



EVALUATION OF ANTIHYPERTENSIVE PRESCRIBING PATTERNS AND BLOOD PRESSURE CONTROL IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Hypertension is a prevalent cardiovascular condition that has been identified as a key risk factor for congestive heart failure, ischemic heart disease, chronic renal failure, and stroke. A sustained systolic blood pressure (pressure of blood against the walls of any blood vessel) of greater than 140 mm Hg or a sustained diastolic blood pressure of greater than 90 mm Hg is described as hypertension. This retrospective observational study was conducted at a tertiary care govt Hospital, Palwancha, patient department of general medicine over a period of six months. The study included a sample size of 350 patients. Although prescribing pattern of anti-hypertensive medications showed adherence to the recommended guidelines, blood pressure control amongst hypertensive patients was not satisfactory.

Keywords :- Hypertension, ischemic heart disease, congestive heart failure, anti-hypertensive.

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INTRODUCTION

Hypertension is a prevalent cardiovascular condition that has been identified as a key risk factor for congestive heart failure, ischemic heart disease, chronic renal failure, and stroke. Hypertension is described as a condition in which blood pressure is high to the point that blood pressure decreasing is beneficial. [1] Hypertension is defined as a systolic blood pressure of greater than 140 mm Hg or a diastolic blood pressure of greater than 90 mm Hg. Increased systolic and diastolic blood pressures are linked to increased cardiovascular morbidity and mortality. The World Health Organization (WHO) projected that noncommunicable illnesses caused 38 million deaths out of a total of 56 million fatalities in 2012, with cardiovascular disease accounting for 46.2 percent of deaths. [2]

Hypertension causes heart failure, renal failure, and acute stroke, while regulating blood pressure slows

the progression of atherosclerosis. Antihypertensives should be prescribed sensibly to meet the ultimate goal of HTN treatment. [3] Appropriate prescribing has been shown to increase drug adherence and illness outcomes. It is common to see deviations from evidence-based standards in the treatment of hypertensive patients in everyday practise. The ultimate purpose of drug prescribing patterns is to determine whether or not drug therapy is rational. [4]

A sustained systolic blood pressure (pressure of blood against the walls of any blood vessel) of greater than 140 mm Hg or a sustained diastolic blood pressure of greater than 90 mm Hg is described as hypertension. Basic hypertension has a diverse aetiology, but it is ultimately mediated by the two primary determinants of blood pressure: cardiac output and peripheral resistance.

There are various and intricate processes that influence these two determinants. Primary hypertension has an unknown underlying aetiology that is most likely complex. Although there are various ideas, we will focus on just a few, keeping in mind that only a small percentage of people with hypertension have a known cause. [5]

Because most individuals have no symptoms, hypertension is known as the "silent killer." Elevated blood pressure is the most common physical finding. Hypertension cannot be diagnosed simply on a single high blood pressure reading. To diagnose hypertension, the average of two or more measurements recorded during two or more clinical visits should be considered. [6] This BP average can then be utilised to make a diagnosis and identify the stage of hypertension that is present.

The overall goal of hypertension treatment is to lessen the morbidity and death associated with hypertension. The cause of this morbidity and mortality is organ damage (e.g., CV events, heart failure, and kidney disease). The major goal of hypertension treatment is to reduce risk, and evidence indicating risk reduction has a considerable impact on pharmacological therapy selection.

A harmful and unanticipated response to a medicine that occurs at levels commonly employed in man for disease prevention, diagnosis, or therapy, or for modifying physiological function. [7] The indicators of prescribing practises assess health-care practitioners' performance across a number of critical variables related to drug usage. We are monitoring, assessing, and comprehending practitioner prescription behaviours through our study prescription patterns, as well as identifying drug interactions, side effects, and medication errors.

MATERIALS AND METHODS

This retrospective observational study was conducted at a tertiary care govt Hospital, Palwanha, patient department of general medicine over a period of six months. The study included a sample size of 350 patients. The inclusion criteria comprised all patients of either gender who were under the age of 20 years old, had hypertension, and were provided antihypertensive medicines while hospitalised in the general medicine department. [8] The exclusion criteria for women who are pregnant or nursing. Patients with weakened immune systems. Patients in psychiatry Patients admitted to the critical care unit (ICU).

