

Original Research Article

PRESCRIPTION PATTERN OF ANTI HYPERTENSIVE DRUGS AT A TERTIARY CARE CENTRE OF EAST NIMAR REGION OF CENTRAL INDIA**¹Dr Pankaj Kumar Jain, ²Dr. Mohit Garg, ³Dr. Satish Chandel, ⁴Dr. Siddharth Banode**

Associate Professor, Department of Medicine, Nandkumar Singh Chouhan Government Medical College & Associated Hospital, Khandwa (M.P)

Assistant Professor, Department of Medicine, Nandkumar Singh Chouhan Government Medical College & Associated Hospital, Khandwa (M.P)

Assistant Professor, Department of Pharmacology, Nandkumar Singh Chouhan Government Medical College & Associated Hospital, Khandwa (M.P)

Associate Professor, Department of Pharmacology, Nandkumar Singh Chouhan Government Medical College & Associated Hospital, Khandwa (M.P)

Corresponding Author: Dr. Siddharth Banode

Email id: sbanode@yahoo.co.in

ABSTRACT:

Aim of the study:The present study aims to determine the pattern of prescription of Anti Hypertensive in a cohort of patients at a tertiary care centre of East Nimar region of Central India. **Methods:**The study was a Prospective observational study and was conducted in the Outpatient department of Medicine conducted for a period of 6 Months. Demographic and clinical data of Total 86 patients were collected and Prescription of these Hypertensive patients were analysed. **Result:**Out of Total 86 Patients, the maximum percentage of Hypertensive patients, including both males and females belonged to the age group of 60 to 70 years. As majority of Patients belonged to the elderly age group, Calcium channel Blocker /Amlodipine was the most prescribed drug class/ drug, followed by Telmisartan and Metoprolol.Among the combination therapy prescribed in 35 patients (40.69%), often two drug combination were prescribed (25 patients, 29.06%), ARBs Combination with CCBs dominated the scenario with 16 patients (18.60 %) followed by CCBs + Beta Blockers (5 patients, 5.81 %). **Conclusions:**The present study represents the current prescribing pattern of Anti-Hypertensive Drugs in our Hospital. Our findings showed that CCBs dominated the scenario of Monotherapy among the elderly populations of hypertension followed by combination therapy of CCBs and ARBs. The use of Anti-hypertensive drugs largely confirms the guidelines as most of the patients belonged to the category of elderly populations, but still there is a significant room of improvement in terms of rational prescribing.

INTRODUCTION/JUSTIFICATION OF THE STUDY:

Prescription pattern analysis is defined as insight regarding the existing drug usage to ensure rational drug therapy^{1,2}. Prescription is one of the most important tools that communicate between the physician and the patient and also a written order of medication schedule to the patient^{2,3}.

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 Anti Hypertensive Medication. Hypertension is 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 arterioles and cause high blood Pressure (BP). Elevated blood pressure leads to a variety of diseases like myocardial diseases, coronary artery diseases, stroke, kidney diseases, and vision loss^{4,5,6,7}.

Prescription analysis helps to improve the rational use of drugs. It helps in knowing the errors and improper prescribing, major problem identified in hospitals these days. It also helps us to provide advantageous feedback to prescribers in order to improve their prescribing behaviour. Therefore, we planned to carry out the study in Hypertensive patients with focus on outlook of "How the Anti Hypertensive drugs are being prescribed" which helps in understanding various factors such as over and under consumption of drugs, greater use of newer medicines. With increase in prevalence of Hypertension, there may be increase in associated complications and co-morbidities which leads to increase in the number of drugs in the prescription which in turn leads to irrational drug use as a result of poly-pharmacy.

2. MATERIALS AND METHODS:

The study was a Prospective observational study and was conducted in the Outpatient department of Medicine, Nandkumar Singh Chouhan Government Medical College and Associated Hospital, Khandwa (M.P) India. The study was conducted after its approval by Institutional Ethics Committee, NSCGMC Khandwa.

