which may be due to sedentary behaviour and alcohol intake among urban. Yang et al. found in their study, physical

activity especially low sports activity was an independent risk factor for hypertension after adjustment for age, sex, body mass index.

Akatsu.H. et al. found 17% prevalence of hypertension and most of them were overweight/obese women with upper body type obesity which is associated with increased cardio-vascular risk. Lamon Fava et al. studied the distribution of body mass index in the participants of the 3rd examination cycle of the Framingham offspring study and found high prevalence of overweight in Americans and supported the concept that increased BMI is associated with adverse effects on all major Coronary Artery Disease risk factors. Uehana et al suggested that blood pressure more likely to be determined by BMI in the individuals with the genetic predisposition to the hypertension. Jackson et al. measure BMI and found both hypertension and Diabetes was associated with significantly higher BMI. Jones D.N. observed weight reduction regimen can reduce elevated blood pressure and promote further reduction when combined with therapy.

### Materials and Methods

A community based cross-sectional study was conducted to estimate the prevalence of hypertension in the Primary Health Centre (Naravarikuppam) area using cluster sampling technique among the adult population of 20 and above. Sample size for the study was 810 which was calculated based on the assumption of about 30% of the adult population were hypertensive.

Study Instrument: The pre-tested structural questionnaire, consists of 3 parts. The first part sought information on the socio-demographic aspect like age, sex, occupation, and education, per capital income, marital status. The second part sought information on Blood pressure (Sphygmomanometer) and body mass index.

### Measurement of BP

Accurate measurement of blood pressure requires reliable, well maintained equipment, properly trained observer and knowledge of factors known

to affect the blood pressure. Two readings were made a five minutes interval as per the WHO recommendation. When high blood pressure greater than or equal to 140/90mmHg was noted a third reading was made after thirty minutes. Lowest of the three was recorded.

Body Mass Index = Wt. in Kg. / Ht. in M<sup>2</sup>

1. < 25 - Normal weight
2. 25 - < 30 - Over weight
3. > 30 - Obese

**Statistical Analysis:** Data entry was made using Fox-Pro software and analysis was done using EPI 6 and SPSS packages.

**Table – I** Prevalence Of Hypertension As Per W.H.O. Grading

W.H.O. B.P. Grading	Systolic B.P. non of Hg.	Diastolic B.P. ram of Hg	Frequency	Percentage	Proportion
Optimal	< 120	< 80	458	56.54	Normal 75.68%
Normal	< 130	< 85	97	11.98	
High Normal	130-139	85-89	58	7.16	
GRI Mild	140-159	90-99	92	11.36	
Sub-group Borderline	140-149	90-94	3	0.37	Hypertension 24.32%
Gr.11 (Moderate)	160-179	100-109	29	3.58	
Cr.111 (Severe)	≥ 180	≥ 110	5	0.62	
I.S.H.	≥ 140	< 90	56	6.91	
Controlled	On treatment (Pharmacological)		12	1.48	
Total			810	100.00	

### Sex

Chi-square = 70.74; P=0.0000). The O.R. of sex to hypertension - 1.35 (C.1 - 0.96 to 1.60). Hypertension prevalence was more in males than in females.

**Table 2** Mean B.P. and sex

Mean BP	Mean	SD	F value (P value)
Systolic	Male	126.10	17.64 (0.00003**)
	Female	119.64	
Diastolic	Male	81.79	63.07 (0.0000**)
	Female	76.71	

### Limitation

- Single visit measurements even when averaged may over estimate the prevalence of hypertension by 17%.
- Unfortunately limited resources and budgetary constraints precluded a second visit to obtain additional measurements.

### Results and Discussion

#### Prevalence of Hypertension

There were 197 individuals who had hypertension and the rest 613 individuals had normal values.

Mean systolic B.P. among males was 126.10 ( $\pm$  18.29) mm Hg whereas for females 119-64 ( $\pm$ 25.01) mm Hg which was significantly different (P=0.0000).

Similarly mean diastolic BP among males was 81.79 (\* 8,76) mm Hg whereas among females it is 76.71 (-k 9.44) mm Hg which was significantly different (Table IV) p=0.0000.

### Age:

**Table – 3** Mean Systolic B.P. By Age

Age (in Years)	Frequency	Mean	S.D.
20- 29	210	111.42	14.43
30-39	214	118.65	19.24
40-49	182	128.53	19.76
50-59	88	133.59	24.07
60 +	116	134.46	27.91
Total	810		

F = 158.68      p = 0.0000

The mean diastolic B.P. was found to be increasing with age from 75.51 mm of Hg at the 2nd decade to 82.30 mm of Hg at 5th decade after which a decline in mean Diastolic B.P. (80.05 nun of Hg) at the age of 60 years and above (Table 3).

### Occupation

The prevalence of hypertension among the study population did not show any relation to the occupation (Table 4).

**Table 4** Prevalence Of Hypertension By Occupation

Occupation	Normal	Hypertensive	Total
Unemployed	280	89(24.11)	369
Unskilled	139	40(22.35)	179
Semi skilled	55	16(22.54)	71
Skilled	76	30(28.30)	106
Clerk/Shopkeeper	44	16(26.67)	60
Semi Professional	15	5(25.00)	20
Professional	4	1(20.00)	5
Total	613	197(24.32)	810

P = 0.22 (N.S.)

