INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN: 2320-2831

*IJPAR |Vol.4 | Issue 1 | Jan-Mar-2015*
*Journal Home page: www.ijpar.com*

*Research article* *Open Access*

# Prescribing pattern of anti-hypertensive drugs: A prospective study

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## ABSTRACT

The sources of drug utilization data vary from country to country depending on the level of sophistication of record keeping, data collection, analysis and reporting and the operational considerations of the health care system. So in most part of our country the prescribing pattern of antihypertensive drugs by different physicians is not in compliance with that of the standard guidelines. The purpose of this study was to evaluate the prescribing pattern of antihypertensive drugs and to determine the type of drugs commonly prescribed i.e. either monotherapy or combination drugs. This observational prospective study was conducted in erode for a time period of 4 months. The maximum percentage of male and females with hypertension was found at the age group of 50-60 years. As monotherapy ACE-inhibitors (34%) were the most commonly prescribed antihypertensive followed by calcium channel blockers (18%) and beta blocker (12%). Among combination therapy often 2 drug combinations were prescribed, the most common combination was ACE-inh + CCB (8%), followed by beta-blocker + CCB (6%). Hence we concluded that underutilization of diuretics and inadequate oral instructions by clinical pharmacist are found to be the limitations of the present prescribing pattern and hence, an intervention study is needed to improve the current prescribing practice in clinical use of hypertension management.

**Keywords**: Hypertension, Antihypertensive drugs, Monotherapy, Combination therapy.

## INTRODUCTION

Hypertension has been reported to be the strongest modifiable global risk factor for cardiovascular morbidity, mortality as well as health burdens [1, 2]. Epidemiological studies conducted in many parts of the world have consistently identified an important and independent link between hypertension and various disorders, especially coronary heart disease, stroke, congestive heart failure and impaired renal function [3,9]. Hypertension is currently the leading risk resulting in considerable death and disability worldwide and accounted for 9.4 million deaths and 7% of disability adjusted life years in 2010 [4,5,6]. In India, the situation is more alarming as hypertension attributes for nearly 9% of all deaths [7,8]. Prevalence of hypertension in India is reported to vary from 4-16% in urban and 2-7% in rural population [10]. It is estimated that the worldwide prevalence of hypertension would increase from 26.8% in 2000 to 26.2% in 2025 [11,12]. Epidemiological studies also demonstrate that prevalence of hypertension is

increasing rapidly among Indian urban and rural populations [13,14].

Hypertension is defined as a systolic blood pressure (SBP) of 140 mm Hg or more, or a diastolic blood pressure (DBP) of 90 mm Hg or more, or taking antihypertensive medication. Hypertension is one of the most common chronic conditions that can lead to several other health problems in the presence of contributing factors like genetics, obesity or high cholesterol levels. These factors further increase the resistance of blood flow through the arteries and cause high BP. Elevated blood pressure is linked to a variety of diseases like coronary artery diseases, stroke, kidney diseases, vision loss and myocardial infarction.[15,16,17]

## CLASSIFICATION OF BLOOD PRESSURE

| Classification | Normal | Stage 1 | Stage 2 | Stage 3 |
|---|---|---|---|---|
| BP Elevation | Normal or rare | Occasional or intermittent | Sustained | Marked and sustained |
| Cardiovascular disease | None | Early | Progressive | Advanced |
| Cardiovascular risk factors | None or few | Several | Many | Many |

**According to JNC 7 guidelines:[18]**

- ✓ Normal blood pressure: SBP <120 mm Hg and Diastolic blood pressure (DBP) <80 mm Hg
- ✓ Prehypertension: These are patients on the cusp of developing hypertension. It is defined as a SBP of 120-139 mm Hg or a DBP of 80-89 mm Hg
- ✓ Stage I hypertension: SBP 140-159 mm Hg or DBP 90-99 mm Hg
- ✓ Stage II hypertension: SBP ≥160 mm Hg or DBP ≥100 mm Hg

| JNC 6 category | SBP/DBP | JNC 7 category |
|---|---|---|
| OPTIMAL | <120/80 | NORMAL |
| NORMAL | 120-129/80-84 | PREHYPRTENSION |
| BORDERLINE | 130-139/85-89 | PREHYPERTENSION |
| HYPERTENSION | ≥140/90 | HYPERTENSION |
| STAGE I | 140-159/90-99 | STAGE I |
| STAGE II | 160-179/100-109 | STAGE II |
| STAGE III | ≥180/110 | STAGE II |

