Original Research Article

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Socio-demographic distribution of hypertension and its risk factors among urban slum adults of Tirupati: a cross sectional study

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ABSTRACT

Background: Some of the community surveys have documented that between three and six decades, prevalence of hypertension has increased by about 30 times in urban people and by about 10 times among the rural area people. Urban population of developing countries is showing similar prevalence to that of developed countries. Treating hypertension has been associated with 15% reduction in incidence of myocardial infarction and 40% reduction of stroke. The objectives of the study were to estimate the prevalence of hypertension among adults aged between 30-50 years in selected urban slum areas of Tirupati and to know the associated important risk factors with hypertension in the study subjects.

Methods: A community based cross sectional study was conducted in urban slum community of Tirupati, to estimate the prevalence and its risk factors of Hypertension by using the JNC VII criteria. This study was conducted during January 2012 to February 2013, among 2136 subjects of 30-50 years age group.

Results: The prevalence of hypertension was found 481 (22.5%), majority of them belongs to the age group of 45-50 years 212 (44.0%) and lowest in 30-35 years 45 (9.3%). Hypertension was predominant in males 186 (30.1%) than females 295 (19.4%).

Conclusions: This study found that there is increasing trend of prevalence of hypertension in the urban community. This study suggests to health planners to take remedial measures to address growing hypertension in the community through health education about lifestyle changes, dietary modification, and avoidance of stress.

Keywords: Hypertension, Urban slums, 30-50 years age, JNC-VII criteria, Risk factors

INTRODUCTION

The global burden of non-communicable diseases continues to grow and tackling it poses one of the major challenges for development in the twenty-first century. With effective interventions the disease can be largely prevented by targeting the risk factors like-tobacco use, unhealthy diet, physical inactivity and harmful use of

alcohol. Morbidity, mortality and disability rates will improve if better disease management is done and will lead to better health outcomes.¹

Subjects with hypertension are known to have two fold higher risk of developing coronary artery disease, four times risk of congestive heart failure and seven times higher risk of stroke compared to normotensive subjects.² Urban population of developing countries is showing

similar prevalence to that of developed countries.^{3,4} Treating hypertension has been associated with 15% reduction in incidence of myocardial infarction and 40% reduction of stroke.⁵

Hypertension is an important non communicable disease and increasing globally due to changing life styles. Being asymptomatic, it remains undetectable for a long time. The disease is well amenable for control if detected in early stage with life style modification along with drug treatment. Hypertension is the disease which is suitable for regulation of the disease process though not curable. The complications however can be preventable.

Hypertension detection and Follow up Program was diagnosed to decrease the morbidity and mortality among hypertensives in USA.⁶ To find out the trends World Health Organisation (WHO) MONICA project (Monitoring trends and determinants in cardiovascular disease project) was initiated to identify the risk factors for cardio vascular diseases. The Multiple Risk Factors Intervention Trial (MRFIT) in the USA was a randomized, primary prevention trial, designed to test the effect of intervention Program.⁷

Objectives

- 1. To know the prevalence of hypertension among adults aged between 30-50 years of both sex in selected urban slum areas of Tirupati.
- 2. To know the association of certain important risk factors with hypertension in the study subjects.

METHODS

A cross sectional study to estimate the prevalence of Hypertension and its associated risk factors was conducted in urban slums of Nehru Nagar Urban Health Centre, a field practice area attached to S.V. Medical College, Tirupati during the January 2012 to February 2013. It has been observed from the earlier studies that the prevalence of hypertension in adults was 16%. Sample size was estimated using the prevalence rate of 16% with 10% allowable error at 95% confidence level. N =4 PQ/L² the minimum sample size calculated was 2100, finally we studied 2136 sample. Both males and females aged more than 30 years and less than 50 years and who had lived in the study area for more than 6

months were included in the study. Pregnant women and not willing to participate were excluded from the study. Ethical clearance for this study was accorded by Institutional ethical committee, S. V. Medical College, Tirupati.

The study subjects were explained the purpose of the study and informed consent was taken from the subjects. A pre-tested interview schedule incorporated all demographic and life style factors including previous cardiac events, family history, smoking, alcohol intake, dietary pattern and exercise etc., was used for collecting the required information from the subjects.

