

A Study of Prescribing Pattern in Patients of Hypertension

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Abstract

Introduction: Hypertension is a multi-factorial and complex disease that has both environmental and genetic determinants. It is the single most significant risk factor for heart diseases and kidney diseases. Hypertension is a leading contributor to global burden of morbidity and mortality. It is considered as a silent killer because most of the time it is asymptomatic and goes undetected. Hence, hypertensive patients should be prescribed properly. **Objectives:** To evaluate the prescribing pattern of anti-hypertensive drugs in patients of hypertension. **Material and Methods:** This was an observational, cross sectional study conducted over a period of 1 year on hypertensive patients attending the Cardiology out-patient department of Government Medical College and Rajindra Hospital, Patiala and fulfilling the inclusion and exclusion criteria. The prescriptions were evaluated. **Results:** 22% of prescriptions had monotherapy, amongst which beta-blockers were most commonly prescribed. Majority of prescriptions had two drug therapy (47%), among which ARB+ beta blockers (17%) were most frequently prescribed. Beta blockers +CCB (9%) was the most common Fixed Drug Combination (FDC) prescribed. ARB+beta blockers+diuretics (14%) and ACEI+ARB+beta blockers+diuretics (1%) were most commonly prescribed three drug combinations. Among four drug combinations, only ACEI+ARB+beta blockers+diuretics was prescribed to 1% patients. Hypolipidemic drugs (66%) were maximally co-prescribed. **Conclusions:** A high trend of polypharmacy was observed in hypertensive patients. So, emphasis is needed to reevaluate the prescribing trends in these patients.

Keywords: Anti-hypertensive Drugs, Fixed Drug Combination, Hypertension, Prescription Pattern, Drug Utilization

1. Introduction

Hypertension is a chronic disease which accounts for various cardiovascular and cerebrovascular events.^[1] As per the 2018 Heart disease and stroke statistics by American Heart Association (AHA), cardiovascular disease is the leading global cause of death, accounting for more than 17.9 million deaths per year in 2015, a number that is expected to grow more than 23.6 million by 2030.^[2]

According to the 2018 report of Indian Council of Medical Research (ICMR), Hypertension is attributable

to 10.8% of all deaths and 4.6% of DALYs in India.^[3] Trend analysis conducted by Gupta R et al., reported that Hypertension prevalence in India would increase to 44% (95% CI, 43–45%) in year 2030, a relative increase by 17%.^[4]

According to World Health Organization (WHO), hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. WHO defines hypertension as Systolic Blood Pressure (SBP) \geq 140 mmHg and/or Diastolic Blood Pressure (DBP) \geq 90 mmHg.^[5] The seventh report of the Joint National Committee (JNC

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7) on prevention, detection, evaluation and treatment of high blood pressure (B.P.) classified hypertension as follows:^[6]

JNC 7 classification of hypertension ^[6]

Category	Systolic blood pressure (mm Hg)	Diastolic blood pressure (mm Hg)
Normal	< 120	< 80
Pre-hypertension	120-139	80-89
Stage 1	140-159	90-99
Stage 2	≥ 160	≥ 100

Recent guidelines are suggestive of the fact that combination of two drugs belonging to separate pharmacological classes (ACE inhibitors, ARBs, CCBs, beta-blockers or diuretics) in low doses should be the initial choice than using high doses of a drug from a single class.^[7] The present study was aimed to evaluate the prescription patterns of various anti-hypertensive agents in a routine clinical setting.

2. Material and Methods

The present study was conducted over a period of one year at Cardiology Out Patient Department (OPD), Government medical college and Rajindra hospital, Patiala. It was a cross-sectional and observational study.

The study population consisted of 100 patients (men and women) between age group 30-70 years diagnosed for hypertension with or without any comorbidities.