METHOD OF DATA COLLECTION

A retrospective study was conducted with the consent of the KLR Pharmacy College's institutional review board in Palwanha, Telangana 507115, India.

RESULTS

Out of 350 patients, highest number of patients was under the age group of 60- 69 years 101(28.86%) followed by 50-59 years 88(25.14%) respectively. Out of 350 patients, highest number of patients were males 226 (64%) followed by females 124(36%) respectively. Out of 350 patient's majority of patients 135(38.57%) are having pre hypertension, 95(27.14%) patients are suffering with Stage-2 HTN, 80(22.86%) patients are having Stage-1 HTN and the lowest number of patients are having normal blood pressure 40(11.43%). [9] Out of 350 patients 103(29.43%), 82(23.43%), 41(11.71%), 25(7.14%), 8(2.29%), 12(3.43%), 41(11.71%), 8(2.29%), 4(1.14%), 9(2.43%), 4(1.14%), 6(1.71%), 6(1.71%), 6(1.71%), 7(2.00%) and 8(2.29%) patients are suffering with CVA, DM, COPD, CKD, DCLD, SKIN & SOFT TISSUE INFECTIONS, CAD, EPILEPSY, HYPO-THYROIDISM, DYSLIPIDAEMIAS, PVD, DCMP, CORPULMONALE, Acute GE, ANAEMIA and NEPHROTIC SYNDROME respectively. 11(3.14%) patients are having other comorbidities. Out of 350 patients only 17(4.86%) patients are not suffering with co- existing conditions. 183(52.29%) patients are having single coexisting condition. 150(42.86%) patients are having multiple coexisting conditions. [10] According to JNC-8 guidelines out of 131 patients without DM or CKD, (> 60years) 95 has achieved (71.85%) the JNC-8 goal (<150/90 mmHg) and patient's category of without DM or CKD, (< 60years) out of 117 patients 74 has achieved (63.25%) the goal (< 140/90 mmHg). In patients with DM & without CKD (all ages), out of 84 patients 55 has achieved (65.48%) the goal (<140/90 mmHg) & In CKD present with or without DM (all ages), out of 34 patients 18 patients achieved (52.94%) the goal (< 140/90 mmHg). [11] Out of 350 patients who meet the inclusion criteria, highest number of patients 204 (58.29%) were treated with 1 anti- hypertensive drug and 92 (26.29%) patients are treated with 2 anti-hypertensive drugs. And lowest number of patients that is 2 patients are using 6 anti-hypertensive drugs. Average number of Anti-hypertensive drugs per prescription is found to be 1.63 drugs.

Among 604 anti-hypertensive drugs calcium channel blockers are mostly prescribed that is in 115 (32.85) patients followed by diuretics which are prescribed in 94 (26.85%) of study population. Alpha - blockers are least prescribed among study population that is 13 (3.71%). Among the calcium channel blockers AMLODIPINE was mostly prescribed and NIMODIPINE was the least prescribed drug. Among all diuretics FUROSEMIDE was the mostly prescribed drug and METOLOZONE was the least prescribed drug. Among ACE inhibitors only 2 drugs were prescribed they are ENALAPRIL and RAMIPRIL. [12] Among ARBs

TELMESARTAN was mostly prescribed and OLMESARTAN was least prescribed. Among α -Blockers PRAZOSIN was only prescribed drug. Among β -Blockers METOPROLOL was mostly prescribed and PROPRONOLOL was the least prescribed drug. Among $\alpha+\beta$ -Blockers only 2 drugs were prescribed. They are LABETALOL and CARVIDILOL.