Height was measured by using stadiometer. Height measured correct to 0.5 cm. Weight was measured with calibrated weighting machine and recorded to nearest 0.5 kg. Weight and height was measured to calculate BMI by using the formula: weight (kg)/height (m²). Classification recommended by WHO was used to define the obesity. Waist was measured using a properly calibrated tailor measuring tape. The subjects were asked to stand erect in a relaxed position with both feet together on a flat surface; one layer of clothing was accepted. At minimal respiration, the smallest horizontal girth between the costal margins and the iliac crests was measured as Waist girth. JNC VII criteria were used to classify the hypertension.

Measurement of blood pressure was carried out on each participant by using the standard technique. ¹⁰ B.G. Prasad's socio economic status scale was used to classify study subjects based on per-capita monthly income. ^{11,12} The data was analyzed by using MS excel and Epi-info 3.5.1 version software and appropriate statistical tests of significance were employed.

RESULTS

Out of 2136, three quarter of sample subjects were women 1519 (71.1%) and remaining one quarter were men 617 (28.9), among the all study sample 45-50 years age group were 627 (29.4%) slightly higher than the other age groups followed by 35-40 years age group 602 (28.2), 30-35 years age group were 488 (22.8%) and least portion of sample 419 (19.6%) belongs to 40-45 years age group.

Table 1: Prevalence of hypertension (JNC-7) of study subjects (N=2136).

Group	SBP (mmHg)	DBP (mmHg)	No. of subjects	Percentage	(%)	
Normal	<120	and <80	1176	55.05		
Pre-hypertension	120-139	or 80-89	479	22.42	77.40	
Stage I hypertension	140-159	or 90-99	365	17.09	22.52	
Stage II hypertension	≥160	or ≥100	116	5.44	- LL.JL	
Total			2136	100	100	

More than half of the study sample were belongs to backward category 1201 (56.2%) followed by scheduled castes 509 (23.8%), open category 389 (18.2%) and scheduled tribes 37 (1.7%). Coming to the socio economic status, majority of them were belongs to upper lower class 992 (46.4%) followed by lower middle 760

(35.6%), upper middle 223 (10.4%), upper class 99 (4.6%) and lower class 62 (2.9%). Majority of the study subjects were belong to unskilled occupational category 1497 (70.1%), and secondary level educational status (36.1%) followed by illiterates 701 (32.8%) and up to primary level education 232 (10.9%).

Table 2: Distribution of study samples according to their socio-demographic status.

S. No	Variable	No. of hypertensive subjects (n=481)	Total no. of subjects (n=2136)	0/0	Statistical significance	
1	Age group					
	30 - 35	45	488	9.2	$\chi^2 = 103.9$; df = 3;	
	35 - 40	113	602	18.8	χ =103.9, d1 =3, - p<0.001; S	
	40 - 45	111	419	26.5	p<0.001, 5	
	45 - 50	212	627	33.8		
2	Sex				$\chi^2 = 28.9;$	
	Male	186	617	30.1	df = 1;	
	Female	295	1519	19.4	p<0.001; S	
3	Social Category					
	OC	99	389	25.4	$\chi^2 = 4.83$;	
	BC	262	1201	21.8	df =3;	
	SC	108	509	21.2	p = 0.18; NS	
	ST	12	37	32.4		
4	Educational status					
	Illiterate	184	701	26.2		
	Primary	42	232	18.1	.2 12.4.	
	Secondary	158	772	20.5	$\chi^2 = 12.4;$ df = 5;	
	Inter/Diploma	51	216	23.6	- p<0.029; S	
	Degree	34	175	19.4	- p<0.023, B	
	PG/PhD	12	40	30.0		
5	Occupation					
	Unskilled	301	1497	20.1	$\chi^2 = 25.1;$ df = 4;	
	Semi Skilled	98	297	33.0		
	Skilled	56	229	24.5		
	Semi Profession	8	27	29.6	p<0.001; S	
	Profession	18	86	20.9	- p<0.001, B	
6	Socio-economic stat	cus				
	Upper	30	99	30.3		
	Upper Middle	56	223	25.1	$\chi^2 = 7.52;$	
	Lower Middle	175	760	23.0	df =4;	
	Upper Lower	211	992	21.3	p =0.10; NS	
	Lower	9	62	14.5		

The family history of hypertension was present in 470 (22%) subjects, history of previous cerebrovascular or cardiovascular events was found in 52 (2.4%) subjects and history of additional salt intake was found in 1397 (65.4%) subjects. It has been noted that only 260 (12.2%) of the study subjects were doing regular physical exercise. Walking was the commonest form of exercise (85.0%) and majority of them were doing walking for 30-60 minutes regularly 128 (49.3%).

