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## Research Article

# Prescribing Patterns of Antihypertensive Drugs in A Tertiary Care Hospital

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**Abstract:** The choice of drug for the treatment of hypertension changes at short intervals. Drug utilization studies conducted at regular intervals help to guide the physician in prescribing drugs rationally. The present study was done to analyze the prescribing patterns of antihypertensive drugs in a South Indian tertiary care hospital. A retrospective, cross sectional analysis of prescriptions of antihypertensive cases admitted in Medicine in-patient wards of S. Nijalingappa Medical College and HSK Hospital and Research Centre was conducted. All the prescription files with diagnosis of essential hypertension were analyzed. Prescriptions for hypertension with other co-morbid conditions were also included. Frequency and proportions of utilization of antihypertensive medications were charted and figured. During the study period, there were 200 prescriptions for essential hypertension. The most frequently prescribed antihypertensive medications were: Calcium channel blockers (49%) followed by diuretics (43.5%), angiotensin converting enzyme inhibitors (29.5%) beta blockers (29%)and angiotensin receptor blockers (21%). 51% of patients were on multiple drug therapy, the most favored fixed drug combination being diuretics with angiotensin receptor blockers (25.4%). Among the hypertensive cases with co-existing diabetes mellitus type II, the most prescribed class of drugs was diuretics (43.8%) followed by angiotensin converting enzyme inhibitors (40.4%).
**Keywords**: Hypertension, Prescription, Antihypertensive, Medications.

## INTRODUCTION

Hypertensive vascular disease is a common entity readily detectable, asymptomatic at times, easily treatable usually and often known to lead to lethal complications if left untreated [1].It is a clinical syndrome occurring in the general population, characterized by sustained elevation of blood pressure. According to the report of the joint national committee for detection, evaluation and treatment of high blood pressure, hypertension is defined as a clinical state where the systolic blood pressure is above 139mm.Hg and the diastolic blood pressure is above 89mm.Hg persistently [1]. In the majority of cases, a specific underlying cause of hypertension is not known. Such patients are said to have essential hypertension [2].

Hypertension is an established risk factor for cardiovascular diseases such as myocardial infarction, arrhythmias, angina pectoris, cardiac failure and for renal complications with shortened expectancy of life. In this context, the use of established antihypertensives assumes paramount importance. Accordingly, the general principles of antihypertensive therapy conforming to the guidelines of JNC VII and WHO & ISH are considered [3] [JNC VII - The Seventh Report of Joint National Committee of USA on Prevention, Detection, Evaluation And Treatment of High Blood Pressure; WHO & ISH - World Health Organisation and International Society of Hypertension].

The ultimate aim of antihypertensive drug therapy is to minimize or control the morbidity and mortality associated with persistent hypertension. With the establishment of the efficacy of the standard antihypertensive in multicentric clinical trials, selection of initial monotherapy is made possible, followed subsequently by combination therapy, if required. Another approach is to analyze the effectiveness of antihypertensives in regard to the life style and risk factors, if any [4].

The purpose of treating essential hypertension is to prevent complications and to improve patient survival and the selection of the antihypertensives should be based on safety, efficacy and freedom from adverse effects. Accordingly, appropriate drug therapy can ensure immense therapeutic benefit in patients with essential hypertension with least adverse effects.

The study of a prescription pattern is in fact, a part of medical audit involving monitoring and evaluation of various prescriptions of medical practitioners to ensure rationality in medical care.

This study therefore envisages evaluation of the pattern, extent, rationality and frequency of use of the antihypertensive drugs in the treatment of essential hypertension for information to the esteemed medical fraternity.

**Experimental section**

The present study was a retrospective, cross sectional analysis of antihypertensive prescriptions which included all prescriptions of hypertensive patients admitted in Medicine inpatient wards of a tertiary care hospital during the period of January 2012 to June 2012.

All the prescription files with diagnosis of essential hypertension (ICD-9CM: 401-405, WHO international code: A 26) were analyzed. Prescriptions for hypertension with other co morbid conditions were also included. The demographic profile of the patients was filed.

Frequency and proportions of utilization of antihypertensive medications were charted and figured.

The top five prescriptive patterns were presented by patients' age and gender. Percentage was calculated as the number for each of these five categories divided by the total number of prescriptions.

Antihypertensive drugs were grouped into seven categories, namely Angiotensin Converting Enzyme Inhibitors (ACEI), Angiotensin receptor blockers (ARB), Beta-blockers (BB), Calcium channel blockers (CCB), Diuretics, Alpha adrenergic blockers and Central sympatholytic drugs.

**RESULTS**

**Demographic profile of the study population:**

During the entire study period, a total of 214 patients with essential hypertension were screened. Among these patients the nature of antihypertensive drugs was not known in 12 cases. Number of new cases who were not on any drug therapy was two.

