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A Study on Attainment of Target Blood Pressure in Hypertensives in a Teaching Hospital

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Abstract: ***Introduction: In today's India, hypertension is one of the most important public health issues. The global cases of hypertension is about 1.13 billion people. Uncontrolled hypertension causes damage to target organs and a significant burden in the community. As a result, aggressive hypertension control is required to preserve and protect public health in India. Objectives: To estimate the proportion of patients with hypertension attaining target blood pressure on anti Hypertensive treatment. To compare the profile of the two groups of patients who have and have not attained target blood pressure. Design: Observational, cross - sectional study done in a tertiary care hospital, PES Medical College Hospital, Kuppam. Subjects and methods: Hypertensive Patients attending the medical outpatient clinic and those admitted to the medical wards of PES Medical College Hospital, Kuppam. Target goals for BP in different groups were defined according to American Heart Association guidelines 2017. Results: Patients with a history of smoking, obesity, alcohol were from the uncontrolled BP group. Medication non - compliance was seen in the uncontrolled BP group. Conclusion: The most common cause for not attainment of target blood pressure was Noncompliant to medications. So every hypertensive patient should be counseled for taking regular medications, a salt - restricted diet, and frequent follow - ups at the hospital.***

Keywords: hypertension, compliance, target organ damage, smoking, obesity

1. Introduction

The global prevalence of hypertension is 1.13 billion people. Hypertension prevalence in India is 100 million people. Achievement of target blood pressure is dismally low, with only 10.7 percent of rural Indians and 20.2 percent of urban Indians achieving it.[3]

Hypertension is described as having a systolic blood pressure (SBP) of more than 140 mm Hg or diastolic blood pressure (DBP) of over 90 mm Hg and is linked with considerable morbidity and mortality.4 Every 20 mm Hg increase in systolic blood pressure (SBP) and/or 10 mm Hg increase in diastolic blood pressure (DBP) doubles the risk of death from stroke, heart disease, or another vascular disease.5 Lowering blood pressure in hypertensive patients is linked with a 35%–40% reduction in stroke, a 20%–25% reduction in myocardial infarction and a more than 50% reduction in heart failure.[6]

In today's India, hypertension is one of the most important public health issues.1 It is the major cause of cardiovascular death and morbidity around the world. Because it is asymptomatic, many cases go unnoticed. Uncontrolled hypertension causes damage to target organs and a significant burden in the community. As a result, aggressive control of hypertension is required to preserve and protect public health in India.[2]

2. Methods

Study design: This study was conducted as a Observational cross sectional study

Study area: This study was conducted in the department of general medicine, PES Institute of Medical Sciences & Research (PESIMSR), a tertiary care teaching hospital located in Kuppam, Andhra Pradesh.

Study population: 150 hypertensive patients on medications attending the medical out - patient clinic and those admitted to the medical wards in the Department of General Medicine, during the study period were included in the study

Study period: The study was conducted from January 2020 to July 2021.

Inclusion Criteria: Adult patients (above 18 years) with hypertension, duration of hypertension being at least 3 months. All cases of secondary hypertension were excluded.

Exclusion criteria: Critically ill & medically unstable patients were excluded.

Sample size: A sample of 148 subjects will be required to obtain a 95% CI and 5% precision about attainment of target BP with a prevalence estimate of 25.3%. So sample size rounded to 150

Methodology

On obtaining clearance from Institution Ethics Committee and obtaining patient consent, their demographic details and history were recorded. A thorough physical examination was done with particular emphasis on the clinical evidence of hypertensive target organ damage and the details were entered in a predesigned proforma. Method of measurement of blood pressure (BP): The patient is allowed to relax for 5 - 10 minutes. Patient should not have smoked or taken tea/coffee/alcohol within 30 minutes of checking BP. Body mass index (BMI) was calculated. Routine blood investigations (complete blood counts, urine analysis, renal function tests, blood sugar, serum electrolytes, lipid profile,

and ECG) were done as per the advice of the primary treating physician and these were recorded.

Echocardiography, ultrasound abdomen, brain imaging results were noted if it was done by the treating team.

Target goals for BP control in different groups according to American Heart Association guidelines 2017.1 hypertension patients (age 65 years) –140/90mm Hg were set and agreed upon by all the physicians of department of general medicine.

Resistant hypertension: As defined in the 2017 AHA/ACC Hypertension Guidelines.1 Target organ damage (retina, kidney, heart, brain) was considered as per clinical and lab evidence like if the patient had hypertensive retinopathy, left ventricular hypertrophy by ECG using Sokolow - Lyon criteria or by echocardiography, proteinuria on urine routine examination/ elevated serum creatinine.

Compliance: Was defined as the extent to which a patient acts in accordance with the prescribed interval and dose of a dosing regimen.7 It was considered as always (if 100%), mostly (if > 80%) and sometimes (if<80%).

