

**ANTIHYPERTENSIVE DRUG UTILIZATION IN PATIENT**

**ATTENDING PRIVATE MEDICAL CENTER IN INDIA**

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**Summary**

The study was conducted in Sarvahit Medical Center, (MH) India from January 2009 to June 2009. Total 700 prescriptions were studied and evaluated for six months as per WHO Guideline. Analysis of prescription data reveals that hypertension is more prevalent in males 197(56.28%) than females 153(43.71%). Mostly prescribed antihypertensive drug class were  $\beta$ -blockers 24.85%, calcium channel blockers 33.42%, angiotensin-converting enzyme (ACE) inhibitors 9.7%, Angiotensin-II antagonist 9.1%, combination class drugs 38.57% and miscellaneous (alpha-blocker and diuretics) 1.7%. Antiplatelet drugs (32%) were also used with antihypertensive drugs to reduce the risk of Ischemic heart disease.

This study revealed that both monotherapy (28.12%) and combination therapy (71.88%) were employed to the patient. The mostly preferred drugs from monotherapy were Atenolol (44.44%) and Amlodipine (28.39%). The combination of Losartan + Hydrochlorthiazide (62.22%) was mostly used from combination class. Diabetes (14%) was common associated with hypertension. This study highlighted the current prescribing trend of antihypertensive drugs in India and pointed out the present prescribing practice.

There is great need of enhancing quality of life style through proper diet, exercise and stress and tension free life. Through education intervention patient knowledge should be improved that will perhaps boost up patients health care in future.

**Key words:** Hypertension, Drug Utilization Pattern, Prescription analysis.

## Introduction

Hypertension or high Blood Pressure is among the most common chronic medical conditions, affecting >600 million individuals in the world at risk for heart attack, stroke and cardiac failure<sup>1, 2</sup>. In India at an underestimate, there are 31.5 million hypertensives in rural populations and 34 million in urban populations and it is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths<sup>3</sup>. In the past 3 decades, hypertension treatment has contributed to a decrease in morbidity and mortality occurring due to cardiovascular diseases. However, a recent meta-analysis showed an increase in the prevalence of hypertension, 10%– 30.9%, in urban areas over the years, while earlier reports since 1950 showed a prevalence of 1%–3%. This data also showed a continued poor Blood Pressure control rate (<35%) for Indian hypertensives, which is far below the Healthy People 2010 goal of 50%.<sup>4,5</sup> It is therefore important to understand current antihypertensive medication utilization patterns and to study their impact on Blood Pressure control and hypertension-related clinical outcomes.

A large number of drugs, including diuretics,  $\beta$ -blockers, calcium channel blockers (CCBs), angiotensin-converting enzyme (ACE) inhibitors, and angiotensin receptor blockers (ARBs), are available for lowering elevated blood pressures. These drugs have been shown to reduce hypertension-related morbidity and mortality.<sup>6-8</sup> On the basis of many randomized clinical trials, the 1997 JNC VI recommended diuretics and  $\beta$ -blockers as the first-line agents for pharmacological treatment of uncomplicated hypertension; listed compelling indications for calcium channel blockers (CCBs), angiotensin-converting enzyme (ACE) inhibitors, and  $\beta$ -blockers; and discussed additional favorable clinical indications for these and other drug classes.<sup>8</sup> However, most previous published data indicated an increasing use of the more expensive calcium channel blockers (CCBs) and angiotensin-converting enzyme (ACE) inhibitors<sup>9-12</sup> despite the lack of evidence to support that they are superior to diuretics and  $\beta$ -blockers in preventing major forms of cardiovascular disease. To understand current medication utilization patterns among hypertensives we have conducted a study which can explore trends and patterns of antihypertensive medication usage among Indian adults with hypertension.