The drug-use chain includes the processes of drug acquisition, storage, distribution, prescribing, patient compliance and the review of outcome of treatment. Each of these events is an important aspect of drug utilization, and most countries have regulations to cover these aspects. Data are collected, or are available, at national, regional and local health facility or household level and may be derived from quantitative or qualitative studies. Quantitative data may be used to describe the present situation and the trends in drug prescribing and drug use at various levels of the health care system. The sources of drug utilization data vary from country to country depending on the level of sophistication of record keeping, data collection, analysis and reporting and the operational considerations of the health care system.[19,20,21]

In the prehypertensive stage, lifestyle modifications alone are recommended, whereas in Stage I hypertension lifestyle modifications combined with single-drug therapy (usually a thiazide-type diuretic) is recommended.[22] In Stage II hypertension, lifestyle modifications are recommended, but initial therapy is aggressive, and typically includes a thiazide-type diuretic in combination with an angiotensin-converting

enzyme (ACE) inhibitor, angiotensin receptor blocker (ARB), calcium channel blocker (CCB), or a beta-blocker. In early versions of JNC, beta-blockers were considered first-line therapy, but in JNC 7 beta-blockers were considered either add-on therapy to thiazide-type diuretics, oral initial therapy in patients with compelling indications.[23,24]

The purpose of this study was to evaluate the prescribing pattern of antihypertensive

Drugs and to determine the type of drugs commonly prescribed i.e. either monotherapy or combination drugs.

## METHODOLOGY

- **Number of Patients**: 50 Patient's Prescriptions.
- **Study Site**: The study was conducted in erode.
- **Study duration:** 4 Months study.
- **Study design:** Observational, prospective study.

### Literature review

A literature review was done in order to support the study proposed and to up-to-dateour knowledge about the current topic and other related topics.

### Inclusion criteria

- Patients with the age Group > 20 yrs.
- Alcoholic and non-alcoholic
- Smokers & non smokers
- Hypertension with & without cardiovascular disease
- Hypertension with & without diabetes mellitus
- Patients receiving antihypertensive drugs with combinations.

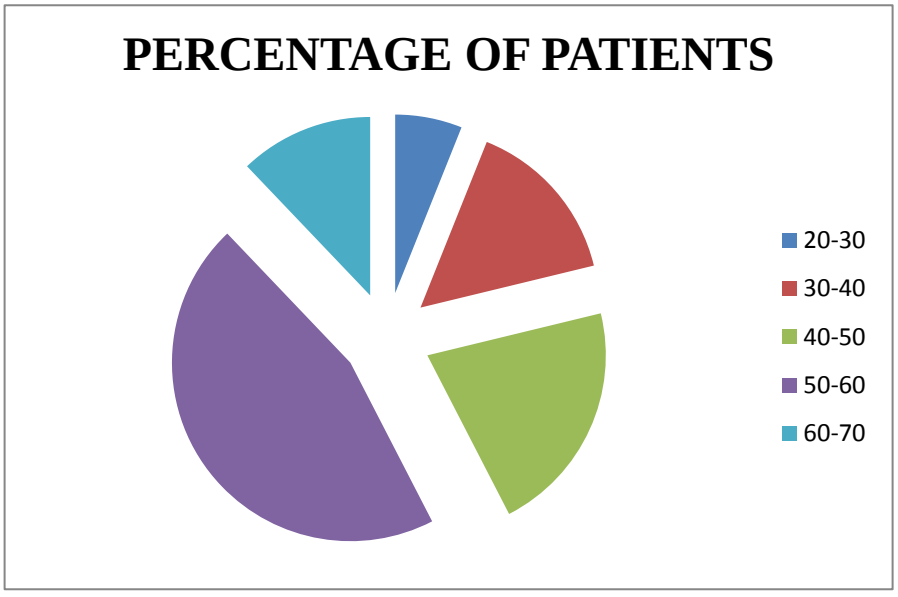
### Exclusion criteria

- Pregnant women.
- Patients with liver disorder
- Patients with opportunistic infection
- Age < 20 Years