In the present study, 193 (9.0%) were currently smokers. Majority of them 140 (73.0%) had been smoking 1-10

cigarettes per day and since 11-20 years 77 (39.9%). It is found that 708 (33.1%) are overweight and 346 (16.2%) are obese. Based on the Waist Circumference, central obesity was found in 753 (35.3%).

In the present study the prevalence of hypertension was 22.5% and pre-hypertension was 22.4%. Most of the hypertensive subjects belong to stage I (17.1%) and 5.5% had stage II hypertension.

Mean±standard deviation of systolic blood pressure (SBP) among Study group was 121.7±15.1 mm of Hg;

males 125.2 ± 14.5 mm of Hg and females 120.3 ± 15.2 mm of Hg. There was no statistically significant difference between the means (Z =-1.07, P>0.05, Not significant, at 95% level). Mean diastolic blood pressure (DBP) among

Study group was 80.2 ± 9.3 mm of Hg; males 82.3 ± 9.7 mm of Hg and females 79.4 ± 9.1 mm of Hg. Statistically there was no significant difference between the means (Z =0. 42, P>0.05, Not significant at 95%level).

Table 3: Distribution of study samples according to the risk factors status.

Variable	No. of hypertensives (n=481)	Total no. of subjects (n=2136)	%	Statistical significance				
Family history of hypertension								
Yes	144	470	30.6	$\chi^2 = 22.7$; df =1; p<0.029; S				
No	337	1666	20.2					
History of cerebro/cardiovascular events								
Yes	19	52	36.5	$\chi^2 = 6.0$; df =1; p =0.014; S				
No	462	2084	22.2					
Physical exercise								
Yes	57	260	21.9	$\chi^2 = 0.06$; df = 1;				
No	424	1876	22.6	p =0.80; NS				
Smoking								
Yes	65	193	33.7	$\chi^2 = 15.1$; df =1;				
No	416	1943	21.4	p<0.001; S				
Additional salt intake								
Yes	333	1397	23.8	$\chi^2 = 2.57$; df =1; p=0.10; NS				
No	148	739	20.0					
Central obesity based on waist circumference								
Yes	226	753	30.0	$\chi^2 = 37.4$; df =1;				
No	255	1383	18.4	p<0.001; S				

DISCUSSION

The prevalence study was conducted among 2136 subjects (28.9% male and 71.1% females) between the age of 30-50 years has found that majority of them belonged to the age group of 45-50 years (29.4%) and backward caste (56.2%). Most of them belonged to unskilled category (70.1%) and upper lower socioeconomic status (46.4%) and secondary level of educational status (46.4%).

Family history of Hypertension was found in 22.0% while 2.4% individuals had suffered previously from one of the cardiovascular or cerebrovascular events like angina pectoris, myocardial infarction, cardiac failure, stroke etc. It was found that 65.4% of them were taking additional salt. A study conducted in urban Lucknow was found a (56.4%) high family history of hypertension this difference might be due to areas of selection slums and non-slum areas, while a study in urban Chennai found a high mean dietary intake of salt (8.5 gm/day compared to 5 gm/day as the recommended level). ^{13,14}

Majority of study subjects had sedentary way of life with increased risk for hypertension and cardiovascular diseases. It was found that only 12.2% do regular physical exercise. The walking is the commonest form of exercise (85.0%) with majority of them doing exercise for 30-60 minutes (49.3%). It was found that 9.0% were smokers with most of them smoking 1-10 cigarettes per day (73.0%). The proportion of overweight and obesity

together was found to be around 49.3% while central obesity based on waist circumference was seen in 35.3%.

The overall prevalence of hypertension in the present study based on the cut off level of 140 mmHg systolic and 90 mm Hg diastolic blood pressure was found to be 22.5%. Several studies found the prevalence to vary from 14% to 36%. ¹⁵ A lower prevalence was reported by studies in Bangalore (8.0%), rural Tamil Nadu (8.7%), rural areas of Bareilly (10.8%), Haridwar (11%), Faridabad (16.5%) and Meerut (18%). ^{14,16-19} A comparable prevalence was reported in studies at Malda, West Bengal (24.9%) and Kancheepuram (25.2%). ^{20,21} However, a higher prevalence was reported in studies at Urban Lucknow (32.2%), Agra (36.2%), Parsi community in Mumbai (36.4%) and a population based study in Mumbai (48%). ^{13,22} The differences in the prevalence rates are related to the definition adopted, age groups selected for study and differing socio-cultural factors as well as studies done during various time periods.