## Method

### Study Site and Subjects

The present study was conducted at one of the largest medical centers, Sarvahit Medical Center, of the Sangli, Maharashtra, India. The Sarvahit Medical Center is the India's largest equally accessed, comprehensive, integrated health care center. The provision of medical care has been structured around a primary care model since the mid-1990s. Practitioners at this site are a combination of primary care staff physicians, allied health professionals, sub-specialists who staffed primary care clinics part time, and general medicine residents. About all of the primary care physicians and all of the sub-specialists had an academic affiliation.

In present study computerized medical records were used to obtain diagnostic information (International Classification of Diseases, Clinical Modification, 9th Revision (ICD-9-CM) codes), demographic information, vital signs and use of prescription drugs. Data was collected retrospectively for the period January 2009 to June 2009. All inpatients and outpatients of the parent tertiary care facility were screened. All data was transferred to the study team for analysis.

### **Inclusion and Exclusion Criteria**

Patients were identified for inclusion in the study based on previous research, described in detail elsewhere<sup>13-15</sup>. Briefly, all patients visited from January 2009 to June 2009 were screened and classified as having hypertension and prescription drug information.

Patient was classified as hypertensive if he met with any of the following 5 criteria:

1. At least 2 outpatient visit diagnoses of hypertension; or
  2. At least 1 prescription of antihypertensive drug plus at least 1 outpatient diagnosis of hypertension; or
  3. At least 1 prescription of antihypertensive drug plus at least 1 elevated Blood Pressure measurement; or
  4. At least 2 elevated blood pressure measurement plus one outpatient diagnosis of hypertension; or
  5. At least 2 elevated Blood Pressure measurements.
- Elevated Blood Pressure was defined as greater than or equal to 130/85 mmHg, according to the sixth report of the Joint National Committee on the Prevention, Detection, Evaluation and Treatment of High Blood Pressure.<sup>16</sup>

### **Treatment Patterns**

In this study computerized pharmacy records were used to identify prescribed anti-hypertensive drugs ( $\beta$ -blockers, calcium channel blockers, other antihypertensives, ACEI, ARB, and  $\alpha$ -blockers) from January 2009 to June 2009. The number of anti-hypertensive drugs being prescribed were tabulated and classified for patients with any prescriptions for specific class of antihypertensive drugs eg. angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers as ACEI/ARB. The proportion of use of these antihypertensive drug classes was tabulated for all patients.

### **Analysis**

The pattern of use of antihypertensive drugs among all patients and in sub-groups of patients was evaluated for one or more drugs. The use of the specific class of drugs among the patients was compared and further evaluated for patients on monotherapy and on multi-drug regimens. Patients were classified on the basis of their blood pressure, patients with Blood Pressure range 140-159 mmHg were classified as mild hypertensive, with Blood Pressure range 160-179 mmHg were classified as moderate hypertensive, with Blood Pressure range 180-209 mmHg were classified as severe hypertensive and above 210 mmHg were classified as very severe hypertensive.

### **Results**

There were 700 patients who met the inclusion criteria for hypertension. The maximum numbers of patients were in age group of 45-54 (30.57%). Approximately 56% were male and 44% were female (See Table-1).