2.1 Inclusion Criteria

- Patients with hypertension in stage I (SBP 140 –159 mm Hg & DBP 90 –99 mm of Hg) /stage II (SBP ≥ 160 mm of Hg & DBP ≥ 100 mm of Hg).
- Newly diagnosed and old patients of hypertension.
- Hypertensive patients with or without comorbidities.

2.2 Exclusion Criteria

- Patients with SBP > 210 and/or DBP > 120 mm Hg, requiring emergency care.

- Patients with CAD at present or previous history of CAD.

The procedures were followed in accordance of the institutional guidelines and written consent obtained from all participants after informing them of the objectives, benefits, medical content and confidentiality of personal information.

Study Sequence

All the patients were informed about the study objectives, benefits, medical content and confidentiality of personal information in layman language and written informed consent was taken. The patients with HT coming to the department of Cardiology, Rajindra Hospital, and Patiala were included in the study. After an initial evaluation of all the patients, the prescriptions prescribed to patients for HT were surveyed. Data from the prescriptions was entered into data entry forms. The data was then analyzed for anti-hypertensive drug use pattern. A pilot study was conducted to assess the feasibility of the study tools for which 20 hypertensive patients from total sample were selected randomly.

2.3 Blood Pressure Evaluation

BP was measured following routine clinical standards in the right arm of the study subject in sitting position (after being seated for 5 minutes before the measurement) using standardized mercury sphygmomanometer. Both SBP and DBP were measured.

2.4 Prescription Evaluation

All the prescriptions prescribed to patients of hypertension were surveyed. The prescriptions collected were evaluated for:

- Pattern of usage of a class of antihypertensive drugs
- Pattern of usage of individual drugs within the class
- Pattern of usage of antihypertensive drugs in patients treated with multiple drug therapy/ Fixed drug combination (FDC)

The prescriptions were also evaluated for presence of any associated co morbidities and the drugs prescribed for those co morbidities. Statistical analysis was performed using SPSS software version 20.0 Chicago, Illinois, USA.

2.5 Trial Registration

The trial was registered at the Clinical Trial Registry - India [CTRI.nic.in identifier: CTRI/2018/05/014045] and the World Health Organization [Universal Trial Number: U1111-1188-7585].

3. Results

In the present study, 100 prescriptions of hypertensive patients were evaluated over a period of one year. The mean age of presentation was found to be 55.57 ± 10.49 years. The prevalence of the disease was more in the age-group of 61-70 years (35%). Out of 100 cases, 55 patients were females and 45 patients were males indicating a female preponderance.

The mean duration since hypertension was 3.04 ± 1.60 years. The patients with SBP range 121-140 mm Hg was 46%, ≥ 140 mm Hg was 39% and 90-120 mm Hg was 15% while DBP range 60-80 mm Hg was 48%, 81-90 mm Hg was 32% and >91 mm Hg was 20%. According to stage of hypertension, 60% of patients were in the pre-hypertension stage, 16% were in stage I and 9% were in stage II (Table 1).

Out of total 100 cases, 78% of patients were on anti-hypertensive polytherapy while 22% patients were on anti-hypertensive monotherapy. Among the patients on polytherapy, 47% were on two drugs, 30% were on three drugs and 1% was on four drug combination. Among monotherapy, the most common prescribed anti-hypertensive group as monotherapy was beta-blockers (11%) followed by angiotensin receptor blockers (7%), CCBs (2%), ACE inhibitors (1%) and diuretics (1%) (Table 4) (Figure 2). The most common prescribed anti-hypertensive fixed dose combination was beta-blockers+CCB (9%) followed by ARB+diuretics (6%), ARB+ beta blockers (4%), ACEI+ beta blockers (2%), ARB+CCB (1%), and CCB+ diuretics (1%). (Table 5) ARB + beta blockers (17%) was maximally prescribed two drug combination therapy followed by ACEI + beta blockers (12%), ARB + CCB, ARB + diuretics (5 % each), beta blockers + CCB (4%), CCB + DI (2%), ACEI + diuretics and beta blockers + diuretics (1% each). Among three drug combination, ARB + beta blockers + diuretics (14%) was maximally prescribed followed by ARB + beta blockers + CCB (11%), ARB + CCB + diuretics (3%), ACEI + beta blockers + CCB and beta blockers + CCB + diuretics (1% each). Among four drug combination, only

ACEI+ARB+ beta blockers +diuretics was prescribed to 1% patient (Table 2).