Number of Patients: 86 patients Prescription of Hypertension were analyzed

Study Site: Outpatient department of Medicine, Nandkumar Singh Chouhan Government Medical College and Associated Hospital, Khandwa (M.P) India

Study Duration: 3 months study but was extended for 6 months more due to insufficient data collection

Study Design: Prospective Observational Study

Selection of Subjects: The patients or the subjects were selected or taken into this study according to the following inclusion and exclusion criteria

Inclusion criteria:

1. Patients of both sexes with of age >18 Years.
2. Patients diagnosed with Hypertension and on Anti Hypertensive Medication.
3. Patients with Hypertension along with other co-morbidities were selected.
4. Patients with concomitant Hypertension and Type II Diabetes Mellitus

Exclusion criteria

1. Pregnant and lactating females
2. Pediatric Patients and Patients with Age <18 years
3. Patients with active opportunistic infection
4. Patients with Liver and Kidney disorders
5. Patients with Malignant Hypertension
6. Those patients who were not willing to come for follow up, or had unrealistic expectation from the treatment.

Statistical Analysis: Data was collected and analysis was done using MS excel. Categorical variable was expressed in frequency, Percentage and 95 % confidence interval was calculated

3. RESULTS:

Fig 1. Sex wise distribution of Hypertensive Patients

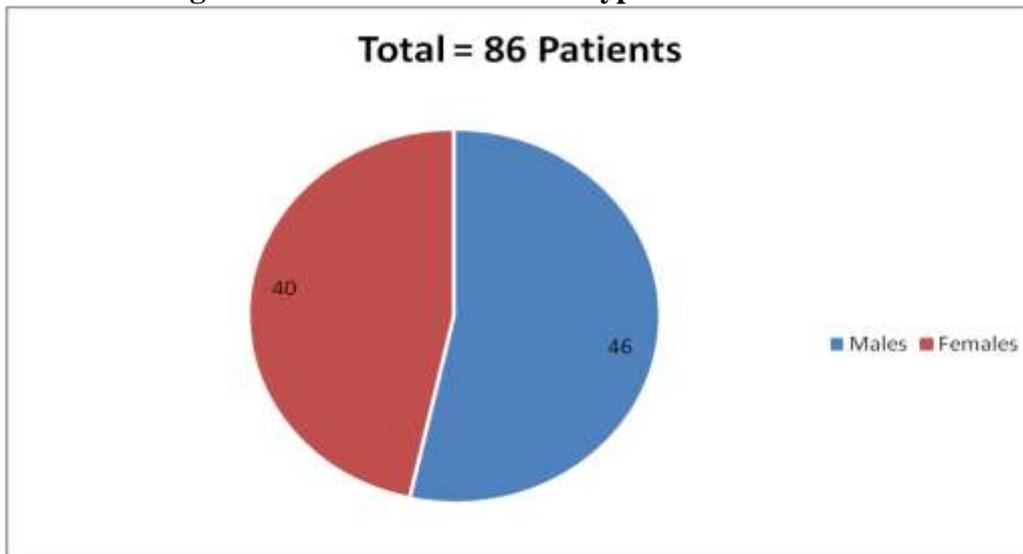


Fig.2 Age wise distribution of Hypertensive Patients:

