

**PATTERN OF DRUG UTILIZATION OF ANTIHYPERTENSIVE DRUGS IN A  
TERTIARY CARE TEACHING HOSPITAL IN EASTERN UTTAR PRADESH, INDIA**Gupta Dharmender<sup>1</sup>, Gairola Bikash\*<sup>2</sup> and Masuram Bharath<sup>3</sup><sup>1,2,3</sup>Assistant Professor, Department of Pharmacology, Varun Arjun Medical College and Rohaikhand hospital, Banthra, Uttarpradesh Shahjahanpur.**\*Corresponding Author: Dr. Gairola Bikash**

Assistant Professor, Department of Pharmacology, Varun Arjun Medical College and Rohaikhand hospital, Banthra, Uttarpradesh Shahjahanpur.

Article Received on 05/06/2018

Article Revised on 25/06/2018

Article Accepted on 15/07/2018

**ABSTRACT**

**Background:** Hypertension is the most common modifiable disease which can reduce the risk factor cardiovascular mortality and morbidity around the world. **Objective:** To study and analyze the prescribing pattern of antihypertensive drugs in a tertiary care teaching hospital in Shahjahanpur region. **Materials and Methods:** A cross-sectional study was carried out at the Outpatient department of medicine of Varunarjunmedical college and Rohaikhand hospital(VAMC&RH) in Shahjahanpur, a tertiary care teaching hospital, to access the prescription pattern of antihypertensive drugs during October 2017 to March 2018. **Results:** Overall 68.5% patients were on monotherapy while rest of the 31.5% on combination therapy. Calcium channel blockers (CCBs) 39.4% were the most commonly prescribed antihypertensive agent as monotherapy. **Conclusion:** In the present study, it was found that CCBs were the most commonly prescribed antihypertensive drug, followed by ARBs in monotherapy. Combination therapy was given according to associated risk factors and comorbid conditions.

**KEYWORDS:** Prescribing Pattern; Monotherapy; Calcium Channel Blockers; Shahjahanpur, VAMC&RH.**INTRODUCTION**

Hypertension is defined as elevated systolic blood pressure  $\geq 140$  mm Hg or diastolic blood pressure  $\geq 90$  mm Hg.<sup>[1]</sup> Prevalence of hypertension also becomes higher with increasing age. High blood pressure is the most common modifiable risk factor for cardiovascular diseases (CVD), stroke and renal failure.<sup>[2]</sup> It is also the second leading cause of chronic kidney disease (CKD). Worldwide more than one billion adults are suffering from hypertension this figure is likely to be increase 1.56 billion by the year 2025 which would around 60% increase in figure from 2000. Hypertension and cardiovascular cause a loss of around 4% of gross domestic product annually for low and middle income countries amounting to 500 billion USD.<sup>[3]</sup> Timely and efficacious treatment reduces the risk co morbid conditions such as stroke, myocardial infarction, heart failure, revascularization procedures and end-stage renal diseases in hypertensive patients.<sup>[4]</sup>

Population growth, ageing and behavioural risk factors, such as unhealthy diet, alcoholism, sedentary lifestyle, obesity, smoking and exposure to persistent stress in routine life are attributing to the day by day increasing prevalence of hypertension, contributing to 9.4 million deaths worldwide every year<sup>[5]</sup>, with 50% of mortality due to heart disease and stroke.<sup>[6]</sup> India is seeing a rapid increase in prevalence of hypertension, varying from 4 to 15% in urban and 2-8% in rural sector population.<sup>[7,8]</sup>

Antihypertensive drugs are prescribed mainly to reduce the morbidity and mortality caused by hypertension and its complications. Many a time, patients may require more than one drug for effective control of hypertension.<sup>[9]</sup> Several guidelines on its classification and management have been developed by different bodies around the world, the most recent being that of Joint National Committee (JNC) published in 2014 for the management of hypertension in different clinical settings, based on a systematic review of literature to help clinicians, especially the primary health care physicians.<sup>[4]</sup> The choice of an antihypertensive drug is based on efficacy, side-effects, effects on other systems and cost. Accordingly, there is a need to survey the pattern of usage of antihypertensive drugs, to evaluate the rational use is in concordance with current prescribed guidelines for treatment of hypertension.<sup>[10]</sup> Drug utilization studies are valuable for researchers, policy makers and drug & therapeutic committee to determine rational drug use pattern and cost effective prescriptions.<sup>[11]</sup> Therefore, the present study was conducted to establish current prescribing pattern of anti hypertensive drugs in Varunarjun medical college and Rohaikhand hospital in Shahjahanpur, Uttar Pradesh, India.