The most frequently prescribed anti-hypertensive group either as monotherapy or in combination therapy was that of beta-blockers (87%) followed by angiotensin receptor blockers (74%), calcium channel blockers (40%), diuretics (36%) and angiotensin converting enzyme inhibitors (18%) (Table 3) (Figure 1).

There are many other drug groups which were prescribed in the patients of hypertension. Among these drug groups, the most common drug group was hypolipidemic (66%), followed by anti-platelet drugs (50%), anxiolytics (46%), Calcium & Vitamin D Supplements (34%), Anti-Diabetic (28%), anti-ulcer drugs (25%) and Thyroxine (7%).

4. Discussion

Drug utilization studies are a parameter to assess rationality/irrationality in drug usage. Evaluation of prescribing trends over time helps in improvement of appropriateness and quality of drug usage in clinical scenario. In the present study, 100 prescriptions of hypertensive patients were analyzed over a period of one year.

Out of total 100 cases, 22 (22%) received monotherapy, while 78 (78%) received polytherapy therapy of anti-hypertensive agents. Sharma AK *et al.*, (2015) reported 67.97% received combination therapy while only 31.8% received monotherapy.^[8] Roobiya A *et al.*, (2018) also reported similar findings with 63.5 % patients being on polytherapy and 36.5 % patients on monotherapy.^[9]

Studies show a significant change in the pattern and the drug therapy shift from monotherapy to combination therapy in majority of patients. This can be explained as hypertension, being a chronic disease, becomes more severe and uncontrollable with single drug therapy over a period of time and physicians add more drugs to the drug therapy regimen of patients to get better control over it.^[10]

The present study found that the most common prescribed anti-hypertensive group as monotherapy was beta-blockers (11%) followed by angiotensin receptor blockers (7%), CCBs (2%), ACE inhibitors (1%) and diuretics (1%). Khurshid F *et al.*, (2012) reported that the various classes of anti-hypertensive drugs used were β -blockers (28.8%), diuretics (24.1%), calcium channel blockers (21.8%), ACE inhibitors (18.4%), angiotensin

II receptor blockers (5.7%) and α 1- blocker (1.1%).^[11] However, Roobiya A *et al.*, (2018) reported that the most prescribed anti-hypertensive drug was ARB (33.8%) followed by CCB (24.2%), beta blocker (3.3%), ACE-I (3%) and diuretic (1.3%).^[9]

Although beta blockers are no longer recommended as a first line anti-hypertensive drug class in uncomplicated HT, beta blockers are preferred to be used only in patients with compelling cardiac indications or as add-on agents in uncontrolled HT.^[12,13]

The most common prescribed anti- hypertensive fixed dose combination was beta blocker +CCB (9%) followed by ARB+ diuretics (6%), ARB+ beta blocker (4%), ACEI+ beta blocker (2%), ARB+CCB (1%), and CCB+ diuretics (1%) (Figure 3). When available, FDCs were preferred over combination therapy, accounting for 13% of all the two drug therapies in the present study. This is likely due to the reason that FDCs make dosing format more convenient and improve patient compliance. FDCs when used as an initial therapy, combat therapeutic inertia, which is the physician's failure to either increase the dose of anti-hypertensive medication or add another medication to achieve BP control.^[14]

Among the patients on polytherapy, maximum number of patients were prescribed two drug therapy (55%) followed by three drug therapy (30%) and four drug therapy (1%). Murti K *et al.*, (2015) reported 68 (68.68%) patients on 2 drug therapy, 27 (27.27%) patients on three drug therapy and 4 (4.04%) on four drug therapy.^[15]