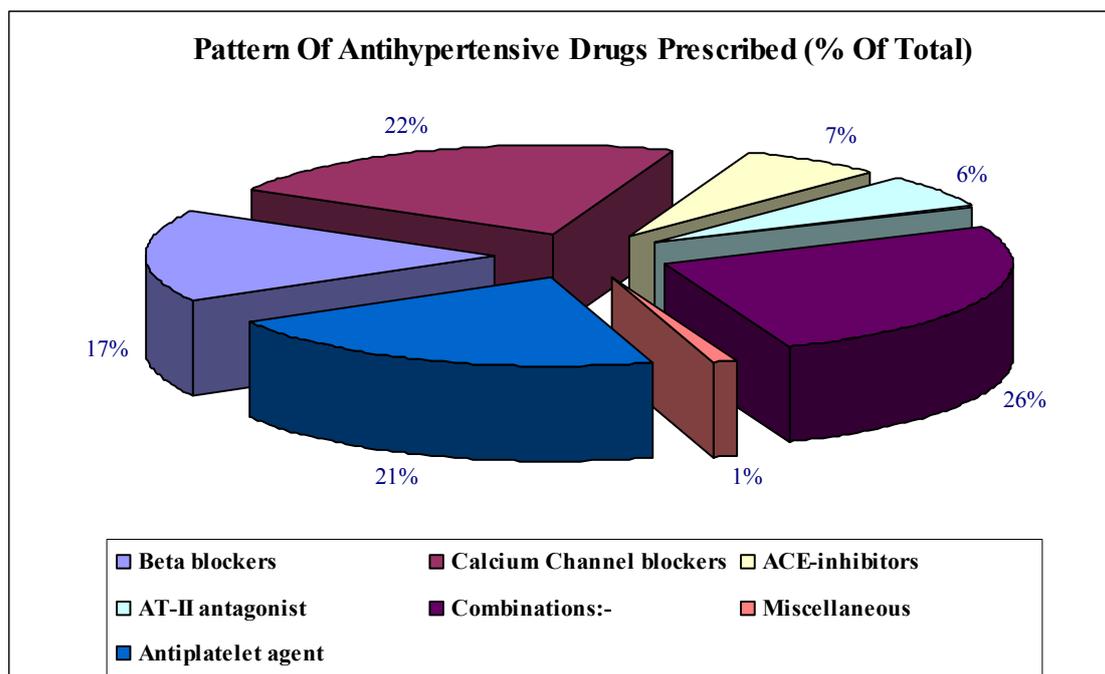
**Table No: 1 Age & Sex distribution of hypertensive patients.**

Age Group (years)	Male (n= 394)	Female (n=306)	All Patients (n=350)
25-34	18 (4.56%)	24 (7.84%)	42 (6.0%)
35-44	44 (11.16%)	24 (7.84%)	68 (9.71%)
45-54	130 (32.90%)	84 (27.45%)	214 (30.57%)
55-64	68 (17.25%)	78 (25.49%)	146 (20.85%)
65-74	96 (24.36%)	72 (23.52%)	168 (24.00%)
Above 75	38 (9.6%)	24 (7.84%)	62 (8.85%)
Range (years)	26-88	25-85	25-88

Overall, (28.12%) patients were receiving monotherapy, drugs prescribed in monotherapy were Atenolol (44.44%), Amlodipine (28.39%), Losartan and S-Amlodipine (12.3%). Remaining (71.88%) patients were receiving combination therapy, mainly two combinations Losartan + Hydrochlorothiazide (62.22%) and Atenolol + Chlorthalidone (30.37%). Most patients were receiving calcium channel blockers (33.42%) followed by  $\beta$ -blockers (24.85%), ACEI's (9.7%), Angiotensin-II antagonist (9.1%) and then miscellaneous (1.7%) (Alpha-blocker and diuretics). Percentage of combinations and Antiplatelets were (38.57%) and (32%) respectively. Antiplatelets were combined with antihypertensive drugs to reduce the risk of Ischemic heart disease. (See Table 2).

**Table No: 2<sup>17, 18</sup> Pattern of antihypertensive drugs prescribed.**

Drug class	Drug	No. of Prescriptions	Percentage of total
$\beta$ -blocker	Atenolol	150	24.85%
	Metoprolol	20	
	Bisoprolol	12	
	Nebivolol	02	
Calcium Channel blockers	Amlodipine	138	33.42%
	S-Amlodipine	86	
	Diltiazem	04	
	Nifedipine	06	
ACE-inhibitors	Enalapril	16	9.71%
	Ramipril	52	
AT-II antagonist	Losartan	64	9.1%
Combinations	Atenolol + Chlorthalidone	82	38.57%
	Losartan + Hydrochlorothiazide	168	
	Others	26	
Miscellaneous	Prazocine	10	1.7%
	Spiranolactone	02	
Antiplatelet agent	Clopidogrel	124	32%
	Acetyl salicylic acid	100	



The number of mild hypertensive patients were 272 (38.85%), moderate hypertensive were 208 (29.71%), severe hypertensive were 96 (13.71%) and very severe hypertensive were 26 (3.71%). B.P of some patient's was 130-139 mm Hg (14%) and they were also on antihypertensive therapy. Out of 700 patients, 124 (17.7%) patients were associated with diabetes.

