

Prevalence And Determinants of Hypertension in Underserved Rural Populations: A Community-Based Study

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Abstract: *Hypertension remains a significant public health concern in India, particularly in underserved rural areas. This study investigates the prevalence of hypertension among adults in the Primary Health Centre area of Kaveripakkam. Using a community-based cross-sectional approach with 918 participants aged 20 and above, the study identified a 24.3% prevalence of hypertension. Statistical analysis revealed higher prevalence among males, older age groups, and individuals with lower educational status. The findings underscore the need for improved awareness, targeted interventions, and comprehensive management strategies to address hypertension in rural India [1] [2].*

Keywords: Hypertension, rural health, public health, blood pressure, community-based study

1. Introduction

Hypertension is one of the major public health problems in India. Hypertension refers to high blood pressure and is defined as persistent elevation of both systolic and diastolic levels of pressure [14] (WHO, 1999).

Inconsistent guidelines introduce uncertainty in the accuracy of hypertension diagnoses and increase the likelihood of poor health outcomes [15]. India is a diverse developing country with mixed economic populations, and many individuals are unaware of their hypertensive status. Among rural, the awareness of hypertension is only in a quarter, among which only in a quarter receive treatment and fail to adhere to therapy, remaining untreated [15]. The prevalence of control of hypertension is only around 10% in rural population. (MoH&FW 2016). Hypertension is a primary health care problem which is therefore best detected, managed and followed up at primary care level [9] [14]. 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 disease, **three times** as much arterial coronary heart disease, **four times** as much congestive heart failure and **seven times** as much stroke [9] (Park K.).

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 [10] in the control of hypertension worldwide both in individual patients and in the population (Sainani).

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.

2. Objectives

To estimate the prevalence of hypertension in adult population aged 20 years and above in a Primary Health Centre area. This study highlights the critical gaps in hypertension awareness and management in rural India, providing evidence to support targeted public health interventions.

3. Review of literature

Eslavath Rajkumar et al. have done a study to describe the association between behavioral risk factors, knowledge and hypertension knowledge in the prevalence and control of hypertension. Study showed that knowledge was an important determinant to change behavior or lifestyle. Further findings showed that behavioral risk factors including smoking, fruits and vegetables consumption, body mass index, age group significantly predicted the odds of hypertension [1].

Doreen Busingye et al. have done a community-based study among adults of rural population in Rishi Valley, India. Only 31% of participants knew that hypertension adversely affects an individual's health and 7% knew the benefits of treating hypertension. Almost a third (30%) of those aware of their hypertensive status, and 48% overall, did not know any of the risk factors for hypertension. Screening and targeted

educational programmes are warranted in this population to improve health behaviours and reduce the consequences of hypertension [16].

Gilbert et al. did a cross sectional survey in K. V. Kuppampanchayat North Arcot District and found the prevalence of hypertension in highest socioeconomic group (22.5%) was more than twice that in the lowest socioeconomic 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 [6].

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 cardiovascular 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.

3.1 Materials and Methods

A community - based crosssectional study was conducted to estimate the prevalence of hypertension in the Primary Health

Centre (Kaveripakkam) area using cluster sampling technique among the adult population of 20 and above. The sample size of 918 was determined based on an estimated hypertension prevalence of 24.3% among the adult population.

3.2 Study Instrument

The pretested structural questionnaire, consists of 3 parts. The first part sought information on the sociodemographic 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.

3.3 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 M²

- 1) < 25 - Normal weight
- 2) 25 < 30 - Overweight
- 3) > 30 - Obese

3.4 Statistical Analysis

Data entry was made using FoxPro software and analysis was done using EPI 6 and SPSS packages.

3.5 Limitation

Single visit measurements even when averaged may over estimate the prevalence of hypertension by 24.3%. Unfortunately, limited resources and budgetary constraints precluded a second visit to obtain additional measurements.

4. Results and Discussion

4.1 Prevalence of Hypertension

There were 223 individuals who had hypertension and the rest 695 individuals had normal values.

Table 1: 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	95	10 %	Normal 75.68%
Normal	< 130	< 85	269	29 %	
High Normal	130 - 139	85 - 89	219	24 %	
GRI Mild	140 - 159	90 - 99	112	12 %	Hypertension 24.32%
Sub - group Borderline	140 - 149	90 - 94	78	9 %	
Gr.11 (Moderate)	160 - 179	100 - 109	34	4 %	
Cr.111 (Severe)	> 180	> 110	59	6 %	
I. S. H.	> 140	< 90	36	4 %	
Controlled	On treatment (Pharmacological)		16	2 %	
Total			918	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	18.29	17.64 (0.00003**) H. S.
Female	119.64	25.01	
Diastolic			
Male	81.79	8.76	63.07 (0.0000**) H. S.
Female	76.71	9.44	

Mean systolic B. P. among males was 126.10 (+ 18.29) mm Hg whereas for females 119.64 (+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.

Table 3: Mean Systolic B. P. by Age

Age (in Years)	Frequency	Mean	S. D.
20 - 29	165	111.42	14.43
30 - 39	168	118.65	19.24
40 - 49	198	128.53	19.76
50 - 59	174	133.59	24.07
60 +	213	134.46	27.91
Total	918	134.44	21.08

F = 158.68 p = 0.0000

The mean diastolic blood pressure increased from 111.42 mm Hg in the first decade to 134.46 mm Hg in the fifth decade, followed by a decline thereafter (134.46 mm of Hg) at the age of 60 years and above (Table 3).

4.2 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	290	75	365
Unskilled	146	48	194
Semi skilled	65	28	93
Skilled	82	36	118
Clerk/Shopkeeper	44	22	66
Semi Professional	21	8	29
Professional	47	6	53
Total	695	223	918

P = 0.22 (N. S.)

4.3 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	97	65	162
Primary	139	30	169
Middle	150	36	186
High School	139	38	177
intermediate/Diploma	45	18	63
Degree	54	13	67
Professional	71	23	94
Total	695	223	918

p = 0.0287 X² = 4.783

4.4 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 VI).

Table 6: Prevalence of Hypertension and Sex by Modified Kuppuswamy Scale

S. E. S. by M. KS.	Normal	Hypertension	Total
Lower	69	23	92
Upper lower	318	96	414
Lower middle	129	52	181
Upper middle	160	44	204
Upper	19	8	27
Total	695	223	918

P = 0.1672 X² = 6.46

4.5 Body Mass Index B. M. I.

The trend chisquare 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)	79	507	586	76.013 (0.0003**) H. S.
Overweight (25 - 30)	89	148	237	
Obese (>30)	55	40	95	
Total	223	695	918	

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.

5. Discussion

It was found that 24% of the adults aged 20 years and above in this study population had elevated blood pressure levels [16]. 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. (1997) where the prevalence of hypertension was 20.8% Rajeev Gupta H. Prakash et al. (1997) found 21% prevalence of hypertension in a rural adult population in Rajasthan.

6. Conclusion

The possible reason for higher prevalence of hypertension in this study population might be because of the changing lifestyles. Lifestyle modifications are an integral part of the management of persons with hypertension, regardless of severity of hypertension, may help prevent progression of high normal BP to hypertensive levels. The study area was located nearer to 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 [7] [10] [16].

This study reveals a significant prevalence of hypertension among rural adults, emphasizing the need for awareness programs and improved health infrastructure. Addressing modifiable risk factors such as BMI and lifestyle could substantially reduce the hypertension burden in rural India.

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