In this study 604 anti-hypertensive drugs were prescribed among 350 patients and out of which amlodipine was prescribed to 115 (66.22%) patients followed by furosemide which was prescribed in 152 (41.08%) and Olmesartan is the least prescribed drug which is prescribed in only one (0.27%) prescription. Out of 350 patients, 214 (57.84%) patients were on single drug therapy. Among all mono-therapies AMLODIPINE alone was prescribed in 144 (42.35%) patients of study population. Labetalol, Nifedipine, Spironolactone, Propranolol, Olmesartan are prescribed in single person as a mono-therapy. Out of 350 patients who meet the study criteria, 110 (31.43%) patients were on two-drug regimen. AMLODIPINE+FUROSEMIDE was the most frequently prescribed combination in 48(13.71%) patients followed by FUROSEMIDE+PROPRONOLOL which

was prescribed in 21(6.00%) patients. Seventeen types of two-drug combinations were observed in this study. 45(12.86%) patients out of 350 study population were on three-drug therapy. In this study we observe almost twenty-three, 3-drug regimen out of which most frequently prescribed three drug regimen was FUROSEMIDE+SPIRONOLACTONE+ENALAPRIL and this combination was prescribed in 4 patients out of 350 patients who meet the study criteria. Out of 350 patients only 9 (2.43%) patients were using 4 drug-regimen to treat HTN. Out of 350 prescriptions only 8(2.29%) prescriptions are having 5 drug regimens to treat HTN. [13]

Among 350 prescriptions 2604 drugs were prescribed and the average number of drugs per encounter was found to be 7.04 drugs. Among 2604 drugs 1780(68.36%) drugs were prescribed by generic name. Out of 350 prescriptions 204(55.14%) prescriptions contain antibiotic drugs. [14] Out of 350 prescriptions 330(89.19%) prescriptions having parenteral dosage forms. Among 2604 drugs 1863(71.54%) drugs are prescribed from essential drug list.

Table 1: Age-Based Distribution of Study Population

S.NO	AGE (YRS)	NO OF PATIENTS (N=350)	PERCENTAGE (%)
1	20-29	5	1.43%
2	30-39	20	5.71%
3	40-49	45	12.86%
4	50-59	88	25.14%
5	60-69	101	28.86%
6	70-79	66	18.86%
7	80-89	25	6.57%

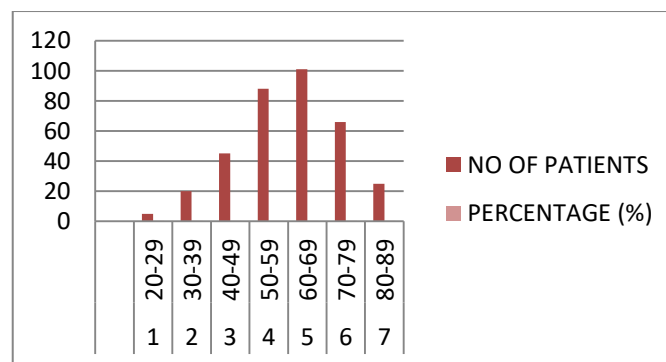


Figure 1: Age Wise Distribution

Table 2: Patient Distribution by Gender among the Study Population

S.no	Gender	No. of Patients	Percentage (%)
		(N=350)	
1	Male	226	64%
2	Female	124	36%

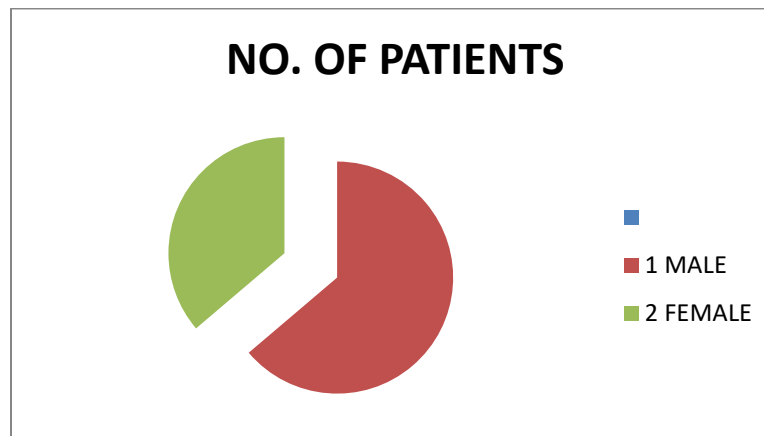


Figure 2: Gender Wise Distribution

Table 3: Patient Distribution Based on Stages of Hypertension (JNC-8)

S. No	Type of HTN	No of Patients	percentage%
		(N=350)	
1	Normal	40	11.43%
2	Pre HTN	135	38.57%
3	Stage 1 HTN	80	22.86%
4	Stage 2 HTN	95	27.14%