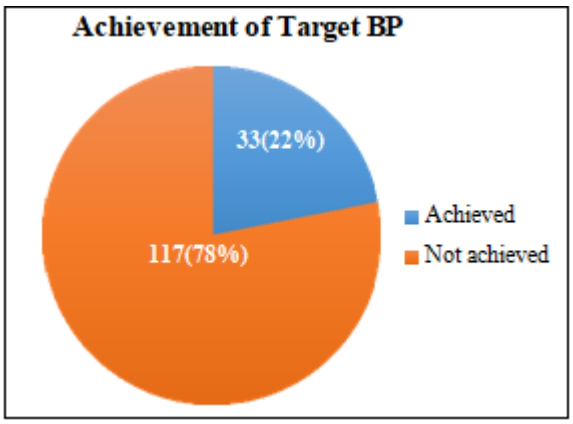
3. Results

A total of 150 patients were included in the study. The characteristics of the study population were as follows. The mean age of the subjects was 57.12±12.23 years. Almost half the patients (n=73; 48.67%) were in 51 – 65 years age group and 23% were over 65 years of age. Men were twice as many as the women (male: female = 2.06: 1). The mean duration of hypertension was 5.3 ± 4.9 years and almost half of them (n =72; 48%) had hypertension for1 – 5 years. 36 patients (24%) had hypertension from 5 to 10 years and 13 (8.67%) had hypertension for over 10 years. 57 (38%) patients were using a single medication and 93 (62%) were using multiple medications. The average number of anti – hypertensive drugs per patient was 1.9±0.9. calcium channel blockers (CCB) were most used class of anti - hypertension drugs (n=90, 60%) angiotens in converting enzyme inhibitors (ACE I) were used by least number of patients (n=8, 5.33%).

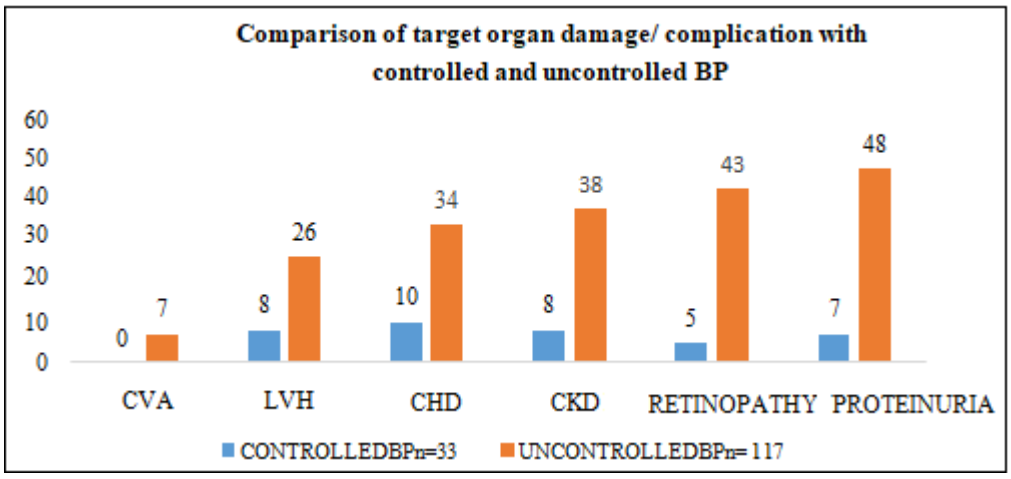
Only 24 % (n=36) were always compliant. Compliance "most of the time" was seen in71.33% (n=107) and poor compliance in 4.67% (n=7). Smoking and alcohol were seen only in the uncontrolled BP group and none in the controlled BP group (p = 0.000). Mean BMI was 23.9 ± 3.0kg/m2 in controlled BP group and 25.83 ± 4.3kg/m2 inuncontrolled BP group (p = 0.020).

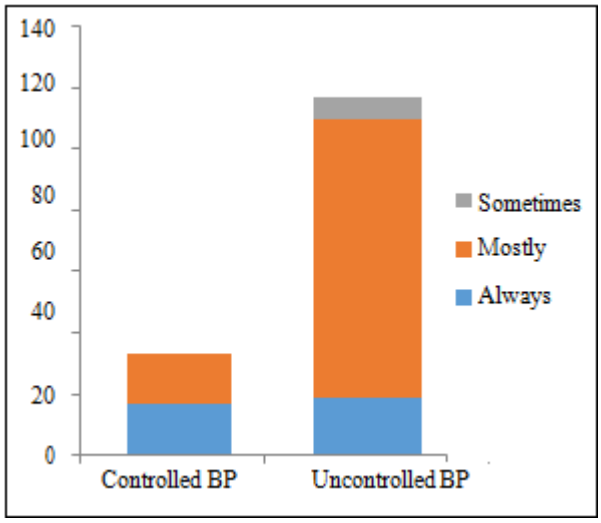
Retinopathy was seen in 5 (15.1%) in the controlled BP group and 43 (36.7%) in uncontrolled BP group (p = 0.201). Proteinuria was seen in 7 (21.2%) subjects in controlled BP group and 48 (41.02%) subjects in uncontrolled BP group (p = 0.277). Coronary artery disease was seen in 10 (30.3%) subjects with controlled BP and 34 (29%) subjects in uncontrolled group (p = 0.579) and stroke was seen in uncontrolled BP group in 7 (5.6%) of study subjects and not seen in subjects with controlled BP group (p = 0.156).