### Discussion

Prescription by a doctor may be taken as a reflection of physician's attitude to the disease and role of the drug in treatment. It also provides an insight into the nature of health care delivery system.<sup>[18]</sup> Little information exists about the prescriptive behavior of physicians and the misuse of antihypertensive in the management of outpatient and inpatient with hypertension. In general practice, the therapeutic approach for hypertension is nearly empirical and the main aim of physicians is to treat as specifically as possible. The present descriptive study indicates general trends of prescribing in the OPD and IPD for hypertension.

This study describes patterns of antihypertensive use in patients with hypertension to evaluate whether they were consistent with evidence-based practice guidelines. Overall calcium channel blockers and  $\beta$ -blocker use was higher in patients. Commonly either  $\beta$ -blocker or calcium channel blockers was used (Atenolol (44.44%), Amlodipine (28.39%)) as a monotherapy. A large proportion of treated patients (71.88%) were being prescribed multidrug regimens, reflecting the pattern observed in several previous trials. In these regimens, the most common drug class prescribed was  $\beta$ -blocker/ angiotensin receptor blockers followed by diuretics. Our findings indicate that medication use was mostly consistent with evidence-based practice guidelines to treat hypertension. There was, however, room for improvement in prescribing.

Further it was found that number of patients with mild (38.85%) and moderate (29.71%) Blood Pressure were high as compared to severe (13.71%) and very severe (3.71%) Blood Pressure. Obviously, Blood Pressure control is multifactorial, with factors such as age, comorbidity, and patient adherence to medication regimens affecting this outcome, and our study does not attempt to examine these. Interestingly, the control rate did not differ much across the regimens.

The study was carried out over a six month period, and seasonal variations in disease pattern and drug utilization were not considered. Further, the number of patients was low and the study was restricted to only one hospital, hence the results cannot be considered representative of the whole country. IBut because of the predominantly male population of our patients, the results cannot be generalized to women and the study was restricted to only one hospital, hence the results cannot be considered representative of the whole country. We also did not analyze individual medical records to look for contraindications to specific drugs. In addition, we did not have the breakdown of the number of specific anti-hypertensive prescriptions written by individual physicians. However, in spite of all these limitations, our study highlighted some rational prescribing practices. In this study actual dispensed prescriptions were assessed for given class of drug and specific prescribing pattern was characterized. Information from diagnostic, pharmacy and vital signs was combined so as not to rely on any single source of information.

Our findings suggest that in hypertensive population, calcium channel blocker's use was found in a large proportion of treated patients. The majority (71.88%) of treated patients were on multidrug regimens. However, there remains potential room for improvement in drug utilization and a critical need for better Blood Pressure control. Further research is needed to qualify how utilization and control rates compare outside the Sarvahit Medical Center setting, and to determine specific patient and provider factors associated with variation in prescribing patterns and Blood Pressure control. Continued research efforts to understand poor Blood Pressure control despite good pharmacological treatment are needed. In this study continuing education on rational drug use and development of easy to use treatment guidelines for common diseases is suggested. In our future endeavors, we plan to study the effect of regulatory and educational interventions on drug use pattern in the management of hypertension.

#### **Acknowledgement**

We thank to the Sarvahit Medical Center and Appasaheb Birnale College of Pharmacy, Sangli, Maharashtra, India for their kind help and cooperation in conducting this study.

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