**MATERIALS AND METHOD**

A cross sectional study was undertaken undertaken by the department of pharmacology for six months (Oct.

2017 to Mar. 2018.) in outpatient and inpatient department of Medicine of the Varunarjun medical college and Rohailkhand hospital, Shahjahanpur. With due permission with institutional ethical committee 128 hypertensive patients' prescription were enrolled, Informed verbal consent was received from each patient & they were further inquired for other co-morbidities. The contents of the prescriptions were assessed & brand names were decoded to generic names using standard CIMS India & internet. The Inclusion criterion for the selection of prescriptions was hypertensive patients of all ages between 20-70 years, were on regular treatment and follow up in department of medicine after taking. Selection of study participant was according to the JNC-VIII guidelines.

### Exclusions

Prescriptions of hypertensive patients with ischemic heart disease, congestive cardiac failure, dysrhythmias, chronic kidney disease, hypo/hyperthyroidism, diabetes, asthma, peptic ulcer, pregnancy, renal artery stenosis or other co-morbidities and patient on lifestyle modification

and non pharmacological measures were excluded from our study.

The demographic characteristics of study patients, number of drugs prescribed per prescription, commonly prescribed antihypertensive drugs. Different groups of anti-hypertensive drugs were screened namely, Calcium channel blockers (CCBs), Angiotensin converting enzyme inhibitors (ACEIs), Angiotensin receptor blockers (ARBs) beta blockers (BBs),  $\alpha$  blockers,  $\alpha$  agonists, diuretics and Fixed Dose Combinations (FDCs). Over all data collected shall be analyzed using MS Excel 2007 and summarized as counts and percentages

### RESULTS

In the present study, out of 128 selected prescriptions, 112 prescriptions were evaluated and 16 prescription were excluded as the patient were on life style modification and non pharmacologic treatment. Age and sex distribution is shown in figure-1, total 70(62.5%) were of male and 42 (37.5%) were of female hypertensive patients (figure 2).

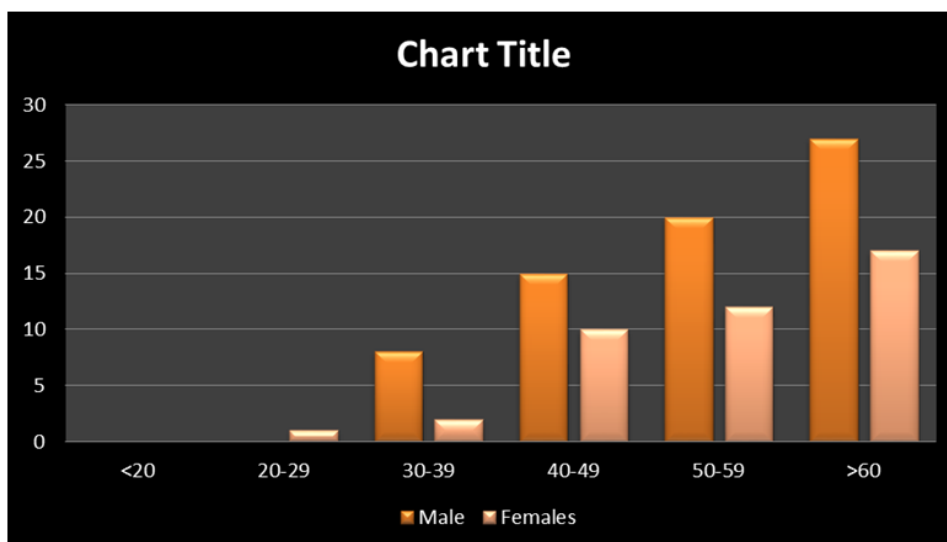


Fig. 1: Age and Sex Distribution (n=112).