Among two drug therapy, overall ARB + beta blocker (17%) was maximally prescribed two drug combination therapy followed by ACEI + beta blocker (12%). The other less prescribed two drug therapies included ARB + CCB, ARB + DI (5% each), beta blocker + CCB (4%), CCB + DI (2%), ACEI + DI and beta blocker + DI (1% each). Among three drug combination therapy, ARB + beta blocker + DI (14%) was maximally prescribed followed by ARB + beta blocker + CCB (11%), ARB + CCB + DI (3%), ACEI + beta blocker + CCB and beta blocker + CCB + DI (1% each). Among four drug combination, only ACEI+ARB+ beta blocker + DI was prescribed to 1% patient (Figure 4). Cidda M *et al.*, (2014) reported similar findings with the most commonly prescribed three drug combination of ARB + beta blocker + DI (21.27%) followed by ARB + ACEI + DI (19.14%), ARB + DI + CCB (14.89%), ARB + 2DI (14.89%) and ACEI + DI + beta blocker (10.63%).

Among >3 drug therapy, ARB + 2DI + beta blocker (20%), ARB + 3DI (20%) and ACEI + α -Blocker + beta blocker + DI (20%) were most commonly prescribed.^[16]

Tandon et al (2014), however, reported among three drug combination, ARB + DI + CCB was most commonly prescribed (1.6%) followed by DI + BETA BLOCKERS + CCB (0.45%) and ACEI + DI + CCB (0.2%). Among four drug combination, Telmisartan + Hydrochlorothiazide + Metoprolol + Amlodipine (1.0%) was most frequently prescribed.^[17]

Due to the presence of multiple comorbidities, many other drug groups are usually prescribed in the hypertensive patients. Among these drug groups, the most common drug group was hypolipidemic (66%), followed by anti-platelet drugs (50%), anxiolytics (46%), Calcium & Vitamin D Supplements (34%), Anti-Diabetic (28%), anti-ulcer drugs (25%) and Thyroxine (7%). Beg MA *et al.*, (2014) reported that amongst a total of 1828 drugs prescribed in hypertensive patients, 38.13% were anti-hypertensives, 13.30% antidiabetic drugs, 9.52% non-steroidal anti-inflammatory drugs, 8.44% statins, 6.24% thyroid hormones, 2.95% anti-anxiety/antidepressants and miscellaneous category included 21.44% drugs.^[18]

5. Observation

Table 1. Baseline characteristics of hypertensive patients

		Frequency	Percentage
Duration Since HTN (Years)	1-2 Years	16	16%
	2-3 Years	28	28%
	3-4 Years	30	30%
	4-5 Years	09	9%
	≥5 Years	17	17%
	Mean±SD	3.04±1.60	
Systolic blood pressure (mm Hg)	90-120	15	15%
	121-140	46	46%
	>140	39	39%
Diastolic blood pressure (mm Hg)	60-80	48	48%
	81-90	32	32%
	>91	20	20%
Stage of Hypertension	Normal	15	15%
	Pre-HT	60	60%
	Stage I	16	16%
	Stage II	09	9%

Table 2. Distribution of patients according to type of anti-hypertensive polytherapy