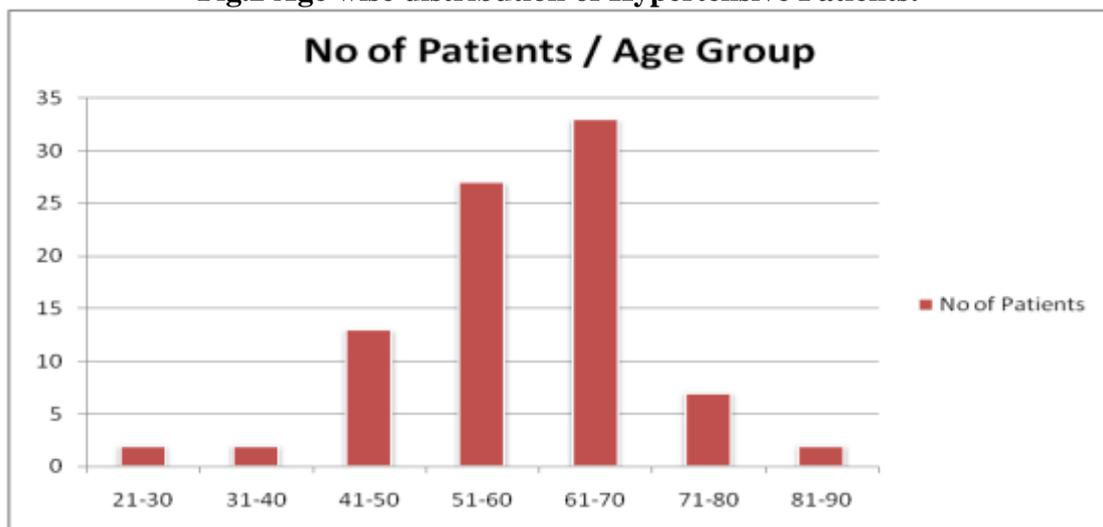


Table 1. Clinical Characteristics of Hypertensive Patients

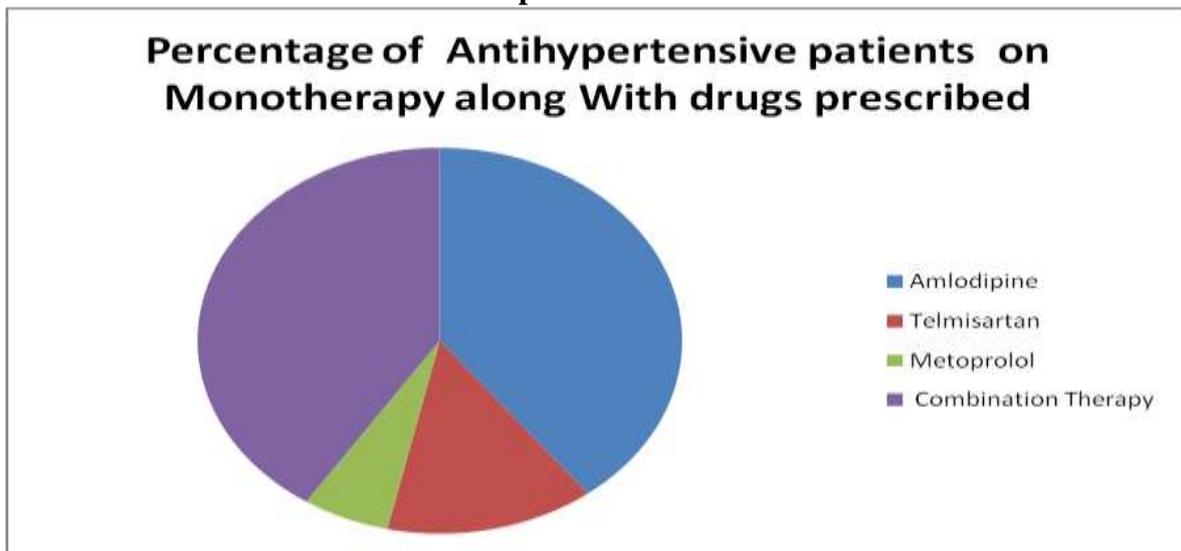
No of comorbidity	No of patients with comorbid conditions	Percentage	95% Confidence interval
No Comorbidity	77	89.53 %	0.8109 to 0.9460
One Comorbidity	5	5.81 %	0.0219 to 0.1322
Two Comorbidity	3	3.48 %	0.0077 to 0.1018
Three Comorbidity	1	1.16 %	0.0001 to 0.0692
Types of Comorbidities			
Diabetes mellitus	4	4.65 %	0.0146 to 0.1172
Hyperlipidemia	5	5.81%	0.0219 to 0.1322
Ischemic heart disease	1	1.16 %	0.0001 to 0.0692
Diabetes mellitus + hyperlipidemia	2	2.32 %	0.0028 to 0.0815
Diabetes mellitus + ischemic heart	1	1.16 %	0.0001 to 0.0692