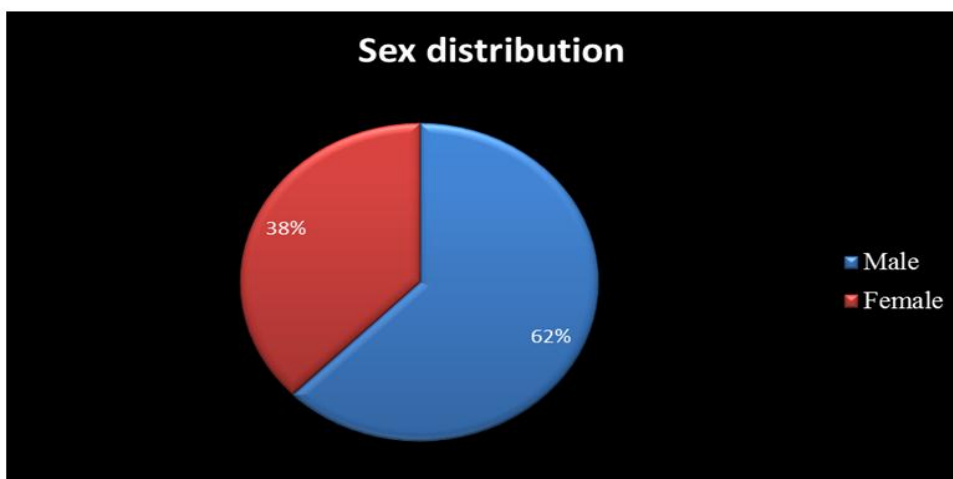


Figure 2: Sex distribution within the study.

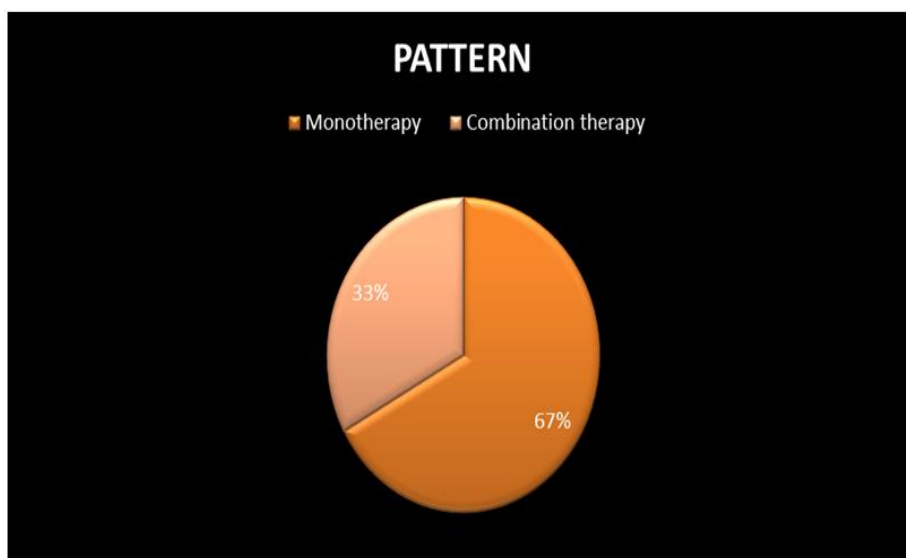
All the patients were literate and most of them (46%) belonged to class II (upper middle class) according to modified kuppuswamy scale which has been summarized in (Table-1).

**Table 1: Socioeconomic status: (Modified Kuppuswamy Scale).**

S.No.	Class	Percentage
1.	Class I (upper)	9%
2.	Class II (upper middle)	48%
3.	Class III (lower middle)	38%
4.	Class IV (upper lower)	5%
5.	Class V (lower)	0%

75(68.5%) patients were on monotherapy while rest of the 37 (31.5%) on combination therapy. (figure 2). In the present study, there was a male preponderance with total numbers of 70 prescriptions. Among which, 37 (52.85%) were on monotherapy and 33 (47.15%) were on combination therapy. In monotherapy, 15 (21.4%) were on CCBs, 6.23 (8.9%) were on ACEIs while 10.6

(15.2%) with ARBs and 4.3 (6.2%) patients were treated with combination of ARBs + CCBs while 3.1(4.5%) patients were on combination diuretics + ARBs (Table 2) and out of 42 female hypertensive patients, 24.2(57.6%) were on monotherapy, while 17.8 (42.3%) were on combination therapy. 18 (42.8%) female hypertensive patients were on CCBs, 3.3 (5.3%) patients were treated with ARBs, and 2.2 (5.3%) patients were on ACEIs, while 1.5 (3.6%) patients were treated combination of ARBs with CCBs. Calcium channel blockers (CCBs) 39.4% were the most commonly prescribed antihypertensive agent as monotherapy, followed by angiotensin receptor blockers (ARBs) 23.2% and angiotensin-converting enzyme inhibitors (ACEIs) 11.1%, ARBs with CCBs was prescribed to 9.8% patients, while 5.3% received combination of diuretics with ARBs (Table 2). Most of the patients in the study were on monotherapy while the co patients who did not have better control of blood pressure with single drug therapy were managed by combination therapy.