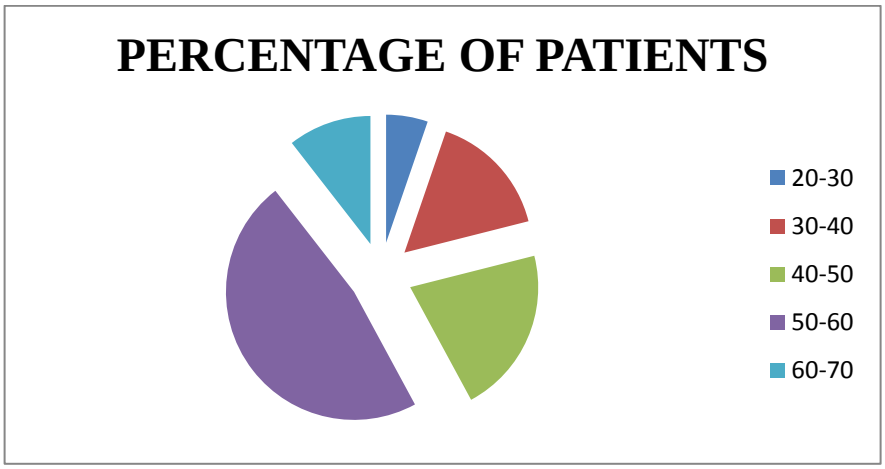
## RESULTS AND DISCUSSION

The maximum percentage of male and females with hypertension was found at the age group of 50-60 years. Among the total male patients 30% were within 50-60 age groups and in case of females 18% were in 50-60 age groups.

**Percentage distribution of males**



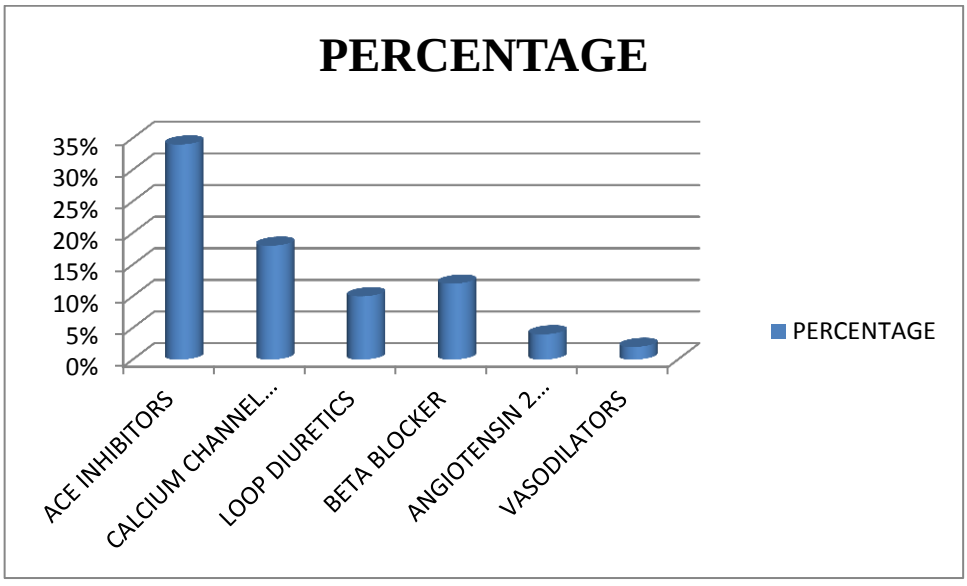

**Percentage distribution of females**




As monotherapy ACE-inhibitors (34%) were the most commonly prescribed antihypertensive followed by calcium channel blockers (18%) and beta blocker (12%). Among combination therapy often 2 drug combinations were prescribed, the most common combination was ACE-inh + CCB (8%), followed by beta-blocker + CCB (6%).

