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Original Research Article

A cross sectional study of the prevalence of hypertension and associated risk factors in coastal Andhra Pradesh

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ABSTRACT

Background: Hypertension (HTN) accounts for 9.4 million deaths worldwide every year. A rise in HTN is projected by the global burden of HTN 2005 study, it portrays a grim picture. Community level data for hypertension is scarce in Andhra Pradesh. A cross sectional study was conducted to know the prevalence of hypertension in Vijayawada.
Methods: 1009 apparently healthy adults visiting the hospital accompanying patients in outpatient department were screened for hypertension by blood pressure recording. All measurements were obtained by automated blood pressure measuring (AOBPM) systems.
Results: Of the total population screened, hypertension accounted for 42.5% (n=429). A multivariate analysis showed that hypertension is more common in age group >50 years [odds ratio (OR)=3.004, 95% confidence interval CI being=2.2707-3.9645], in diabetics (OR=2.9091, 95% CI=2.0595-4.1092), in males (odds ratio=1.3223, 95% CI=1.0214-1.7118) and in smokers (OR=1.7442, 95% CI=1.0469-2.9059). A linear positive association was found between obesity and hypertension. No significant association was found between hypertension and alcohol intake. This study also showed that awareness was present in only 44% and 37% had hypertension under control of known hypertensive subjects.
Conclusions: This is the first cross sectional study done with AOBPM. Our study finds that hypertension is an important public health burden in coastal Andhra Pradesh with low awareness, treatment, and control. It implies that strategies need to be developed to improve effective primary care management of hypertension.

Keywords: Hypertension, Ischemic heart disease, Acute myocardial infarction, Peripheral arterial disease, Ambulatory blood pressure, Diabetes mellitus

INTRODUCTION

Globally cardiovascular disease accounts for approximately 17 million deaths a year, nearly one third of the total.[1] Of these, complications of hypertension (HTN) account for 9.4 million deaths worldwide every year.[2] HTN is responsible for at least 45% of deaths due to heart disease, and 51% of deaths due to stroke.

HTN has been long recognized as one of the major risk factors for cardiovascular disease and premature deaths worldwide. In India with a population estimation of 1.3 billion, the prevalence of HTN has been estimated to be 3 to 34.5% in males and 5.8 to 33.5% in females.[3,4] By the end of 2025 the projected prevalence of HTN in Indian men and women are 22.9% and 23.6%.[5] As per the statistics of Directorate General of Health Services,

Ministry of Health and Family Welfare, Government of India, the overall prevalence of HTN in India by 2020 will be 159.46/1000 population.[6] In India, it exerts substantial public health burden on cardiovascular health status and health care system. It is estimated to account for 10.8% of all the deaths and 4.6% of disability-adjusted life year (DALYs) in the country. The adult HTN prevalence has shown a drastic increase in the past three decades in urban as well as rural areas. It is estimated that 16% of ischemic heart disease, 21% of peripheral arterial disease, 24% of acute myocardial infarction and 29% of strokes are attributed to HTN. This stresses the need for its effective management and control, and it highlights the huge impact it can have on the burden of cardiovascular diseases.

An alarming rise in HTN projected by the Global Burden of HTN 2005 study and the Global Burden of Disease 2010 study portrays a grim picture for the Indian population.[2] Reliable information about the prevalence of HTN is essential to the development of national and local level health policies for prevention and control of HTN. Community level data for HTN and its risk factors is scarce in south coastal Andhra Pradesh. Thus, this study was conducted with the objective of finding prevalence of HTN and its risk factors in coastal Andhra Pradesh.

Objectives

We aimed to do a cross sectional study by opportunistic and mass screening for prevalence of HTN, awareness, treatment, control and risk factors associated with HTN in Vijayawada, a major metropolis in Andhra Pradesh, a south eastern coastal state in India.

METHODS

Sample size was calculated estimating the prevalence of HTN in the region by previous study from the department, which was around 20%.

The formula was, Sample size=$4PQ/L^2$

Where, P was prevalence which was 20%, Q was 100–P i.e., 80% and L was absolute error i.e., 4%.

The sample size came out to be 400. Around 1009 adults visiting the Aayush Hospital accompanying patients in out-patient department without history of chronic diseases were selected as the study population. They were screened for HTN by blood pressure recording as per standard protocol. This study was conducted from 1st May 2018 to 31st May 2018, after taking approval from Aayush hospitals ethics committee.

Inclusion criteria

Patients of age ≥18 years and who gave verbal consent for participation were included in the study.

Exclusion criteria

Any acute illness requiring active medical treatment and patients attending for consultation and follow up for any new or existing illness were excluded from the study.