**Figure 2: Prescription Pattern.**

**Table 2: Prescribing pattern of antihypertensive drugs.**

Group of drugs	n (%)	
	Male	Female
CCB	15 (21.4)	18(43)
ACEI	6.23 (8.9)	2.2(5.3)
ARB	10.6 (15.2)	3.3(8.0)
ARB+CCB	4.3 (6.2)	1.5 (3.6)
ARB+DIURETICS	3.1 (4.5)	0.3 (0.9)
β BLOCKERS	0	0.7(1.8)
DIURETICS	1.9 (2.7)	0
α BLOCKERS+CCB	0	0.3 (0.9)
DIURETICS+CCB	1.9 (2.7)	0.3 (0.9)
ARB+ β BLOCKERS	0.6 (0.9)	0.3 (0.9)
β BLOCKERS+CCB	1.9 (2.7)	0.3 (0.9)
ACEI+β BLOCKERS	0.6 (0.9)	0.3(0.9)

CCB: Calcium channel blocker, ARBs: Angiotensin receptor blockers, ACEI: Angiotensin-converting enzyme inhibitor.

## DISCUSSION

Our study was only a prescription based survey of the patients on anti hypertensive drugs. This kind of study is one of the effective ways to access and evaluate the current trends in prescriptions and attitude of physicians and their adherence to recommendations provided by the international/national bodies. These studies also help us to get the feedback which would help us in promoting rational drug use.<sup>[12]</sup> It also helps in evaluating the adherence of the patient to the prescription. In the present study, stated that the prevalence of hypertension was more in male patients (62.5%) as compared to females (37.5%), so males are affected more than females, correlates the previous study done by Farag *et al.*<sup>[13]</sup> Similar studies done in past reveal that combination therapy is most commonly prescribed for better control of hypertension is<sup>[14]</sup> However, in contrast to these studies, our study observed that the monotherapy (81.7%) is more commonly prescribed than combination therapy (34.8%) which correlates to a previous study by Kuchake *et al.*<sup>[15]</sup> preference to combination therapy was given in those patients, not controlled with monotherapy.<sup>[16]</sup> In the present study, it was found that CCBs (31.2%) are most commonly prescribed antihypertensive agent as monotherapy. This was in accordance with the previous study done by Konwar *et al.*<sup>[17]</sup> We observed in this study that CCBs were preferred in elderly patients which is in accordance to the guidelines of National Institute for Health and Care Excellence (NICE).<sup>[18]</sup> The NICE guidelines 2011 also specify that age as a selection of initiating drug therapy; with age <55 years to be started with ACEI and with >55 years to be started with CCB. ARBs and ACEIs were preferred antihypertensive drugs in those patients who have associated nephropathy. Diuretics are mostly preferred in combination with ARBs, CCBs, and ACEIs. This correlates the previous study done by Johnson and Singh.<sup>[19]</sup>

## CONCLUSIONS

The present study confirms that prescribing trends are rational and are as per recommended guidelines existing during that period. The study also provides the baseline data for similar studies in future, as patterns in prescribing antihypertensive drugs keep changing. Newer guidelines provided by JNC8 entitled “2014 evidence based guidelines for the management of high blood pressure in adults”. These guidelines state that thiazide type diuretics, CCBs, ACEIs, and ARBs are considered as the first line antihypertensive drugs without any preference. As per these guidelines, Beta blockers are not the first line antihypertensive drug because of higher rate of cardiovascular deaths compared to use of ARB which are also not recommended for first line therapy as they worsen cerebrovascular, heart failure and combined cardiovascular outcomes in comparison to diuretic therapy.<sup>[4]</sup>

These styles of studies will be needed in future to profit the physicians to judge the prescribing trends of

medication medicine at purpose of time. It's conjointly necessary to state that the physicians ought to be sensitised to stick to the recent treatment guideline additionally patient education is must regarding the importance of adherence to the drugs and its advantages.