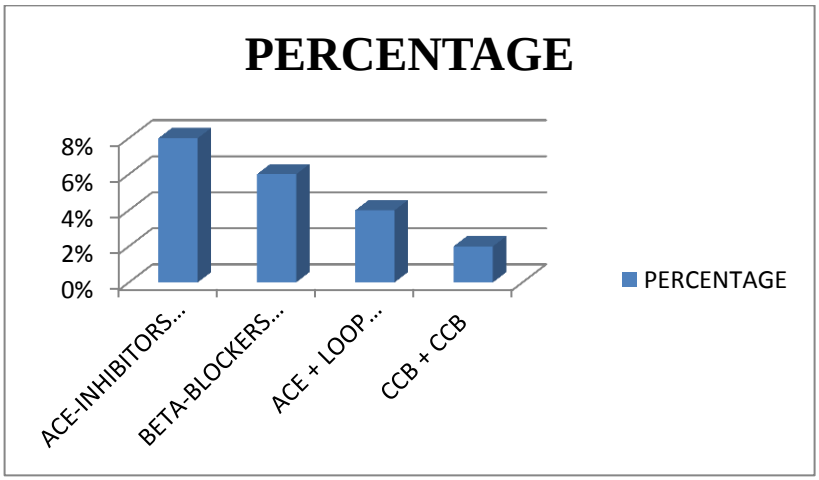
## PERCENTAGE OF PRESCRIBED MONOTHERAPY ANTIHYPERTENSIVES

| SL. NO | DRUG CLASS | PERCENTAGE |
|---|---|---|
| 1. | ACE INHIBITORS | 34% |
| 2. | CALCIUM CHANNEL BLOCKER | 18% |
| 3. | LOOP DIURETICS | 10% |
| 4. | BETA BLOCKER | 12% |
| 5. | ANGIOTENSIN 2 ANTAGONIST | 4% |
| 6. | VASODILATORS | 2% |




**Percentage of combination drugs used for treatment**

| SL.NO | DRUG CLASS | PERCENTAGE |
|---|---|---|
| 1, | ACE-INHIBITORS + CCB | 8% |
| 2. | BETA-BLOCKERS + CCB | 6% |
| 3. | ACE + LOOP DIURETICS | 4% |
| 4. | CCB + CCB | 2% |




Among the 50 patients, 40 patients received monotherapy and only 10 patients received a combination therapy. In patients receiving monotherapy the rate of prescription of antihypertensive was followed in the order of frequency by ACE-I (34%), calcium channel blockers (18%), Beta blockers(12%) followed by diuretics(10%), angiotensin-2 receptor antagonist with prescription rate of 4%.

ACE-Inhibitors constitute the most frequently prescribed antihypertensive drug class. Among all ACE-inhibitors ramipril and enalapril was the most commonly prescribed especially in the department of cardiology and in the case of calcium channel blockers amlodipine was the most commonly prescribed drug.

In the case of diuretics the overall preference for prescribing the thiazides was negligible on the other hand there were 10% of prescriptions with loop-diuretics. The percentage of prescription of angiotensin-2 receptor antagonist was 4% of which 90% of prescriptions were with telmisartan.

The following are the 2-drug combinations that were prescribed.

(i) ACE-Inh+CCB

(ii) Beta-blocker+CCB

(iii) CCB+CCB

(iv) ACE-Inh + loop diuretics.

A 2-drug combination of CCB+ACE-Inhibitors were prescribed to a majority of patients (8%), Followed by a combination of Beta-blockers+CCB (6%), ACE+Loop-diuretics (4%), CCB+CCB (2%).

## CONCLUSION

In this prospective study, it was observed that the physicians had preferred monotherapy more often than the combinations and the most frequently prescribed agent among monotherapy was ACE-Inhibitor class of antihypertensive. ACE-Inhibitors are the only class of drugs that are often prescribed to diabetic hypertensive patients, as these drugs prevent the chance of occurrence of diabetic complications. As the use of the thiazide diuretics as monotherapy was negligible it increases the side effects on the patients. As per the combinations were concerned only two drug combinations were prescribed there were no three or four drug combination prescriptions observed. Underutilization of diuretics and inadequate oral instructions by clinical pharmacist are found to be the limitations of the present prescribing pattern and hence, an intervention study is needed to improve the current prescribing practice in clinical use of hypertension management.

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