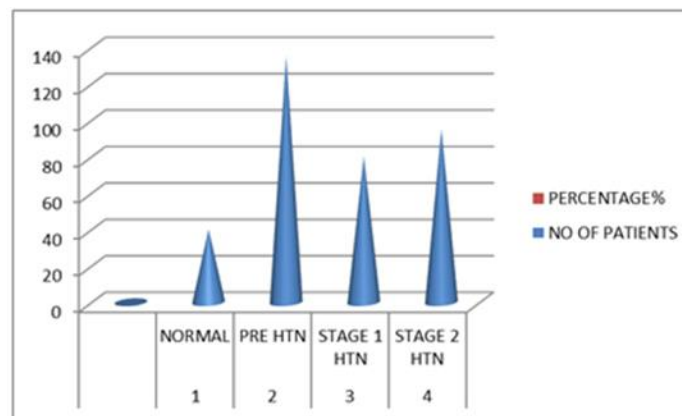


Figure 3: Distribution Based on the Stage of HTN

Table 4: Patient Distribution Based on their Comorbidities

	Co-Existing Condition	No of Patients	% of Patients
		(N=350)	
1	CVA	103	29.43%
2	Skin& Soft Tissue Infections	12	3.43%
3	DM	82	23.43%
4	CKD	25	7.14%
5	Dyslipidaemias	4	1.14%
6	CAD	8	2.29%
7	PVD	4	1.14%
8	Epilepsy	8	2.29%
9	Hypothyroidism	5	1.43%

10	COPD	41	11.71%
11	CCF	6	1.71%
12	DCLD	8	2.29%
13	DCMP	6	1.71%
14	Corpulmonale	6	1.71%
15	Acute GE	6	1.71%
16	Nephrotic Syndrome	8	2.29%
17	Anaemia	7	2.00%
18	Others	11	3.14%

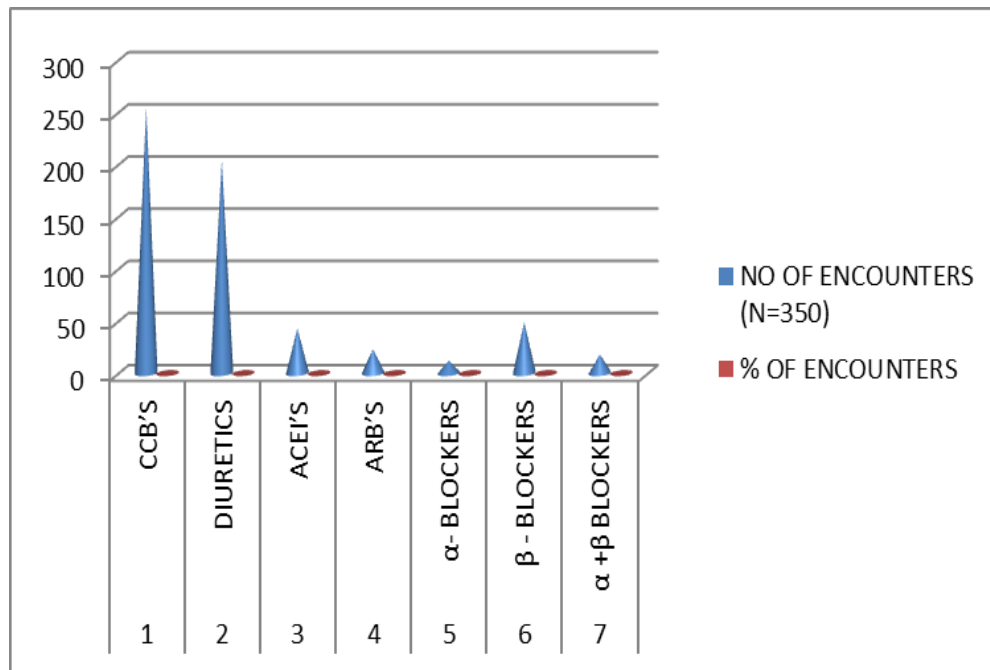


Figure 4: Category Wise Distribution of Anti- Hypertensive Drugs

DISCUSSION

Hypertension if not treated properly, can lead to major cardiovascular diseases; like heart attack, stroke, CKD and we all know that heart disease one of the leading causes of death all over the world. People who have high blood pressure are at higher risk of heart diseases than others.