Type of Therapy	Anti-hypertensive class	Combination		FDC		Total (%)
		No	%age	No	%age	
Two Drug	ACEI + BB	12	12%	02	2%	14 (14%)
	ACEI + DI	01	1%	00	0%	01(1%)
	ARB + BB	17	17%	00	0%	17 (17%)
	ARB + CCB	05	5%	01	1%	06 (6%)
	ARB + DI	05	5%	02	2%	07 (7%)
	BB + CCB	04	4%	03	3%	07 (7%)
	BB + DI	01	1%	00	0%	01 (1%)
	CCB + DI	02	2%	00	0%	02 (2%)
	Total	47	47%	08	08%	55 (55%)
Three Drug	ACEI + BB + CCB	01	1%	00	0%	01 (1%)
	ARB + BB + CCB	11	11%	00	0%	11 (11%)
	ARB + BB + DI	14	14%	00	0%	14 (14%)
	ARB + CCB + DI	03	3%	00	0%	03 (3%)
	BB + CCB + DI	01	1%	00	0%	01 (1%)
	Total	30	30%	00	0%	30 (23.18%)
Four Drug	ACEI+ARB+BB+DI	01	01%	00	0%	01 (0%)
	Total	01	1%	00	0%	01 (1%)

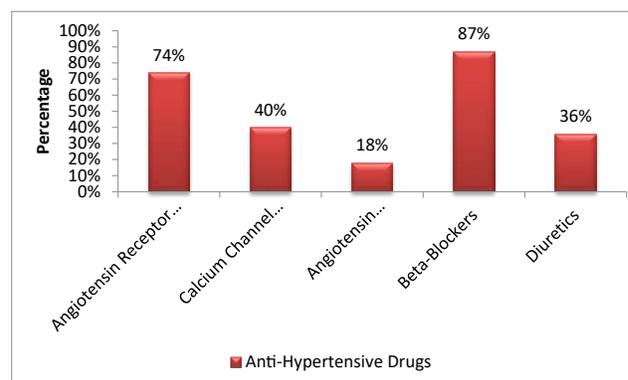
Table 3. Overall anti-hypertensive drug frequency either as monotherapy or combination therapy

Anti-Hypertensive Class	Frequency	Percentage
Beta-Blockers	87	87%
Angiotensin Receptor Blockers	74	74%
Calcium Channel Blockers	40	40%
Diuretics	36	36%
Angiotensin Converting Enzyme Inhibitors	18	18%

6. Conclusion

Rational medical care depends on the evaluation of prescription patterns. Prescription pattern studies are the reflector of the current status of drug use in medical field and they also help in understanding whether they are in accordance to the standard guidelines or not. In this study, BBs were the most frequently prescribed anti-hypertensive category. The most common prescribed

two-drug anti-hypertensive combination was ARB + BB. Combination therapy was thus the trend in the present study. The target of management of hypertensive patients must be focused on effective control of BP and prevention of complications related to cardiovascular and cerebrovascular systems.

**Figure 1.** Overall anti-hypertensive drug frequency either as monotherapy or combination therapy.

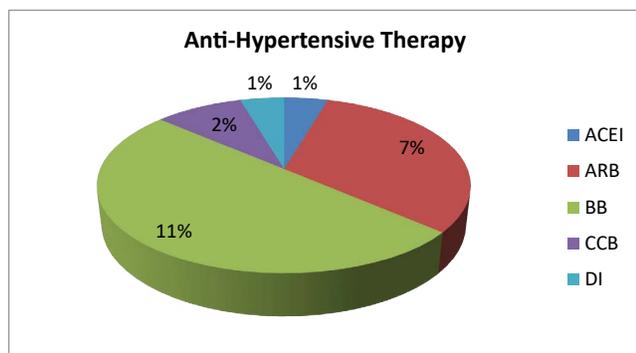


Figure 2. Distribution of patients according to individual anti-hypertensive drugs (Monotherapy).

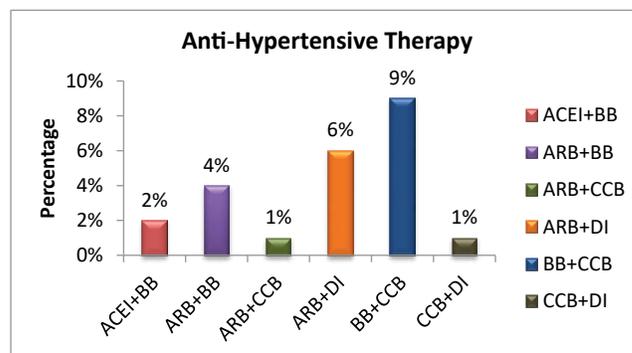


Figure 3. Distribution of patients according to individual anti-hypertensive drugs (FDC).

