

## ADHERENCE TO JNC-7 GUIDELINES IN PRESCRIBING ANTIHYPERTENSIVE MEDICATIONS TO HYPERTENSIVE PATIENTS WITH CO-MORBID CONDITIONS IN A TERTIARY CARE HOSPITAL

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### *Abstract*

The present study was conducted to compare the prescribing pattern of antihypertensive drugs with JNC-7 guidelines. Prescriptions of adult patients of both sex, who were attending Hypertension Outpatient Department of Shri Chhatrapati Shivaji Maharaj Sarvopachar Rughnalaya, Solapur since last 6 months and being prescribed antihypertensive drug/s for hypertension, were selected for the study. Hypertensive patients with co- morbidities diabetes mellitus, ischemic heart diseases and congestive heart failure were also included in the study. Adherence to JNC-7 guideline with respect to prescribing antihypertensive drugs in patients with diabetes mellitus was found to be 95.48%, while it was found to be 73.33% in patients with ischemic heart disease. In cases of hypertension with congestive heart failure, adherence to prescribing antihypertensive were found to be 100% Following such authentic guidelines in managing a chronic disease like hypertension and implementing them is very important for the successful attainment of target blood pressure.

### *Keywords:*

Hypertension, diabetes mellitus, ischemic heart diseases, congestive heart failure.

## INTRODUCTION

Hypertension is a major public health challenge around the world and affects approximately 1 billion adults worldwide.<sup>1,2</sup> The Global Burden of Disease Study identified elevated blood pressure as the leading risk factor, among 67 studied, for death and disability adjusted life-years lost during 2010. High blood pressure is ranked as the third most important risk factor for attributable burden of disease in south Asia (2010).<sup>3</sup> Hypertension has been identified as a major risk factor for cardiovascular diseases, including stroke and myocardial infarction by the INTERSTROKE and INTERHEART study teams.<sup>4</sup> In India, hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths.<sup>5</sup> According to the WHO 2008 estimates, the prevalence of raised BP in Indians was 32.5% (33.2% in men and 31.7% in women).<sup>6</sup> According to Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, the overall prevalence of hypertension in India by 2020 will be 159.46/1000 population.<sup>7</sup>

Clinical trials have shown that treatment of hypertension reduces the risk of cardiovascular disease outcomes, including stroke (by 35 to 40%), myocardial infarction (by 15 to 25%), and heart failure (by up to 64%).<sup>8,9,10</sup> However, as hypertension often exists with other co-morbid conditions such as diabetes mellitus (DM), ischemic heart disease (IHD) and congestive heart failure (CHF), the antihypertensive therapy should be chosen according to specific individual variables. The presence of coexisting disorders may either favour or limit the use of particular antihypertensive drugs.<sup>11</sup> To treat hypertension associated with these co-morbid conditions, the Seventh report of Joint National Committee (JNC-7) has laid down certain guidelines.<sup>8</sup> These guidelines aim to provide indications for clinical practice based on rigorous scientific evidence and are important tools to improve the clinical approach of the physician in the daily treatment. However, their use in decision making in clinical practice is largely neglected by physicians.<sup>12,13</sup>

Keeping this in view, the present study was conducted in the Hypertension Outpatient Department in Shri Chhatrapati Shivaji Maharaj Sarvopachar Rugnalaya, Solapur, a tertiary care teaching hospital attached to Dr. V. M. Govt. Medical College, Solapur with objectives of studying the prescribing patterns of various antihypertensive medications in hypertensive patients with co-morbidities like diabetes mellitus, ischemic heart diseases and congestive heart failure and compare the same with JNC-7 guidelines.

## METHODS

A retrospective, observational, cross sectional study was done among the patients attending the Hypertension Outpatient Department of Shri Chhatrapati Shivaji Maharaj Sarvopachar Rugnalaya, Solapur. The study was conducted after getting approval from the Institutional Ethics Committee, local HMIS (hospital management information system) project implementation committee of the institute. The data was analysed for a period of six months from November 2015 to April 2016.