To treat HTN, various drug products are available in the market. Rational use of Anti-hypertensive drugs may help to lower the complications associated with HTN.

A prescription pattern monitoring studies are considered to be one of the most effective methods to assess and evaluate the prescribing attitude of physicians and dispensing practice of pharmacists.

Among 350 patients, 226(64%) were male patients and only 124(36%) were female patients. This study was similar to the study conducted. Their studies shown that males are more prone to HTN. [15] This is

due to the work stress and addiction to social habits such as smoking and alcohol consumption.

According to JNC-8 guidelines out of 135 patients without DM or CKD, (> 60years) 97 has achieved (71.85%) the JNC-8 goal (<150/90 mmHg) and patient category of without DM or CKD, (< 60years) out of 117 patients 74 has achieved (63.25%) the goal (< 140/90 mmHg). In patients with DM & without CKD (all ages), out of 84 patients 55 has achieved (65.48%) the goal (<140/90 mmHg) & In CKD present with or without DM (all ages), out of 34 patients 18 patients achieved (52.94%) the goal (< 140/90 mmHg). Our study results shown that the hypertensive goals were being achieved in this study. This study is similar to the study conducted They shown that as per JNC-8 guidelines majority of BP goals were achieved.

In total of 350 prescriptions a total number of drugs prescribed were 2604. Out of which 604 (23.2%) were anti- hypertensive drugs and 2000 (76.8%) are other drugs. Average number of drugs in prescription is found

to be 7.04 drugs. Average number of Anti-hypertensive drugs per prescription is found to be 1.63 drugs.

A maximum number of drugs prescribed in our study was thirteen which were prescribed to one patient. In total of 350 prescriptions a total number of drugs prescribed were 2604. Average number of drugs prescribed per prescription is found to be 7.04 drugs in a range of 2 to 13 drugs. Most patients of our study population 214(57.84%) were received monotherapy and remaining 156(42.16%) were on combination drug therapy to treat their HTN. Among the combination treatment regimens, 2- drug regimen was most commonly used in 102 patients, while utilization of 3-, 4-, 5- and 6- drug regimen was prescribed in 39, 9, 4 and 2 patients respectively.

Among the calcium channel blockers AMLODIPINE was mostly prescribed and NIMODIPINE was the least prescribed drug. Among all diuretics FUROSEMIDE was the mostly prescribed drug and METOLOZONE was the least prescribed drug. Among ACE inhibitors only 2 drugs were prescribed they are ENALAPRIL and RAMIPRIL. Among ARBs TELMESARTAN was mostly prescribed and OLMESARTAN was least prescribed. Among α -Blockers PRAZOSIN was only prescribed drug. Among β -Blockers METOPROLOL was mostly prescribed and PROPRANOLOL was the least prescribed drug. Among α + β -Blockers only 2 drugs were prescribed. They are LABETALOL and CARVIDILOL. Out of 7 classes of Anti-HTN drugs prescribed in our study CCB's were found to be most frequently prescribed followed by diuretics. This study is similar to the study conducted They also shown that CCB's are most frequently prescribed class of Anti- HTN drugs.

Among 350 cases 16 ADR's were identified. Causality assessment was done by using NARANJO'S CAUSALITY ASSESSMENT SCALE and we found that 12 ADR's were probable, 2 ADR's were possible and 2 ADR's were definite.

MODIFIED HARTWIG and SIEGEL scale is used to assess the severity of an ADR. Among 16 ADR's identified 3 are mild(level-1) ADR'S, 5 are mild(level-2) ADR's, 6 are moderate(level-3) ADR's, 1 is moderate(level-4a) ADR & 1 is moderate(level-4b) ADR.

REFERENCES

1. Shalavadi MH, Chandrashekhar VM, Manohar K, Nihar K, Srikanth DRS. (2018). A Prospective Study on Prescription Pattern of Antihypertensive Drugs and Drug Interactions at a Tertiary Care Teaching Hospital. *Am J Pharmacol.* 1(2), 1010.
2. Ashok K. Sharma, Navdeep Dahiya, Jayant K. Kairi, Sandesh M. Bharati. (2015). Prescription patterns of antihypertensive drugs in a tertiary care hospital in India; *International Journal of Basic & Clinical Pharmacology*, January-February 4(1), 55-59.