Procedure

After obtaining verbal consent the following data was collected in a specified form approved by the International Society of Hypertension, it included screening (hospital or pharmacy or public area or workplace), date and time of measurement, temperature at the site of screening, ethnicity, history of blood pressure measurement in the last 12 months, past history of high blood pressure or medication to treat, age, sex, pregnancy status (in females), fasting and post prandial status, history of diabetes, use of tobacco, consumption of alcohol, stroke and heart attack. Weight in kilograms, height in centimeters and calculated body mass index (BMI) (kg/m^2) was recorded.

Blood pressure measurement

Ten physician assistants working in the out-patient department of Aayush Hospital were selected and trained in the proper measurement of blood pressure and recording the data.

The following protocol for measuring clinic blood pressure has been approved by the cardiology department.

All participants were not allowed to smoke, drink coffee or tea, or exercise within 30 minutes before measuring their blood pressure. They were asked to empty their bladder and ensure at least 5 minutes of quiet rest before measurements. Blood pressure was measured by properly calibrated automated electronic device OMRON or Philips stand-in automatic blood pressure monitor. Two adult sized cuffs regular and large were used to ensure correct size according to the circumference of the arm. The cuff was placed at the heart level. Measurement over clothes was not allowed. Blood pressure was measured in one arm only, preferably left, and the arm used was recorded. All participants were made to sit with their back straight and supported with their feet flat on the floor and legs not crossed. Arm was supported on a table with upper arm at heart level. The bottom of the cuff was placed directly above the bend of the elbow.

Automated blood pressure measurement device

Blood pressure measurement in clinical practice is routinely done by manual method using mercury sphygmomanometer and stethoscope. In the present study AOBP was used as in 'Systolic Blood Pressure Intervention Trial' and 'Action to Control Cardiovascular Risk in Diabetics' trials. Auscultatory systolic blood pressure readings ate usually higher than AOBP measuring (AOBPM) by 5-10 mm of Hg.[7]

AOBP measurement devices use an electronic pressure sensor with a numerical readout of blood pressure. In most cases the cuff is inflated and released by an electrically operated pump and valve, initially the cuff is inflated to a pressure in excess of the systolic arterial pressure, and then the pressure reduces to below diastolic pressure.

Once the blood flow is present, but restricted, the cuff pressure will vary periodically in synchrony with the cyclic expansion and contraction of the brachial artery. The values of systolic and diastolic pressure are computed from the raw data, using an algorithm.

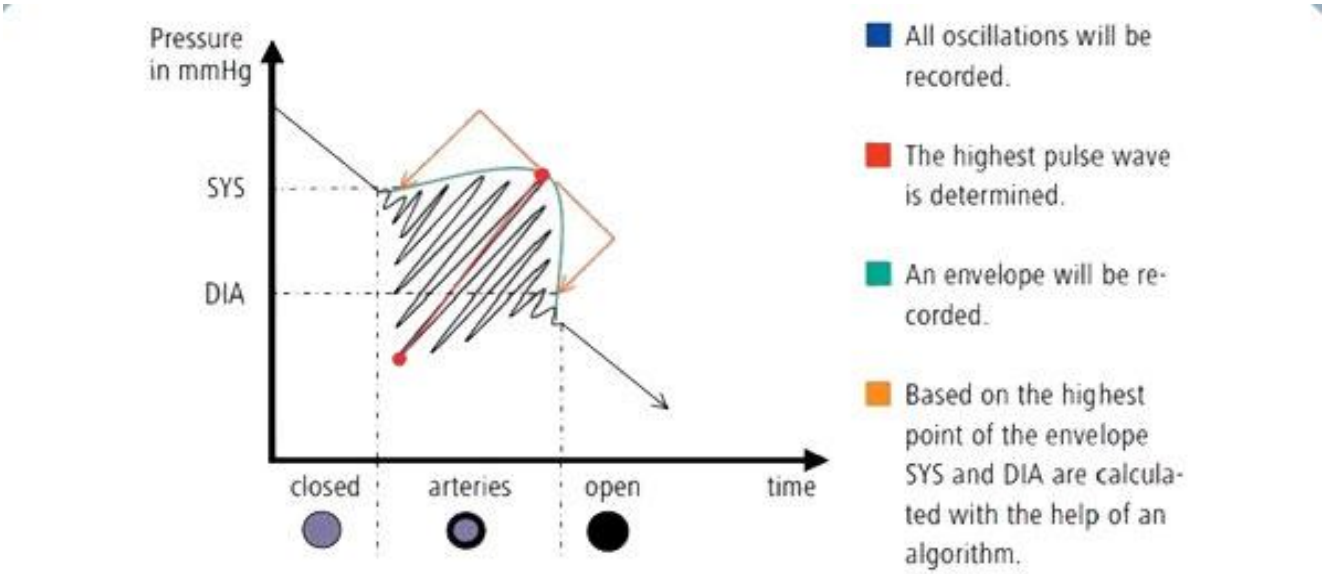

Figure 1: Principle of the oscillometric method of blood pressure recording in AOBP machines.