disease			
Diabetes mellitus + hyperlipidemia + ischemic heart disease	1	1.16 %	0.0001 to 0.0692
Concomitant medications			
Antidiabetic	4	4.65 %	0.0146 to 0.1172
Antihyperlipidemic	7	8.13 %	0.0334 to 0.1605
Antiplatelet	7	8.13 %	0.0334 to 0.1605
Anti Anginal	5	5.81%	0.0219 to 0.1322
Antidiabetic + Antihyperlipidemic	2	2.32 %	0.0028 to 0.0815
Antidiabetic + antiplatelet	1	1.16 %	0.0001 to 0.0692
Antihyperlipidemic + antiplatelet	3	3.48 %	0.0077 to 0.1018
Antidiabetic + antihyperlipidemic + antiplatelet	1	1.16 %	0.0001 to 0.0692
Other medications	65	75.58 %	0.6547 to 0.8350

Table 2. : Prescription pattern of Anti Hypertensive Drugs:

Anti Hypertensive Drug Class	Number of Prescriptions	Percentage of Prescriptions	95 % Confidence interval
Drugs of Monotherapy	51	59.30	0.4873 to 0.6908
Diuretics	0	0	0.0000 to 0.0513
Angiotensin Converting Enzyme Inhibitors	0	0	0.0000 to 0.0513
Angiotensin Receptor Blockers	13	25.49	0.0891 to 0.2430
Beta Blockers	5	9.80	0.0219 to 0.1322
Calcium Channel Blockers	33	64.78	0.2879 to 0.4895
Other Antihypertensive	0	0	0.0000 to 0.0513
Two Drug Combinations	25	29.06	0.2049 to 0.3944
ARBs+ Diuretics	2	2.32	0.0014 to 0.0859
ARBs + CCBs	16	18.60	0.1168 to 0.2821
ARBs + Beta Blockers	1	1.16	0.0001 to 0.0692
CCBs + Beta Blockers	5	5.81	
CCBs + ACEIs	1	1.16	0.0001 to 0.0692
Three Drug Combinations	8	9.30	0.0456 to 0.1752
ARBs + CCBs + Beta Blockers	2	2.32	0.0014 to 0.0859
ARBs + CCBs + Diuretics	2	2.32	0.0014 to 0.0859
ACE Is +CCBs+ Beta Blockers	3	3.48	0.0077 to 0.1018
ACE Is +CCBs+ Diuretics	1	1.16	0.0001 to 0.0692
Four Drug Combinations	2	2.32	0.0014 to 0.0859
ARBs + CCBs + Beta Blockers +Diuretics	2	2.32	0.0014 to 0.0859

Fig 3: Percentage of Antihypertensive patient son mono-therapy along with drugs prescribed:



Out of Total 86 Patients, the maximum percentage of Hypertensive patients, including both males and females belonged to the age group of 60 to 70 years. Among the total 86 patients, 46 were male patients and 40 patients were females. As majority of Patients belonged to the elderly age group, Calcium channel Blocker /Amlodipine was the most prescribed drug class/ drug, followed by Telmisartan and Metoprolol. Out of total 86 Prescriptions, 51 Prescriptions (59.30%) composed of Monotherapy and a total of 33 Prescriptions (64.78%) among these were of Calcium Channel blockers. Angiotensin receptor blocker comprised of 13 Prescriptions (25.89%) and beta blockers were prescribed among 5 patients (9.80%). Among the combination therapy prescribed in 35 patients (40.69%), often two drug combination were prescribed (25 patients, 29.06%), ARBs Combination with CCBs dominated the scenario with 16 patients (18.60 %) followed by CCBs + Beta Blockers (5 patients, 5.81 %). As far as comorbid conditions are concerned 77 Patients (89.53 %) had no comorbid disease along with hypertension, 04 (4.65%) and 05 patients (5.81 %) respectively had Diabetes Mellitus and Hyperlipidaemia and received concomitant medications for the same. Only 1 Patient had all the three comorbid disease viz. Diabetes Mellitus, Hyperlipidaemia and Ischaemic Heart Disease.