## REFERENCES

1. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, *et al.* Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*, 2003; 42(6): 1206-52.
2. Go AS, Mozaffarian D, Roger VL, American Heart Association Statistics Committee and Stroke Statistics Subcommittee *et al.* Heart disease and stroke statistics – 2014 update: A report from the American Heart Association. *Circulation*, 2013; 129: e28–292.
3. World Health Organization (WHO). A global brief on hypertension. Available at: [http://www.who.int/cardiovascular\\_diseases/publications/global\\_brief\\_hypertension/en/](http://www.who.int/cardiovascular_diseases/publications/global_brief_hypertension/en/). Accessed on: 14 dec 2017
4. James PA, Oparil S, Carter BL, Eighth Joint National Committee (JNC 8) Members *et al.* 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8), Supplemental Content. *JAMA.*, 2014; 311: 507–20. doi: 10.1001/jama.2013.284427.
5. Lim SS, Vos T, Flaxman AD, *et al.* A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet.*, 2012; 380: 2224–60. doi: 10.1016/S0140-6736(12)61766-8.
6. Causes of Death 2008 [online database]. Geneva, World Health Organization([http://www.who.int/healthinfo/global\\_burden\\_disease/cod\\_2008\\_sources\\_methods.pdf](http://www.who.int/healthinfo/global_burden_disease/cod_2008_sources_methods.pdf).)
7. Gupta R, Gupta VP. Hypertension epidemiology in India: lessons from Jaipur Heart Watch. *Current science*, 2009; 97(3): 349–55.
8. Sandozi T, Emani VK. Survey of prescription pattern of anti-hypertensive drugs in hypertensives and hypertension associated diabetics. *Int J Pharm Bio Sci.*, 2010; 1(4): 23–6.
9. Rimoy GH, Justin-Temu M, Nilay C. Prescribing Patterns and Cost of Antihypertensive Drugs in Private Hospitals in Dar es Salaam, Tanzania. *East Cent Afr J Pharm Sci.*, 2008; 11: 69–73.
10. Pai PG, Shenoy J, Sanji N. Prescribing patterns of antihypertensive drugs in a South Indian tertiary care hospital. *Drug Invent Today.*, 2011; 3(4): 38-40.
11. Gupta N, Sharma D, Garg SK, Bhargava VK. Auditing of prescriptions to study utilization of

- antimicrobials in tertiary hospital. *Indian J Pharmacol*, 1997; 29: 411-5.
12. Tiwari H, Kumar A, Kulkarni SK. Prescription monitoring of anti-hypertensive drug utilisation at the Punjab University Health Centre in India. *Singapore Med J.*, 2004; 45(3): 117-20.
  13. Farag YM, Mittal BV, Keithi-Reddy SR, Acharya VN, Almeida AF, C A, et al. Burden and predictors of hypertension in India: Results of SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC Nephrol.*, 2014; 15: 42.
  14. Kousalya K, Chirumamilla S, Manjunath S, Ramalakshmi S, Saranya P, Chamundeeswari D. Prescribing trend of antihypertensive drugs in hypertensive and diabetic hypertensive patients. *Asian J Pharm Clin Res.*, 2012; 5(4): 22-3.
  15. Kuchake VG, Maheshwari OD, Surana SJ, Patil PH, Dighore PN. Prescription pattern of antihypertensive drugs in uncomplicated hypertensive patients at teaching hospital. *Indian J Pharm Pract.*, 2009; 2(2): 74-80.
  16. Hansson L, Dahlöf B, Gudbrandsson T, Hellsing T, Kullman S, Kuylentierna J, et al. Antihypertensive effect of felodipine or hydralazine when added to beta-blocker therapy. *J Cardiovascular Pharmacol.*, 1988; 12(1): 94-101.
  17. Konwar M, Paul PK, Das S. Prescribing pattern of antihypertensive drugs in essential hypertension in medicine out patients department in a tertiary care hospital. *Asian J Pharm Clin Res.*, 2014; 7(2): 142-4.
  18. National Clinical Guideline Centre. Hypertension: Clinical Management of Primary Hypertension in Adults. London (UK): National Institute for Health and Clinical Excellence (NICE), 2011; 36.
  19. Johnson ML, Singh H. Patterns of antihypertensive therapy among patients with diabetes. *J Gen Intern Med.*, 2005; 20(9): 842-6.