

## Original Research Article

# Study of prescribing pattern of drugs used in the treatment of hypertension in a tertiary care teaching hospital in North India: an observational study

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### ABSTRACT

**Background:** Hypertension is one of the most common chronic diseases leading to high mortality and morbidity. In order to prevent complications and to improve the patient survival, the early and efficient management of essential hypertension is very much needed. In this context, the use of established anti-hypertensives assumes paramount importance. Objective was to study the prescribing pattern of anti-hypertensive drugs in a tertiary care teaching hospital in north India.

**Methods:** It was a cross-sectional observational study involving 205 prescriptions for patients suffering from primary essential hypertension in the Medicine Outpatient Department of Acharaya Shri Chander College of Medical Sciences and Hospital, Sidhra, Jammu, J and K. All hypertensive patients irrespective of age and sex visiting OPD and treated with at least one hypertensive drugs were included in the study. Data was obtained from the patients by scrutinizing the out patients regarding the demographic profile and details pertaining to the prescribing pattern of antihypertensive drugs used for the treatment of hypertension.

**Results:** A total of 205 prescriptions were analysed during the study period. Out of which 131 (63.9%) were males and 74 (36.1%) were females. Maximum numbers of patients were in the age group of 50-59 years 60 (29.3%) patients. 145 (70.7%) of the patients had a family history of hypertension, (61.5%) of the patients were in stage-I hypertension and (56.1%) were of normal BMI. The results revealed that, the maximum number of 86 (41.9%) patients underwent dual therapy in 86 (41.9%) followed by monotherapy in 59 (28.7%) of patients.

**Conclusions:** From the present study, it can be concluded that in hypertension calcium channel blockers are the most frequently prescribed classes of drugs alone and diuretics are the most commonly used class of drugs in combination. However, further studies are necessary to set up a rationale or pattern for the choice of medication; taking into consideration the demographic factors involved in the prevalence of hypertension.

**Keywords:** Anti-hypertensive drugs, Drug utilization, Hypertension, Prescription patterns

### INTRODUCTION

Hypertension is one of the most common chronic diseases leading to high mortality and morbidity.<sup>1,2</sup> According to WHO health statistics 2012, the prevalence

of hypertension in India was 23.1% in men and 22.6% in women in equal or more than 25 years of age.<sup>3</sup> Hypertension is a major risk factor for stroke, myocardial infarction, coronary heart disease and end-stage renal disease. Hypertension is also commonly associated with

diabetes and chronic renal failure generally. Hypertension is defined as elevated systolic blood pressure  $\geq 140$ mmHg or diastolic blood pressure  $\geq 90$ mmHg.<sup>4</sup>

Hypertension is classified based on etiology into primary (essential) and secondary hypertension. In 95% of cases the specific underlying cause of hypertension cannot be found and referred to have essential hypertension. However, it tends to be familial and the prevalence of essential hypertension increases with age and individuals with relatively high blood pressure at young ages are at increased risk for the subsequent development of hypertension. Lowering of systolic blood pressure by 5-6mmHg confers relative risk reduction of 35-40% for stroke and 12-16% for coronary heart disease within five years of initiating treatment. Therefore, it is important to control the elevated blood pressure.<sup>5</sup>

High blood pressure (BP) can be treated medically by the use of anti-hypertensives as well as by changing lifestyle factors which include losing weight, quitting smoking, eating a healthy diet, reducing sodium intake, exercising regularly and limiting alcohol consumption or both.<sup>6,7</sup> Thus, in order to prevent complications and to improve the patient survival, the early and efficient management of essential hypertension is very much needed.<sup>8</sup> In this context, the use of established antihypertensives assumes paramount importance. The choice of drug depends upon patient and other related factors. Recommendations of a variety of guidelines are available for treatment of hypertension, such as WHO, ISH guidelines and recently the recommendations given by Joint National Committee (JNC-VIII) of USA on prevention, detection, evaluation and treatment of high blood pressure which suggests the rationale administration of drugs by providing algorithms for the treatment as per the stages of hypertension.<sup>9</sup>

In recent JNC-VIII guidelines it doesn't consider diuretic as the first choice rather considers first line and later-line treatments to be limited to four classes of medications: thiazide-type diuretics, calcium channel blockers (CCBs), Angiotensin converting enzyme inhibitors (ACE inhibitors) and Angiotensin Receptor Blockers (ARBs) followed by second and third-line alternatives included higher doses or combinations of ACE inhibitors, ARBs, thiazide-type diuretics and CCBs.<sup>10</sup> The choice of an antihypertensive drug is based on efficacy, side-effects, effects on other systems and cost. Accordingly, there is a need to survey the pattern of usage of antihypertensive drugs, to see if the current usage is rational and in concordance with current guidelines for treatment of hypertension.<sup>11</sup>

The study of prescribing patterns is a component of medical audit which seeks monitoring, evaluation and necessary modifications in the prescribing practices of prescribers to achieve rational and cost-effective medical care.<sup>12</sup> Hence, the present study was done to study the current trend of prescribing of antihypertensive drugs in a tertiary care hospital in India.