4. DISCUSSION:

Hypertension continues to be an important public health concern because of its associated morbidity, mortality and economic impact on the society. It is a significant risk factor for cardiovascular, cerebrovascular and renal complications. It has been estimated that by 2025, 1.56 billion individuals will have hypertension. The increasing prevalence of hypertension and the continually increasing expense of its treatment influence the prescribing patterns among physicians and compliance to the treatment by the patients. A number of national and international guidelines for the management of hypertension have been published. Since many years ago, diuretics were considered as the first-line drugs for treatment of hypertension therapy; however, the recent guidelines by the Joint National Commission (JNC8 guidelines) recommend both calcium channel blockers as well as angiotensin-converting enzyme inhibitors as first-line drugs, in addition to diuretics. Antihypertensive drug combinations are generally used for effective long-term management and to treat comorbid conditions. This review focuses on the antihypertensive medication utilization,

their cost factors, adherence to treatment by patients, and physicians' adherence to guidelines in prescribing medications in different settings including Indian scenario. The antihypertensive medication prescribing pattern studies help in monitoring, evaluation and necessary modifications to the prescribing habits to achieve rational and cost-effective treatment. Additionally, periodic updating of recommended guidelines and innovative drug formulations, and prescription monitoring studies help in rational use of antihypertensive drugs, which can be tailored to suit the patients' requirements, including those in the developing countries.

One of the study conducted by Alkaabi MS, Rabbani SA, Rao PG et al ⁽⁸⁾ had similar observations where Calcium channel blockers were the most frequently (51%) prescribed class both in monotherapy and in combination therapy while angiotensin receptor blockers and angiotensin-converting enzyme inhibitors (55.9%) were the most preferred agents for monotherapy. In contrast to the study Nisha Rani SS, Nelta S Tharakan et al ⁽⁷⁾, ACE Inhibitors (34%) were the most prescribed drugs followed by CCBs (18%) and Beta blockers (12%). They had the most common age group between 51-60 years which was the second most common age group in our study and as compared CCBs were the most commonly prescribed drug as monotherapy in our study.

Prescription pattern studies are needed to optimize and control the drug treatment. The study conducted by Narkar Net al with the aim to study the prescription pattern of antihypertensive drugs in a tertiary care hospital in western India. Pattern of drugs prescribed whether in combination or as single drug in various co morbidities were the objectives of the study. It was observed that ARB was the most commonly prescribed drug (41.5%) either alone or in combination. Multidrug therapy being the preferred treatment (56%), combination of ARB, CCB and Diuretic was the most common (35.7%). Diabetes mellitus was the most commonly associated comorbidity in hypertensive patients (39%), with ARB and CCB as the preferred antihypertensive drugs used in them. The treatment prescribed seemed to be specific to age, comorbidity and was in accordance with national and international guidelines including the Indian Guidelines on Hypertension.(10)

Antihypertensive medications are one among the most highly used drugs across the globe as well as in India, and their prescribing pattern will be erratic despite the various clinical guidelines. Few studies address the pattern and adherence to the standard treatment guidelines in India. This study conducted by Venkataraman R aimed to review the prescribing pattern of antihypertensive medications in a rural tertiary care teaching Indian hospital and to investigate the adherence to the Joint National Commission-8 (JNC-8) guidelines on prevention, detection, evaluation, and treatment of hypertension in adults. Methods A prospective observational study was conducted among the participants from four different inpatient wards who are aged >18 years, without gender restriction. The prescription pattern was reviewed and adherence to the JNC-8 guidelines was also assessed. A purposive sampling technique was adopted and descriptive statistics were used in Statistical Package for the Social Sciences v16. Results of the 101 participants included in the study, 62 (61.39%) were female, 23.76% were aged <30 and >60 years, and the other 52.48% belong to the range of 30-60 years. As per JNC-8 guidelines, 4.95%, 17.82%, 44.55%, and 32.67% of patients were classified as normal, pre-hypertensive, stage I, and stage II, respectively. Most of them (31.68%) were free from co morbidities. The most (23.76%) prescribed drug was calcium channel blocker (CCB), and 15.84% of the patients received combination therapy. Treatment was effective in 70.30% of the patients through analyzing their blood pressure even though the adherence to the JNC-8 guidelines was only in 54.46%. The study revealed that CCB was the most prescribed drug, and in spite of the only 50% adherence rate, treatment was effective in the majority of the population. The treatment outcome can be improved if the adherence rate is increased further.(11)