WHO recommends a sample size of at least 600 encounters for cross-sectional studies.<sup>14</sup> Based on above recommendation, a sample size consisting of 600 patients' prescriptions issued during the last six months period was included in the study. Adult hypertensive patients of both sex and different age groups attending the hypertension Outpatient Department and suffering from essential hypertension alone or with co-morbidities like diabetes mellitus, ischemic heart diseases and congestive heart failure were included in the study. Patients with hypertensive emergency, cerebral stroke or any concurrent acute medical condition like acute myocardial infarction, acute left ventricular failure etc. were excluded.

## RESULT

Out of the 600 patients, 322 (53.67%) were male and 278 (46.35%) were female. Most of the patients fell in the age group of more than 59 years - 428 (71.33%), followed by age group 49-59 years - 119 (19.83%) and age group 39-49 years - 53 (8.83%).

Out of 600 hypertensive patients, 329 (54.83%) were suffering from essential hypertension alone and 271 (45.17%) were having co-morbid conditions. Among these, majority of the patients i.e. 221 (36.83%) were suffering from hypertension with diabetes mellitus, 45 (7.5%) patients from hypertension with ischemic heart disease and 5 (0.83%) patients from hypertension with congestive heart failure. (Table 1)

**TABLE 1: Co-morbid Conditions of study patients.**

Co-morbid Condition	Number of patients (%)
Diabetes mellitus (DM)	221 (36.83%)
Ischemic heart disease (IHD)	45 (7.5%)
Congestive heart failure (CHF)	5 (0.83%)

It was seen that the number of antihypertensive agents prescribed were ranging from 1 to 3. Out of the total 600 patients, 304 (50.66%) were prescribed single drug therapy, 280 (46.66%) were prescribed two drugs and 16 (2.66%) patients received three drugs. Within the group of patients of hypertension alone, 58.36% were prescribed one antihypertensive drug; 39.82% of patients were prescribed two drugs and 1.82% of patients received three drugs. In this group, the mean number of antihypertensive drugs was found to be 1.43. In the group of hypertension with DM, 43.43% patients received single drug therapy while 53.40% and 3.17% patients received two and three drugs respectively. In this group, the mean number of antihypertensive drugs was found to be 1.60. In the group of hypertension with IHD, 35.56% patients were on monotherapy while 64.45% patients were prescribed two drugs. The mean number of antihypertensive drugs in this group was 1.64. In the category of hypertensive patients with CHF, 40% and 60% patients were on dual and triple drug therapy respectively, with a mean number of 2.6 antihypertensive drugs. (Table 2)