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CONCLUSION

This study concluded that most (96.49%) of the prescriptions were complied with recommended JNC-8 guidelines. Although prescribing pattern of anti-hypertensive medications showed adherence to the recommended guidelines, blood pressure control amongst hypertensive patients was not satisfactory. Hence more efforts should be geared by health care professionals towards better blood pressure control. Further studies are needed from time to time in large scale to improve the prescribing pattern in hypertension.

3. Oluseyi Adejumo, Enajite Okaka, Ikponmwosa Iyawe. (2017). Prescription pattern of antihypertensive medications and blood pressure control among hypertensive outpatients at the University of Benin Teaching Hospital in Benin City, Nigeria. *Malawi Medical Journal*, 29 (2). *Noncommunicable Diseases Special Issue*, 113-117.
4. Ashok Kumar Malpani, Manjunath Waggi, Palash Panja, Thella Monica Christien. (2018). Study of Prescribing Pattern of Antihypertensive Drugs and Evaluation of the Prescription with JNC 8 Guidelines in North Karnataka Hospital. *Indian Journal of Pharmacy Practice*. 11(4), 193-197.
5. Noah Jarari, Narasinga Rao, Jagannadha Rao Peela, Khaled A. Ellafi, Srikumar Shakila, Abdul R. (2016). Said, Nagaraja Kumari Nelapalli. A review on prescribing patterns of antihypertensive drugs; *Clinical Hypertension* 22, 7, 8 pages.
6. Mengesha HG, Welegerima AH, Hadgu A, Temesgen H, Otieno MG, Tsegay K. (2018) Comparative effectiveness of antihypertensive drugs prescribed in Ethiopian health care practice: A pilot prospective, randomized, open label study. *PLoS ONE* 13(9), e0203166.
7. Chandra Narayan Gupta, Akul SK, Sugata Mahapatra, Apala Lahiri, Kausik Maji, Sukanta Sen. (2019). Evaluation of Antihypertensive Drug Prescription Patterns, Rationality, and Adherence to Joint National Committee-8 Hypertension Treatment Guidelines among Patients Attending Medicine OPD in a Tertiary Care Hospital; *International Journal of Contemporary Medical Research* 6(10), J31-J37.
8. Tadesse Melaku Abegaz, Yonas Getaye Tefera, Tamrat Befekadu Abebe. (2017). Antihypertensive drug prescription patterns and their impact on outcome of blood pressure in Ethiopia: a hospital-based cross-sectional study. *Integrated Pharmacy Research and Practice*. 6, 29–35.
9. Ajay Kumar, Apoorva Malhotra, Pavan Malhotra, Srishti Mantoo. (2020) Prescribing patterns of antihypertensive drugs: An observational hospital-based study in outpatient department of a medical college in north India; *JMSCR*, 08(01), 228-236.
10. Rajesh Kumar Jangir, Akhtar Ali1, Javed Ahamed, Anusuya Gehlot, Archana Vyas, Kamal Kumar Batar. A (2019), Prospective Study of Prescription Patterns of Antihypertensive Drugs in Hypertensive Patients at a Tertiary Care Hospital; *JMSCR*, 07(03), 1146- 1157.
11. Dorland. *Dorland's pocket medical dictionary*. 29th Edition. Elsevier. 2013
12. Karen Whalen, Richard Finkel, Thomas A. Panavelil. (2015). Lippincott illustrated reviews- Pharmacology. Sixth Edition. *Wolter Kluwer*. 225-254.
13. Russell J Greene & Norman D Harris. (2008). Pathology and Therapeutics for pharmacists- A Basis for clinical pharmacy practice. Third edition. *Pharmaceutical press*. 208-232.
14. K.D Tripathi. (2013). *Essentials of Medical Pharmacology*. Seventh edition. Jaypee brother's medical publishers (P) Ltd. 558-560.
15. Maxine A. Papadakis, Stephen J. (2020). *McPhee. Current Medical Diagnosis & Treatment*. Mc Graw Hill. 59th Edition. 1090, 1101-1115.

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