## METHODS

It was a cross-sectional observational study involving 205 prescriptions for patients suffering from primary essential hypertension in the Medicine Outpatient Department of Acharaya Shri Chander College of Medical Sciences and Hospital, Sidhra, Jammu, J and K. The study was of six months duration from February 2016 to July 2016. The purpose of the study was explained and written informed consent was obtained from the patients prior to the commencement of the study. Institutional Ethical Committee approval was obtained before initiating the study. All hypertensive patients irrespective of age and sex visiting OPD and treated with at least one hypertensive drugs were included in the study. Exclusion criteria included patients below the age of 18 years, pregnant and lactating women, those attending the OPD but were unwilling to participate in the study and patients with secondary hypertension.

Data was obtained from the patients by scrutinizing the out patients regarding the demographic profile that includes age, gender, educational status of the patients, BMI, family history of hypertension and details pertaining to the prescribing pattern of antihypertensive drugs used for the treatment of hypertension. Data collected was analysed and expressed in percentage.

## RESULTS

A total of 205 prescriptions were analysed during the study period. Out of which 131 (63.9%) were males and 74 (36.1%) were females. Maximum numbers of patients were in the age group of 50-59 years 60 (29.3%) patients. 82 (40%) of the patients were belonged to educational status of Grade 2 (Upto 12<sup>th</sup> class), 145 (70.7%) of the patients had a family history of hypertension, (61.5%) of the patients were in stage-I hypertension and (56.1%) were of normal BMI. Out of 205 prescriptions, 96 (46.9%) of the patients had single comorbidity, 47 (22.9%) multiple comorbidities whereas 62 (30.2%) had no comorbidities. The results of demographics were summarized in Table 1.

The results revealed that, the maximum number of 86 (41.9%) patients underwent dual therapy (the most commonly prescribed dual therapy were diuretics + angiotensin II receptor antagonists (ARBs) in 58 (67.4%) followed by diuretics + ACEIs in 15 (17.4%) and others) as shown in Figure 1 followed by 59 (28.7%) monotherapy (the most commonly prescribed monotherapy were calcium channel blockers (CCBs) in 23 (39%) followed by angiotensin II receptor antagonists (ARBs) in 15 (25.4%) and others) as shown in Figure 2. A 29 (14.1%) of patients were prescribed with triple drug therapy (the most commonly prescribed triple drug therapy were diuretics+ARBs+ $\beta$ -blockers in 7 (24.1 %) followed by diuretics+ARBs+ACEI in 6 (20.7%) and others) and 31 (15.1%) of the patients treated with more

than three drugs. The results of detailed pharmacotherapy were summarized in Table 2.

**Table 1: Demographic details of the patients.**

Demographics	No. (%)
<b>Age</b>	3 (1.5)
20-29	13 (6.3)
30-39	36 (17.6)
50-59	60 (29.3)
60-69	58 (28.3)
70-79	31 (15.1)
80-89	4 (1.9)
<b>Sex</b>	
Male	131 (63.9)
Female	74 (36.1)
<b>Educational status</b>	
Grade 0 (uneducated)	12 (5.9)
Grade 1 (upto 8 <sup>th</sup> class)	46 (22.4)
Grade 2 (upto 12 <sup>th</sup> class)	82 (40)
Grade 3 (Graduate/Postgraduate)	65 (31.7)
<b>Family history of hypertension</b>	
Father	56 (27.3)
Mother	44 (21.5)
Both	18 (8.8)
Others	27(13.2)
No history	60 (29.2)
<b>BMI (Kg/m<sup>2</sup>)</b>	
Underweight (<20)	9 (4.4)
Normal weight (20-27.5)	115 (56.1)
Overweight (>27.5)	81 (39.5)
<b>Stages of Hypertension</b>	
Pre-hypertension (80-89 mmHg)	12 (5.9)
Stage I (90-99/140-159 mmHg)	126 (61.5)
Stage II ( $\geq 100/\geq 160$ mmHg)	67 (32.6)
<b>Comorbidities</b>	
Single	96 (46.9)
Multiple	47 (22.9)
No comorbidities	62 (30.2)

## DISCUSSION

Our study was a prescription-based survey which is considered to be one of the most effective methods to assess and evaluate the prescribing attitude of physicians and their adherence to the recommendations by the international bodies.<sup>13</sup> The results of our study suggest that hypertension is more prevalent in male patients (63.9%) than female patients (36.1%).