**Table 1: Demographic characteristics of hypertensive patients undergoing monotherapy and combination therapy**

| Age groups (in years) | Males n=101 | Females n=99 | Total patients n=200 |
|---|---|---|---|
| 30-39 | 3 | 1 | 4 |
| 40-49 | 13 | 13 | 26 |
| 50-59 | 20 | 24 | 44 |
| 60-69 | 39 | 29 | 68 |
| 70-79 | 20 | 26 | 46 |
| 80-89 | 6 | 6 | 12 |
| Mean age (years) | 62.72 | 63.48 | 63.1 |
| Monotherapy | 53(52.4%) | 45(45.4%) | 98(49%) |
| Combination therapy | 48(47.5%) | 54(54.5%) | 102(51%) |

**Antihypertensive drugs prescribed**

In the overall utilization pattern, calcium channel blockers (49%) were the most commonly prescribed drugs followed by diuretics (43.5%), angiotensin converting enzyme inhibitors (29.5%) beta blockers (29%), angiotensin receptor blockers (21%), alpha adrenergic blockers (2%) and central sympatholytics (2%); the leading drugs being Amlodipine, Hydrochlorothiazide, Enalapril, Atenolol, Losartan, Prazosin and Clonidine in the respective groups.

**Table 2: Monotherapy and combination therapy of hypertensive patients**

| Drug therapy | Monotherapy vs combination therapy (%) | Combination therapy (%) |
|---|---|---|
| Monotherapy (n=98) | 49% | - |
| Two-drug regimen (n=69) | 34.5% | 67.7% |
| Three drug regimen (n=28) | 14% | 27.5% |
| Four drug regimen (n=5) | 2.5% | 4.9% |

**Table 3: Age-wise prescribing frequency of antihypertensive drugs**

| Age (yrs) | Diuretics | | ACEI | | ARB | | CCB | | BB | | Prazosin | | Clonidine | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| < 40 | 1 | 1 | 1 | 0 | 2 | 0 | 5 | 9 | 2 | 0 | 0 | 0 | 0 | 0 |
| 40-49 | 2 | 4 | 2 | 4 | 1 | 1 | 13 | 11 | 7 | 5 | 0 | 0 | 0 | 0 |
| 50-59 | 11 | 8 | 5 | 7 | 3 | 8 | 16 | 13 | 6 | 8 | 1 | 0 | 0 | 0 |
| 60-69 | 14 | 19 | 13 | 9 | 7 | 5 | 2 | 15 | 5 | 9 | 1 | 0 | 1 | 0 |
| 70-79 | 9 | 12 | 7 | 6 | 8 | 5 | 5 | 2 | 5 | 7 | 2 | 0 | 0 | 1 |
| 80-89 | 3 | 3 | 2 | 3 | 0 | 2 | 5 | 2 | 1 | 3 | 0 | 0 | 0 | 1 |
| TOTAL | 40 | 47 | 30 | 29 | 21 | 21 | 46 | 52 | 58 | 32 | 4 | 0 | 1 | 2 |
| Total % | 43.5% | | 29.5% | | 21% | | 49% | | 29% | | 2% | | 2% | |

M: Male,F: Female,ACEI: Angiotensin converting enzyme inhibitor, ARB: Angiotensin receptor blocker, CCB: Calcium channel blocker, BB: beta blocker

## DISCUSSION

A prescription-based survey is considered to be one of the most effective methods to assess and evaluate the prescribing attitude of physicians [6] and dispensing practice of pharmacists.

The present study observed that multiple drug therapy (51%) was more common than single drug therapy. These results supported the work of Hansson et al that showed blood pressure could be adequately controlled with the help of combination therapy [7]. Furthermore combination therapy seems to be a rational approach to reduce the cardiovascular mortality [8].

In the present study calcium channel blockers (49%) were the most commonly prescribed drugs for hypertensive patients followed by diuretics (43.5%). In a study by Jhaj R *et al.*, beta adrenoceptor blockers were found to be the most frequently used group of drugs, followed by calcium channel blockers, ACE inhibitors and diuretics in that order [9].

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. Diuretics are generally recommended as first-line therapy for treatment of hypertension (JNC VII) [10]. The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC VI and JNC VII) reports note that volume overload due to inadequate diuretic therapy is one of the commonest reasons for resistance to hypertensive treatments [10].

In the present study, two-drug combinations were mostly prescribed (67.7%), followed by three-drug combinations (27.5%) and four drug combinations (4.9%) (Table no. 3). In two-drug combinations, a diuretic with angiotensin receptor blocker (29.5%) was most commonly prescribed followed by a ß-blocker with a calcium channel blocker (22.1 %).

In this form of combination and in addition to its favourable complementary synergistic effects, ß-blockers tend to blunt the troublesome complementary reflex tachycardia induced by the dihydropyridine (DHP) class of calcium channel blockers. The latter may additionally counteract any peripheral vasoconstriction caused by the former. Their combined efficacy has been confirmed [10, 11].

## CONCLUSION

Present study represents the current prescribing trend for antihypertensive agents. It implies that calcium channel blockers are the leading group of antihypertensive agents followed by diuretics. Our study provides baseline data. The treatment of hypertension keeps changing and newer drugs are being added at a rapid pace. Further studies focused on the rationale for choice of drugs based on demographic data, economic status, associated conditions and complications would give additional insights into prescribing patterns in hypertension in India.

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