Measurement

- If the initial blood pressure is >140/90 mmHg another measurement was taken with one minute interval between the measurements.
- If the second reading is substantially (>5 mmHg) different from the initial reading another measurement taken.
- If the third reading is considerably (>10 mmHg) different more measurements were obtained.
- The lowest of the last two measurements was taken as the clinic blood pressure.

Definition of HTN and pre-HTN

The clinic blood pressure >140 mm of Hg systolic or >90 mm of Hg diastolic is taken as HTN and the clinic blood pressure between 120-139 mm of Hg systolic or 80-89 mm of Hg diastolic is taken as pre HTN.

Awareness, treatment and control

Awareness of HTN was defined as a self-report of any previously diagnosed HTN by health professionals. Treatment information including both pharmacological and non-pharmacological management of HTN was self-reported. The participants were asked whether they were following lifestyle modification like reduced intake of salt, regular physical exercise, weight control, (yes or no); 'whether they were using antihypertensive medication' (yes or no). HTN control was defined as a blood pressure <140/90 mm Hg.

Statistical analysis

All the data was entered in excel sheet and analyzed using IBM SPSS trail version 23.

RESULTS

The total population that was screened amounted to 1009 among them the HTN accounted for 42.5% (n=429) of population hence the prevalence is 42.5%, among them, 279 (63%) were males, 150 (36%) were found to be females (Figure 1). A bivariate analysis showed that males are more predisposed to have HTN [odds ratio (OR)=1.3223, confidence interval (CI)=1.0214-1.7118)], which mean that HTN is 1.3223 times more commonly seen in male than in females.

A multivariate analysis has shown that HTN is more common in elderly age group i.e., age >50 years (OR=3.004, 95% CI being=2.2707- 3.9645), in diabetics (OR=2.9091, 95% CI=2.0595-4.1092), males (OR=1.3223, 95% CI=1.0214-1.7118), smoking (OR=1.7442, 95% CI=1.0469-2.9059) significant association was not found between HTN and alcohol. A linear regression analysis has shown that as the BMI increases there is a linear trend in increase of HTN.

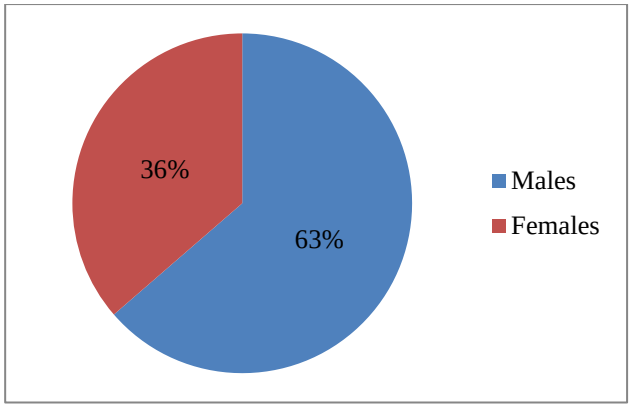

Figure 2: Proportion of males with HTN is more than females.

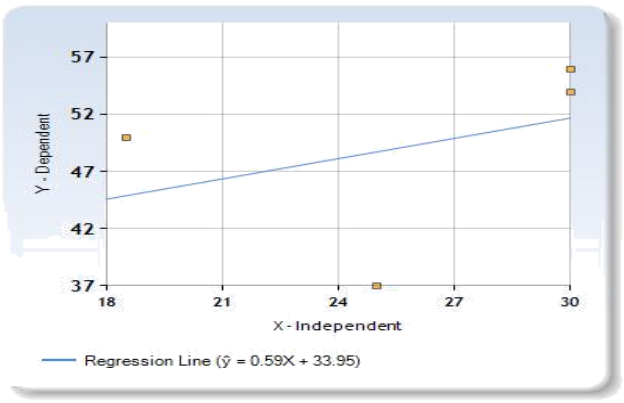

Figure 3: Linear regression analysis showing a linear upward trend of HTN with BMI.

Table 1: Sociodemographic characters of the hypertensive patients.