This finding is in conformity with the studies done by Jhaj et al and Anand et al.<sup>14,15</sup> In the present study, maximum number of patients were in the age group of 50-59 years and above constituting 74.6% of total patients. These results are consistent with the previous studies done by Tasneem S.<sup>16</sup> In our study, 70.8% of the patients had a family history of hypertension reinforces

the fact that there is a strong genetic predisposition in hypertension. This is consistent with the study done by Jackson JH.<sup>17</sup>

**Table 2: Pharmacotherapy of the patients.**

Pharmacotherapy	No. (%)
<b>Monotherapy</b>	
CCBs	23 (39)
ARBs	15 (25.4)
ACEIs	11 (18.6)
Diuretics	7 (11.9)
$\beta$ -Blockers	3 (5.1)
<b>Total</b>	59 (28.8)
<b>Dual Therapy</b>	
Diuretics + ARBs	58 (67.4)
Diuretics + ACEIs	15 (17.4)
Diuretics + $\beta$ -Blockers	4 (4.7)
ACEIs + CCBs	3 (3.5)
ACEIs + $\beta$ -Blockers	2 (2.3)
ARBs + CCBs	1 (1.2)
ARBs + $\beta$ -Blockers	2 (2.3)
$\beta$ -Blockers + CCBs	1 (1.2)
<b>Total</b>	86 (41.9)
<b>Triple Therapy</b>	
Diuretics + ARBs + ACEIs	6 (20.7)
Diuretics + ARBs + $\beta$ -Blockers	7 (24.1)
Diuretics + ARBs + Diuretics	4 (13.8)
Diuretics + ARBs + CCBs	4 (13.8)
Diuretics + ARBs + $\alpha$ -Blockers	2 (6.9)
Diuretics + ACEIs + CCBs	2 (6.9)
Diuretics + ACEIs + $\beta$ -Blockers	3 (10.3)
Diuretics + $\beta$ -Blockers + $\alpha$ -Blockers	1 (3.4)
<b>Total</b>	29 (14.2)
More than 3 drug therapy	31 (15.1)

The results of the present study showed that higher rates of 71.2% combination therapy of antihypertensives were prescribed than 28.8% monotherapy. These results supported the work of Hansson et al, and Kulkarni et al, that showed blood pressure could be adequately controlled with the help of combination therapy.<sup>2,18</sup> Furthermore, combination therapy seems to be a rational approach to reduce the cardiovascular mortality.<sup>19</sup> The present study revealed that CCBs were the most commonly prescribed as a single therapy followed by ARBs and ACEIs. This may be because CCBs seem to be preferred in age group more than 55 years and also because of their good response and less incidence of adverse effects. This is consistent with the study done by Konwar et al.<sup>20</sup>

In the present study, it was also observed that in combination therapy, two-drug combinations were mostly prescribed (%), followed by three-drug combinations (14.2%) and more than three drug combinations in (15.1%). Among the dual combination therapy, a combination of diuretics and angiotensin receptor

blockers were the leading drug combination to be most commonly prescribed indicating that diuretics were used more often as component of multidrug therapy. The use of diuretics in multidrug regimens is recognized as

essential for reduction of blood volume, vascular resistance and hence the efficacy of the combined regimen. This is consistent with study done by Thomas M.<sup>21</sup>