In the present study, higher prevalence of hypertension was found in males (30.1%) than females (19.4%). The mean systolic and diastolic blood pressures were also found to be higher in males. Similar higher prevalence in males was found in urban Faridabad study (17.2% vs. 15.8%) and rural Garhwal study (23.1% vs. 19.2%). In contrast, a higher prevalence was noted in females in studies done in Kancheepuram (27.4% vs. 22.6%),

Haridwar (12.1% vs. 10%) and Mumbai (48.4% vs. 47.5%). 18,21,22

It was found in the present study that the prevalence of hypertension increased significantly with age being highest in 45-50 years (33.8%) and lowest in 30-35 years (9.2%). It was also found that the mean blood pressure levels (systolic and diastolic) increased with age. Similar findings were reported by studies at various places like Faridabad, Kancheepuram, Bareilly, Meerut, Haridwar, Mumbai and Malda. [8-21,23,24]

The prevalence of known hypertension in the present study was found to be 12.6%. It can be inferred that only 55.9% of the hypertensive were aware of their hypertension. This finding correlates with the well-known principle of rule of halves in hypertension. In contrast, the study in Bangalore rural found 86% to be aware of their hypertension. ¹⁶ It was found in the present study 44.1% of hypertensives are newly diagnosed. Overall, the hypertension found was mostly stage I variety (17.09%) while stage II hypertension was found in 5.4% subjects only.

There were no differences in the prevalence of hypertension by caste and socio-economic status though proportionately higher prevalence was found in scheduled tribes and in upper socio-economic status where the prevalence of hypertension as well as mean systolic and diastolic blood pressure levels was found to be comparatively higher. Higher prevalence was reported in lower and lower middle socio-economic status classes in a study at Bareilly. This study noted that prevalence as well as the mean levels of blood pressure to be significantly higher in those with postgraduate education (30.0%) and in those with semiskilled occupation (33.0%). Higher prevalence was reported by study at Kanchepuram among unskilled (31.8%) and unemployed (31.2%). 21

The prevalence of hypertension and the mean systolic & diastolic blood pressures was significantly higher in those with positive family history (30.6%), previous cardiovascular/cerebrovascular events (36.5%) and smokers (33.7%). Similar findings were reported in studies in rural Bangalore and urban Lucknow. ^{13,16}

A comparatively lower prevalence of hypertension was found in those who exercise daily compared to those do not exercise (21.0% vs. 22.6%). Similar finding was reported in the Agra study (25% vs. 51.4%). It was found in the current study that the prevalence of hypertension was higher in those with additional salt intake (23.8% vs. 20.0%). Significantly higher prevalence of hypertension was reported with additional salt intake in studies at rural Bangalore (31% vs. 6.5%), Agra (77.3% vs. 38.1%) and urban Chennai (48.4% vs. 16.6%). Id.16.25

The prevalence of hypertension as well as the mean systolic and diastolic blood pressure levels was found to be significantly higher in obese (41.0%) and those with

central obesity (30.0%) based on waist circumference. Similar findings were noted in other studies (Bareilly higher in obesity 14% vs. 9%; Lucknow overweight/obese- 41.0% vs. 28.7%). 13,17

CONCLUSION

The present study found that there is increasing trend of prevalence of hypertension in the urban community. We have also documented a large number of pre-hypertensive individuals according to the JNC-VII criteria, who are in the middle aged and need special attention to avoid early progression to hypertension and its complications which are common in India. Age and sex specific increase of prevalence of systolic and diastolic hypertension in both women and men indicate significant role of environmental factors. This study suggests to health planners to take remedial measures to address growing hypertension in the community through health education about lifestyle changes, dietary modification, and avoidance of stress.

Recommendations

- 1. The study has revealed that there were 212 newly diagnosed hypertensives which constituted undiagnosed hypertension (44.1%). Hence regular screening programmes should be conducted for early identification of hypertension. At the same time, blood pressure should be routinely measured for all adult Men and Women (aged 30 and above).
- 2. The study has found a high proportion of several risk factors like additional salt intake (65.4%), obesity (49.3%), central obesity (35.3%) and lack of physical exercise (87.8%). Hence regular heath education sessions at individual level and group level should be conducted to modify these life style factors for the control of hypertension.

Limitations

- 1. This present study could not assess some of the risk factors like diabetes, details of alcohol intake and level of stress in individuals as it would become difficult in terms of limitation of time.
- Similarly, no investigation could be conducted like blood sugar level, lipid profile at least in a sub sample due to the logistic considerations of cost and time.

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