		Hypertensives	Non hypertensives	Odds ratio	95% CI	P value
Age (in years)	<50	39.4% (n=244)	60.5% (n=463)	3.004	2.2707-3.9645	<0.0001
	>50	53.6% (n=85)	46.3% (n=117)			
Gender	Male	56% (n=279)	45% (n=339)	1.3223	1.0214-1.7118	<0.05
	Female	44% (n=150)	55% (n=241)			
DM	Diabetics	107	60	2.9091	2.0595-4.1092	<0.001
	Non diabetics	320	522			
Smoking	Smokers	36	28	1.7442	1.0469-2.9059	<0.05
	Non smokers	401	544			
Alcohol	Alcoholics	24	20	1.173	0.6394-2.1516	0.639
	Non alcoholics	488	477			
BMI	<18.5	11 (50%)	11			
	18.5-24.99	124 (37%)	183			
	25-29.99	219 (54%)	183			
	>30	155 (56%)	120			

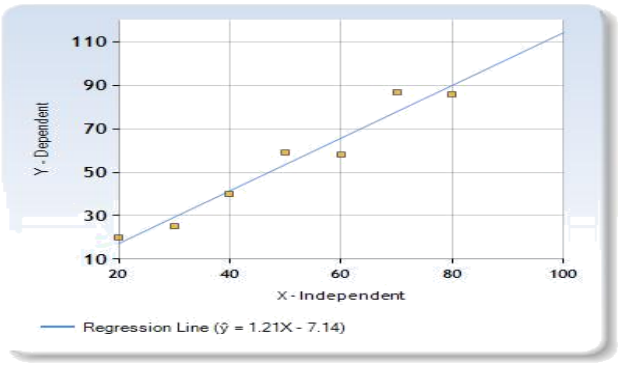

Figure 4: Linear regression analysis showing age on X axis, proportion of patients with HTN on Y axis, showing a linear trend.

Linear regression analysis has shown that as the age increases proportion of patients with HTN also increases in a linear fashion which is shown in the Figure 4.

HTN control is less even in those who are aware of their HTN status i.e., HTN control is only 37% in the whole of those who are aware of their HTN status and using medication for HTN. As the age increase prevalence of HTN increase, its awareness is less, and its control is very poor.

DISCUSSION

The present cross-sectional study was conducted in normal population who attended along with the patient to our hospital, it was conducted to create awareness about HTN as a part of that campaign demographic data was also collected which showed that the prevalence of HTN is 42% in contrast to the peer studies in the area done by Anchalaa et al has shown that over all prevalence of HTN in India is around 29% and in south Indian urban population it is around 30%, Singh has shown that prevalence of HTN was 36%, but in contrast our study showed that prevalence is around 42%, in our study blood

pressure recording was taken with calibrated AOBPM apparatus with a standard protocol, in contrast to other studies where they used manual techniques for the recording of blood pressure.[8,9] Thus, the prevalence rates of HTN are variable from place to place depending on the cut-off point used and the method employed in measurement of blood pressure.

Peak age of prevalence of HTN in our study is 61-70 years of age males, they had 72% prevalence of HTN and 71-80 years age group females where they had 78% prevalence of HTN. These findings may be due to changes in the vascular system as age advances.

Men exhibit higher prevalence of HTN than their female counterparts (M: 65% and F: 34.9%) (OR=1.3223) Similarly, various studies done by Thankappan et al, Krishnan et al has also shown that male gender is associated with more prevalence of HTN.[14,15] One of the possible explanations for this gender disparity in HTN prevalence could be partially due to biological sex difference and partially due to behavioral risk factors like smoking, alcohol consumption, or physical activity. We speculate that absentia from alcohol and smoking might be few of those protective factors against HTN in women. Other than that, women are more interested in health care services utilization and more frequently report their poor health and therefore they are more likely to have better health.

In the present study age, male gender, BMI, tobacco use was significantly associated with the HTN. This study showed that overweight and obesity measured by BMI was a major modifiable risk factor for HTN. There was positive relation observed between increasing BMI and increasing rate of HTN, which was consistent with other studies by Rani et al, Singh et al.[10,11] One of the probable reasons behind this positive relation between obesity and HTN could be that increased weight increases cardiac output and increased peripheral resistance of arterioles. Other than that, urbanization is also a cause of changes in dietary habits and reduced physical activity which leads to obesity and subsequently results in HTN.

This study indicated the positive association between tobacco use and HTN. HTN was more prevalent in tobacco users (OR: 1.74) as compared to nonusers. These findings are in similar line with studies done by Dhungana et al, Reddy et al, where they found a significant association between smoking and HTN.[12,13]

Present study has shown that HTN awareness (awareness to use medication for control of HTN) is present in only 44%, HTN control is present in only 16% of hypertensives, studies done by Anchala et al also demonstrated that awareness and usage of medication for HTN was only 41% and HTN control was present in only 21% The low awareness and treatment levels among hypertensive patients signify a lower knowledge, attitude, and practice levels among patients, reliable information on prevalence of HTN and its control in the present scenario is needed for development of national and regional health policies for prevention and control of HTN.

CONCLUSION

In India there is a constant rise of non-communicable diseases, like HTN which is the prime cause for many other diseases, hence there is a strong need for the development of national and regional health policies for the tackling this menace of rising trends of in general population, for this there is a need to know the prevalence of HTN and its risk factor profile and level of control is needed constantly, for upgrading the efforts of the health care system in India.

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