The present study represents the current prescribing pattern of Anti Hypertensive Drugs in our Hospital. Our findings showed that CCBs dominated the scenario of monotherapy among the elderly populations of hypertension followed by combination therapy of CCBs and ARBs. The use of Anti hypertensive drugs largely confirms the guidelines as most of the patients belonged to the category of elderly populations, but still there is a significant room of improvement in terms of rational prescribing.

Our study had some limitations. First, being a singlecenter study carried out in a government hospital, the sample may not be a complete representation of whole Indian patient population. Second, the study was conducted in a secondary care setting, patients receiving treatment at primary or tertiary centers may have different patterns of antihypertensive drug use. Third, observational nature of the study limited the evaluation of other factors influencing prescription Patterns such as physicians' background and Government institute, influence of hospital administration, and supply of medicines at the institute level and accordingly availability of drugs.

5. REFERENCES:

1. Bhanu P, Prasanand S, Divyashanthi CM, Annabelle R, Pandiamunian J. Prescribing pattern and WHO core prescribing indicators in post-operative patients of gynaecology department of tertiary care teaching hospital. *Int J Basic ClinPharmacol*6: 53-60 (2017).
2. Mohd Mahmood*, Ronda Charitha Reddy, J R SoumyaLahari, Sadiya Fatima, Pooja Shinde, S Anand Reddy, Pranali S Pandit. Prescription Pattern Analysis ofAntidiabetic Drugs in Diabetes Mellitus and Associated Comorbidities. *Clin. Invest. (Lond.)* (2017) 8(1), 5–12.
3. Benet LZ. Goodman and Gilman's Principle of prescription order writing and patient compliance instructions: *The Pharmacological basis of therapeutics* 8: 1640-1649 (1991).
4. Dezii CM. A Retrospective study of persistence with single – pill combination therapy vs concurrent two - pill therapy in patients with Hypertension. *Manag Care.* 2000;9: 2-6.
5. Bramley TJ, Gerbino PP, Nightengale BS, Frech-Tamas F. Relationship of blood pressure control to adherence with anti-hypertensive monotherapy in 13 managed care organizations. *J. Manag Care Pharm.* 2006; 12: 239-245
6. Fretheim A, Back to Thiazide-Diuretics for Hypertension: reflections after a decade of Irrational Prescribing. *BMC Fram. Pract.* 2003; 4, 19-25.
7. Rani N SS,Tharakan NS, SwaminathanG et al. Prescribing pattern of Anti Hypertensive Drugs: A Prospective Study. *IJP* 2015;4(1):35–40.
8. Alkaabi MS, Rabbani SA, Rao PG, Ali SR. Prescription pattern of antihypertensive drugs: An experience from a secondary care hospital in the United Arab Emirates. *J Res Pharm Pract* 2019; 8:92-100.
9. Jarari, N., Rao, N., Peela, J.R. et al. A review on prescribing patterns of antihypertensive drugs. *ClinHypertens* 22, 7 (2015). <https://doi.org/10.1186/s40885-016-0042-0>
10. Narkar N. S, Deshpande T, Rane B. T, Kothari R, Tilak A. V, Bhide H. Pattern of Antihypertensive Drugs Prescribed in a Tertiary Care Hospital in Western India. *Biomed Pharmacol J* 2021;14(2).
11. Venkataraman R, Rashid M, Shashikantha B, Soumya A, Vijayan G, Manuel GG, Islam S. Prescribing pattern of antihypertensive medication and adherence to Joint National Commission-8 guidelines in a rural tertiary care Indian teaching hospital. *J Basic*

ClinPhysiolPharmacol. 2019 Sep 10;31(1). doi: 10.1515/jbcpp-2019-0133. PMID: 31503542.