**TABLE 2: Total number of antihypertensive drugs prescribed per prescription.**

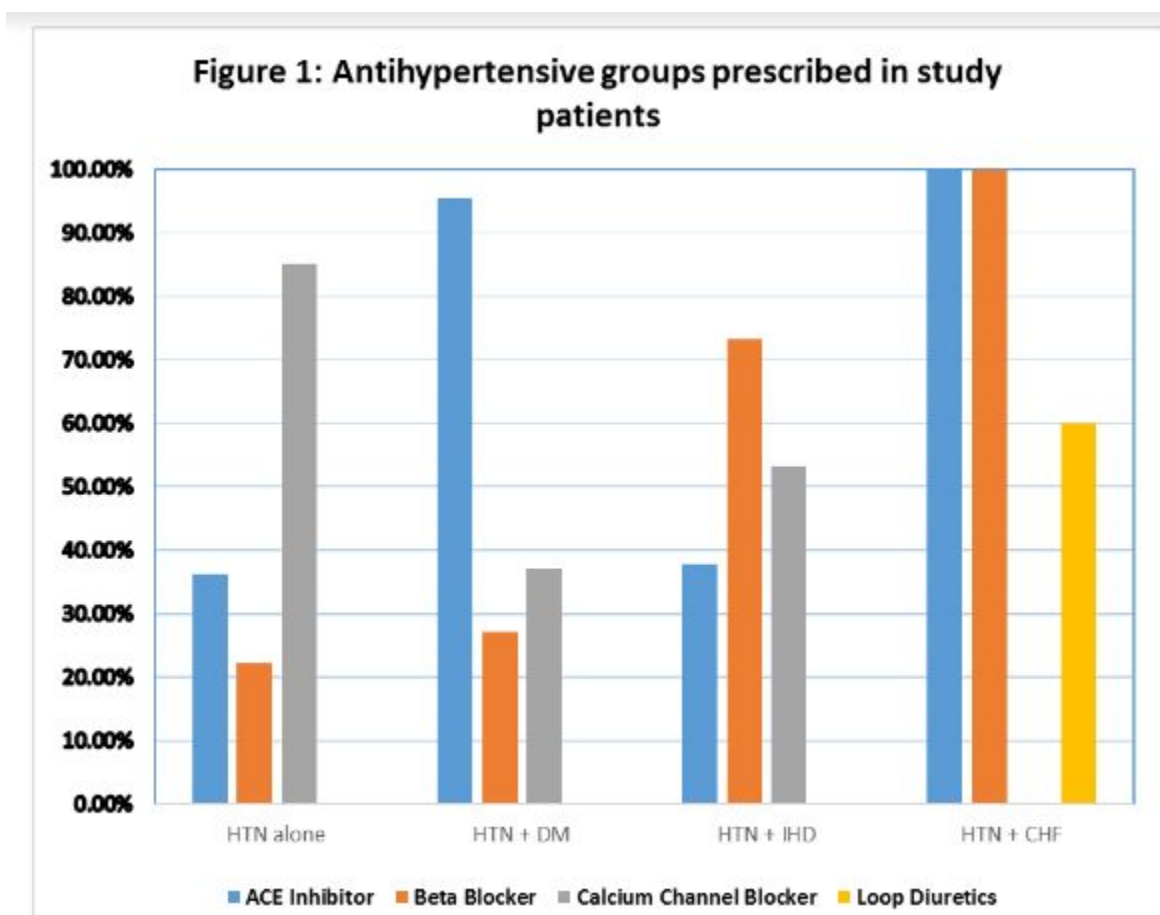
Number of antihypertensive in prescription	No of patients of Hypertension Alone n=329	No of patients of Hypertension Co-morbid DM n=221	No of Patients of Hypertension Co-morbid with IHD n=45	No of Patients of Hypertension Co-morbid with CHF n=5	Total No of patients n=600
1	192(58.36%)	96(43.43%)	16(35.56%)	0	304(50.67%)
2	131(39.82%)	118(53.40%)	29(64.45%)	2(40.00%)	280(46.67%)
3	6(1.82%)	7(3.17%)	0	3(60.00%)	16(2.67%)
Total antihypertensive drugs prescribed	472	353	74	13	912
Mean antihypertensive drugs prescribed	1.43	1.60	1.64	2.6	1.52

In this study, calcium channel blocker(CCB) Amlodipine was the most commonly used antihypertensive drug (64.33%) in study patients, followed by angiotensin converting enzyme inhibitor (ACEI) Enalapril (58.66%) and beta blocker(BB) Atenolol (28.5%). (Table 3).

**TABLE 3: Commonly used antihypertensive drugs in study patients.**

Antihypertensive group	Drug	No. of patients	% of patients
ACE Inhibitor	Enalapril	352	58.66
Beta blocker	Atenolol	171	28.5
Calcium channel blocker	Amlodipine	386	64.33
Diuretic	Furosemide	3	0.5

In patients with Hypertension alone, most were prescribed CCB (85.11%) while 36.17 % and 22.19% of these patient group received ACEI and BB respectively. In group of patients of hypertension co-morbid with diabetes mellitus, 95% patients were prescribed ACEI, 37.1% received CCB and 27.15% of patients received BB. BB were advised in 73.33% patients of hypertension with IHD while CCB and ACEI were prescribed in 53.33% and 37.78% of patients respectively in this group. All patients of hypertension with CHF were prescribed with ACEI and BB while 60% of patients received loop diuretics also. (Figure 1)



In prescriptions of hypertension co-morbid with DM, adherence to JNC-7 guidelines was found to be 95.48%. 73.33% prescriptions of hypertension with IHD were found to adhere to JNC-7 guidelines. In case of hypertension with CHF, adherence was seen in 100% cases. (Table 4)

**TABLE 4: Adherence of the antihypertensive prescriptions with JNC-7 Guidelines.**

Hypertension with co-morbid Condition n=429	Total number of prescriptions	Number of prescriptions following JNC-7 guidelines (%)
Hypertension with DM	221	211 (95.48%)
Hypertension with IHD	45	33 (73.33%)
Hypertension with CHF	5	5 (100%)

## DISCUSSION

Being a chronic disease, hypertension requires lifelong treatment. This study analysed the prescribing pattern of antihypertensive medications in a tertiary care hospital attached to our institute.