### Education

In this study population, the prevalence of hypertension was different for different educational status. High in the illiterate people and fairly low in the professionals

**Table: 5** Prevalence Of Hypertension By Education

Educational Status	Normal	Hypertensive	Total
Illiterate	147	65 (30.66)	212
Primary	89	30(25.21)	119
Middle	150	36(19.35)	186
High School	119	38(24.20)	157
intermediate/Diploma	43	12(21.82)	55
Degree	54	13(19.40)	67
Professional	11	3(21.43)	14
Total	613	197(24.32)	810

$p = 0.0287$   $X^2 = 4.783$

**Socio-Economic Status**

The prevalence of hypertension did not show any relation to the socioeconomic status. It was more or less similar among different social economic status (Table IX).

**Table-6** Prevalence of Hypertension and Sex By Modified Kuppuswamy Scale

S.E.S. by M.K.S.	Normal	Hypertension	Total
Lower	2	3(50%)	5
Upper lower	318	97(24%)	415
Lower middle	129	52(28%)	181
Upper middle	160	44(23%)	204
Upper	4	1(17%)	5
Total	613	197	810

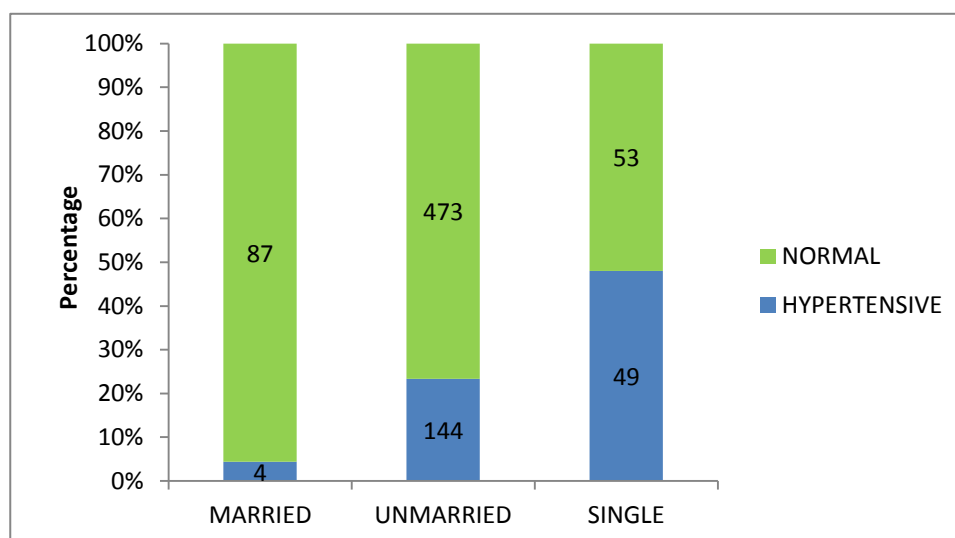
$P = 0.1672$   $X^2 = 6.46$

**Marital Status**

Among the unmarried, only 4 (4.3%) had hypertension. But the prevalence of hypertension among the married was 23.3% whereas it was 48.04% among the single. (Windows, widowers,

divorce or separated). The hypertensive status was significantly different for different marital status. It can be seen in the fig. 6 given below. Chi-square - 51.13,  $P=0.0000$ .

**Fig 1.** Marital status and BP



### Body Mass Index B.M.I.

The trend chi-square shows that the prevalence of hypertension increases as BMI increased from normal to obese (Table 7) in the study.

**Table – 7** Prevalence Of Hypertension And BMI

BMI Quetelet Index)	Hypertension	Normal	Total	Trend Chi-square
Normal (< 25)	(15.53%)84	465	549	76.013 (0.0000**) H.S.
Overweight (25-30)	(40.59%)82	120	202	
Obese (>30)	(52.54%)31	31	59	
Total	197	613	810	

The BMI varies between males and females significantly in this study. The BMI for both the sexes using Quetelet Index shown in fig. 7. P.value =0.0003.

### Discussion

It was found that 24% of the adults aged 20 years and above in this study population had elevated blood pressure levels. Among the hypertensives in the study population, 48% was grade I or mild degree hypertension, 15% was grade II or moderate degree of hypertension and only 3% was grade III or severe hypertension. Similar results were found in the cross-sectional survey in a rural population of Moradabad district, North India, among adults aged 25 years and above conducted by Singh & Sharma et al. where the prevalence of hypertension was 20.8%<sup>12</sup>Rajeev Gupta H. Prakash et al. found 21% prevalence of hypertension in a rural adult population in Rajasthan.

### Conclusion

The possible reason for higher prevalence of hypertension in this study population might be because of the changing life styles. The study area was located only 25 Kms from Chennai city, most of them were travelling across the city for earning their livelihood, education, health and entertainments etc. which resulted in lifestyle changes associated with rapid urbanization which might have had influence on the higher prevalence of hypertension. The high prevalence of mild hypertension would result in a correspondingly high health burden for this population. This would high lighten the need to reduce blood pressure in this population with mild hypertension in order to

achieve substantial reductions in complications in this community as a whole, at the same time protecting the individuals with severely elevated blood pressure from developing complications.

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