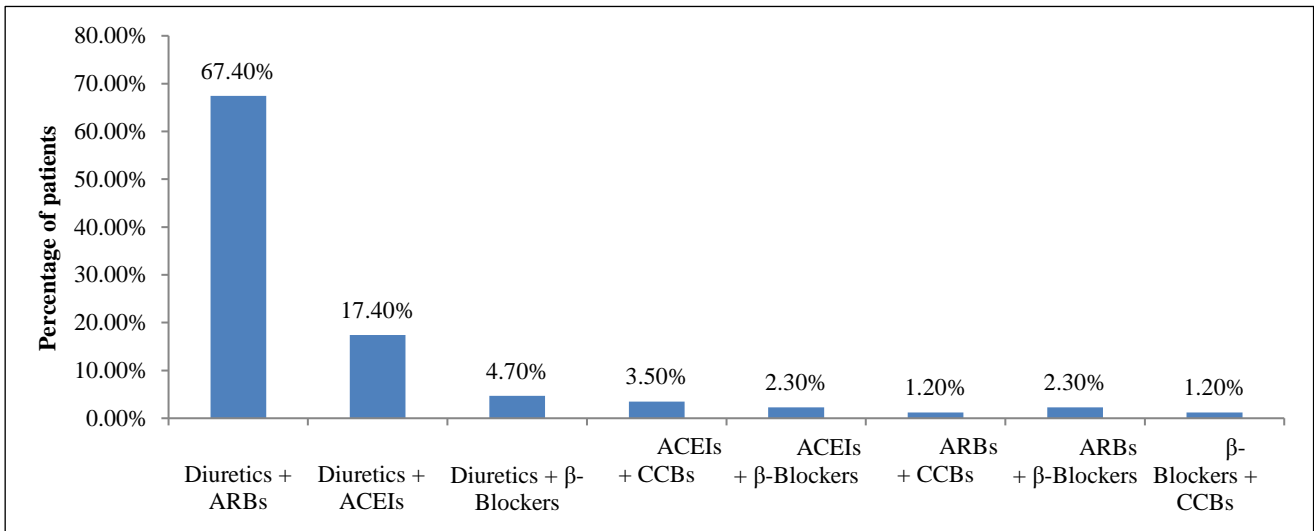


Figure 1: Percentage distribution of patients receiving various two-drug combinations.

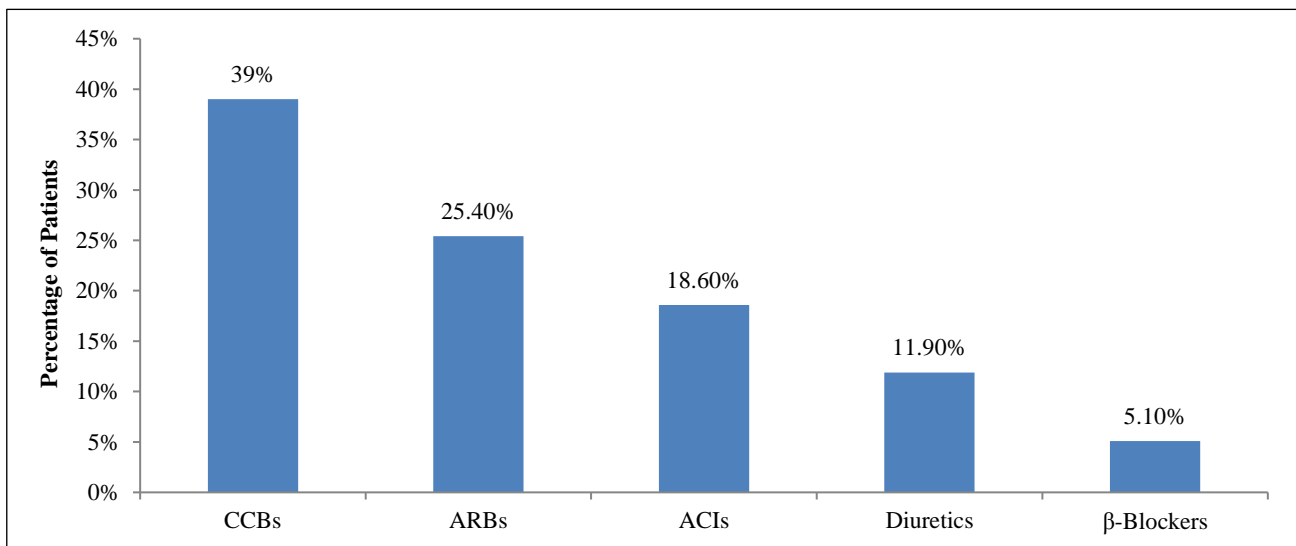


Figure 2: Percentage distribution of patients receiving various groups of drugs in monotherapy.

However, the present study has few limitations being of shorter duration, single-centered and also because of cross-sectional design of the study, there was no assessment whether the present therapy was the initial one or whether it switch or add-on to the original one. Therefore, no information about the treatment strategies over time can be provided.

### CONCLUSION

From the present study, it can be concluded that hypertension is more common in males than in females

and its prevalence seems to follow an increasing trend with increasing age. Calcium channel blockers are the most frequently prescribed classes of drugs alone and diuretics are the most commonly used class of drugs in combination. The incidence of hypertension is dependent upon several factors like ethnicity, genetic, environmental and physiological factors, hence further studies are necessary to set up a rationale or pattern for the choice of medication; taking into consideration the demographic factors involved in the prevalence of hypertension.

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