In this study, prevalence of hypertension was found to be 322(53.67%) in male as compared to 278(46.35%) in female. Another study by Kothari et al<sup>15</sup> have also found a slightly higher prevalence in male. Most common age group involved in our study was more than 59 years (71.33%), followed by 49-59 years (19.83%) and 39-49 years (8.83%). Kothari et al<sup>15</sup> also found similar results whereas Pai et al<sup>16</sup> found most common age group 60-69 years (34%) followed by 70-79 years (23%) and 40-49 years (22%).

Our study found that 45.17% of hypertensive patients were suffering with co-morbid conditions while study done by Kothari et al<sup>15</sup> found 47.72% patients were suffering with comorbid conditions. Majority of the patients in our study were suffering from hypertension with DM (36.83%) followed by IHD (7.5%) and CHF (0.83%). The study by Kothari et al<sup>15</sup> reported similar order of prevalence whereas Sakthi S et al<sup>17</sup> reported DM (35%) as the most frequent co-morbidity followed by asthma (5%) and IHD (1.6%).

In the present study, 50.67% patients were found to be stabilized on monotherapy whereas Kothari et al<sup>15</sup> and Pai et al<sup>16</sup> reported monotherapy in 45.60% and 49% of hypertensive patients respectively.

Since hypertension is associated with various concurrent diseases and its complications, polypharmacy was quite prevalent. 49.34% were on multiple drug therapy. Combination therapy is being favoured in recent years due to the multifactorial nature of hypertension. Achievement of target blood pressure tends to be better with combination therapy, and the risk of side effects owing to use of maximal doses of monotherapeutic agents is reduced.<sup>15</sup>

The Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC) have developed treatment guidelines based on the results of randomized clinical trials.<sup>8</sup> According to 7th report of JNC, therapy with a thiazide diuretic and/or ACEI is an important component of most regimens to control blood pressure in diabetic patients. ACEI favorably affect the progression of diabetic nephropathy and reduce albuminuria.<sup>20,21</sup> In our study, 95.48% hypertensive patients co-morbid with diabetes were prescribed ACEI based regimen, which was encouraging. In the study by Kothari et al, adherence to JNC-7 guidelines in this prescribing drugs to this group of patients was found to be 97%.<sup>15</sup> Thiazide diuretic and angiotensin receptor blocker were not available in the study centre.

Hypertensive patients are at increased risk for IHD and death following an acute myocardial infarction.<sup>8</sup> JNC-7 guidelines recommends use of BB as a first choice drug group with alternative of CCB in patients with hypertension and stable angina pectoris. BB will lower blood pressure; reduce symptoms of angina; improve mortality; and reduce cardiac output, heart rate, and AV conduction. The reduced inotropy and heart rate decrease myocardial oxygen demand.<sup>8</sup> In our study, 73.33% hypertensive patients with IHD were prescribed beta blocker in their prescriptions which is similar to 72.27% found in the study by Kothari et al.<sup>15</sup>

In hypertension along with CHF cases, JNC-7 guideline recommends use of ACEI and BB, angiotensin receptor blockers and aldosterone receptor antagonists along with loop diuretics. 100% antihypertensives prescribed to this patient group followed JNC-7 guidelines. Kothari et al reported an adherence of 93.62%.<sup>15</sup>

The homogenous nature of the study population was the major limitation of this study. Studies on heterogeneous population through the collection of data from multiple centres will be more informative. Nevertheless, the study revealed important aspects of the antihypertensive drug utilization pattern and adherence of these drugs to JNC-7 guidelines in different co-morbid conditions.

**DECLARATION**

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