Pie Chart 1 Target BP achievement:



Graph 1: Target organ damage association between controlled and uncontrolled BP group





Graph 2: Association of compliance of medication with control of BP

Table 1: The characteristics of the two groups of the study population were as follows:

Characteristics	Controlled BP (n= 33)	Uncontrolled BP (n=117)	P value
Age (years)	56.72±10.47	57.36±13.03	0.387
Gender			
Male	20 (60.4%)	81 (69.3%)	0.351
Female	13 (39.6%)	36 (30.7%)	0.351
Urban	7 (21.3%)	26 (22.2%)	0.902
Rural	26 (78.7%)	91 (77.8%)	0.902
BMI (kg/m^2)	23.9±3.0	25.83±4.3	0.02
Duration of HTN (years)	5.0±4.74	5.34 ±4.92	0.747
Average number of drugs per patient	1.78 ±0.73	1.92 ±0.91	0.435
Target organ damage/complications			
Retinopathy	5 (15.1%)	43 (36.7%)	0.201
Proteinuria	7 (21.2%)	48 (41.02%)	0.277
LVH	8 (24.2%)	26 (22.2%)	0.738
CAD	10 (30.3%)	34 (29.0%)	0.559
CVA	0	7 (5.9%)	0.156
Associated risk factors			
Diabetes mellitus	19 (57.5%)	65 (55.5%)	0.271
Dyslipidemia	3 (9.3%)	34 (29%)	0.074
Smoking	0	33 (28.2%)	0
Alcohol	0	37 (31.6%)	0
Compliance with medication			
Always	17 (51.5%)	19 (16.2%)	0
Mostly	16 (48.5%)	91 (77.8%)	0
Sometimes	0	7 (6%)	0

4. Discussion

In this study, a total of one hundred and fifty subjects with hypertension for at least three months were included. Attainment of target blood pressure in them and their clinical profile was analyzed.

Only (n=33) 22% had attained target BP and (n=117) 78% had not attained target BP. The main reason was non - attainment of target blood pressure in this study was noncompliant to medications.

The mean age of the study subjects was 57.12 ± 12.23 years. As the age Advances hypertension in elderly people are compounded by autonomic dysregulation, hemodynamic changes, stiffening of arteries, neurohormonal dysregulation, and declining renal function.[8]

There were twice as many men than women in this present study. Gender association didnot show any statistical significance in control of BP between the two groups (p = 0.351).[9]

In this study none of the patients with smoking and alcohol history attained target BP (P=0.000). smoking cessation is best for the prevention of cardiovascular diseases as it leads to Impairment of endothelial function, arterial stiffness, inflammation, lipid modification as well as an alteration of antithrombotic and prothrombotic factors. Cigarette smoking acutely exerts an hypertensive effect, mainly through the stimulation of the sympathetic nervous system.[10]

Mean BMI of study subjects in controlled BP group was 23.9 ± 3.0 kg/m2 whereas it was higher in the group with uncontrolled BP (25.83 ± 4.3kg/m2) [p = 0.020]. Obesity and in particular the excessive visceral fat distribution is accompanied by several alterations at hormonal, inflammatory and endothelial level. These alterations induce a stimulation of several other mechanisms that contribute to the hypertensive state.[11]

There was no statistically significant difference in target organ damage in the two groups of patients with and without control of BP in the study. As hypertension most of the time it is asymptomatic, by the time patient diagnosed as hypertensive, patient would have already developed target organ damage inspite of whether it is controlled or uncontrolled blood pressure. To establish the relationship between target organ damage and attainment of target blood pressure, regular screening of patients with family history of coronary artery disease, alcoholic, smoker irrespective of whether they are hypertensive or not should be checked for routine blood pressure. As target organ damage is multifactorial include endothelial activation, platelet activation, increased thrombogenesis, changes in the renin aldosterone angiotensin system (RAAS), and collagen turnover.1[2,] [13]

Hence, early detection and treatment of Target organ damage determines the cardiovascular prognosis in hypertensive patient and can retard or prevent further damage.

5. Limitations

This was a cross - sectional study and patients were seen only once. Repeated readings on several occasions may be required to correctly assess attainment of target BP. “White coat hyper tension” could because of or high BP readings in the hospital. Many other factors for non - attainment such as high dietary salt, sedentary lifestyle, secondary causes like obstructive sleep apnoea etc were not evaluated.

6. Conclusion

Target BP was attained in only (n=33) 22% of the 150 study subjects and (n=117) 78% did not attain target BP. Smoking

& alcohol were found to be associated with uncontrolled Blood pressure group. The most common cause for not attainment of target blood pressure was Noncompliant to medications. So every hypertensive patient should be counselled for taking regular medications, salt restricted diet, frequent follow ups of the hospital in order to achieve target blood pressure.

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