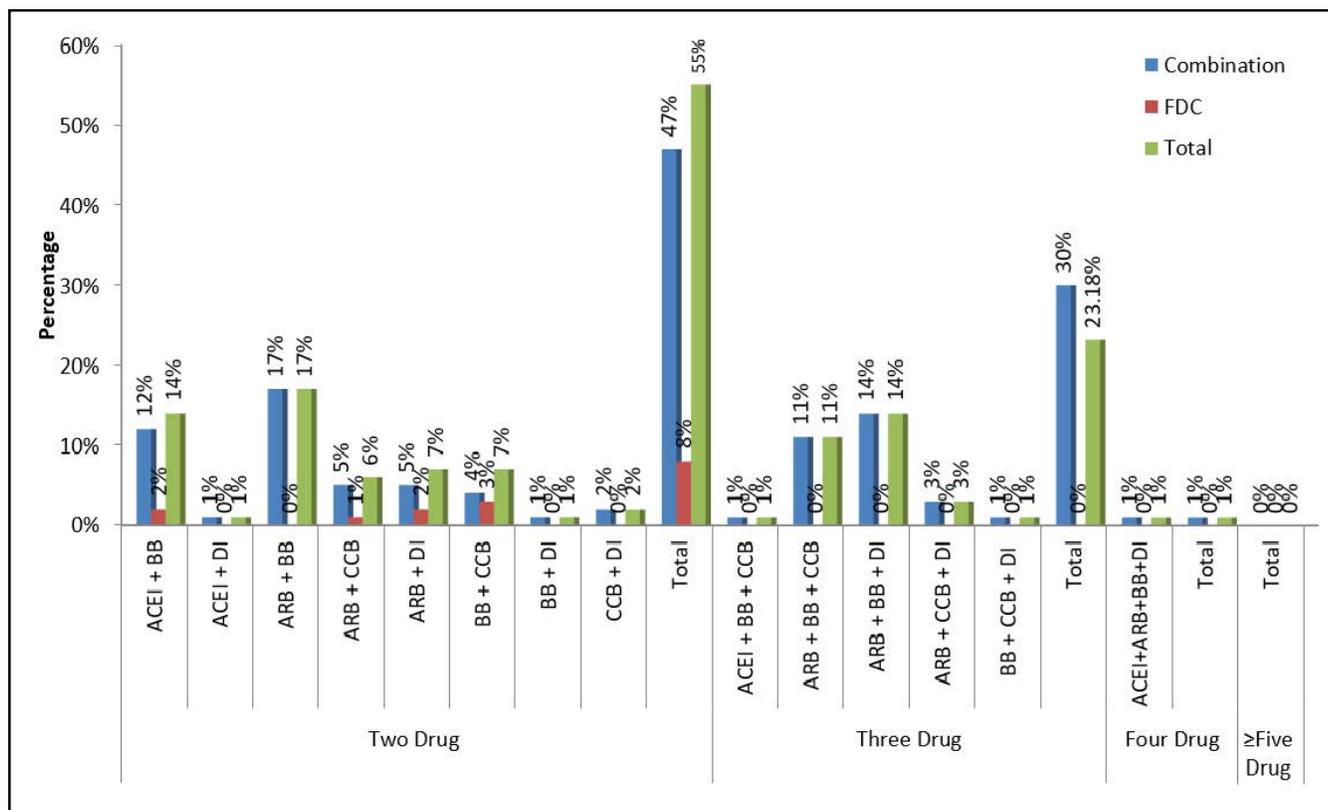


Figure 4. Distribution of patients according to type of anti-hypertensive polytherapy.

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