



ORIGINAL ARTICLE

Drug Utilization Pattern of Antihypertensive Medications in Patients Attending a Tertiary Care Hospital: A Cross-Sectional Observational Study

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Abstract

Background: Hypertension is one of the most common chronic non-communicable diseases and a major risk factor for cardiovascular morbidity and mortality. Rational use of antihypertensive drugs is essential for effective blood pressure control, prevention of complications, reduction of treatment cost, and improvement of patient compliance. Drug utilization studies help evaluate prescribing trends and promote rational pharmacotherapy.

Aim: To study the drug utilization pattern of antihypertensive medications among patients attending a tertiary care hospital.

Materials and Methods: A cross-sectional observational study was conducted in the Department of Pharmacology among 300 diagnosed hypertensive patients attending outpatient and inpatient departments. Prescriptions were analyzed for the demographic profile, duration of hypertension, comorbidities, number of antihypertensive drugs prescribed, drug classes, monotherapy versus combination therapy, fixed-dose combinations, and use of generic names. Prescribing indicators were assessed using descriptive statistics.

Results: Among 300 patients, 168 (56.0%) were males and 132 (44.0%) were females. The majority belonged to the 51–70 years age group. Diabetes mellitus was the most common comorbidity, followed by ischemic heart disease and chronic kidney disease. Monotherapy was prescribed in 126 (42.0%) patients, while combination therapy was prescribed in 174 (58.0%) patients. Calcium channel blockers were the most commonly prescribed antihypertensive class, followed by angiotensin receptor blockers, diuretics, beta-blockers, and angiotensin-converting enzyme inhibitors. Amlodipine was the most frequently prescribed individual drug. Two-drug combinations were most commonly used among patients requiring combination therapy. **Conclusion:** Combination therapy was commonly used among hypertensive patients, especially in those with comorbidities or uncontrolled blood pressure. Calcium channel blockers and angiotensin receptor blockers were the preferred drug classes. Periodic drug utilization evaluation is useful for assessing prescribing trends, improving rational antihypertensive therapy, and promoting cost-effective patient care.

Keywords: Antihypertensive Drugs, Drug Utilization, Hypertension, Pharmacology, Prescribing Pattern, Rational Drug Use.

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1 | INTRODUCTION

Hypertension is a major public health problem and one of the leading modifiable risk factors for cardiovascular disease, stroke, renal failure, and premature mortality. It is often asymptomatic in the early stages but may cause long-term target organ damage if not properly controlled. Effective pharmacological treatment significantly reduces the risk of complications and improves long-term outcomes. (1)

The burden of hypertension has increased globally due to population aging, urbanization, sedentary lifestyle, obesity, unhealthy diet, tobacco use, alcohol consumption, and psychosocial stress. In India, hypertension is an important contributor to cardiovascular morbidity and is increasingly being detected in both urban and rural populations. (2)

Pharmacological treatment of hypertension includes several drug classes such as diuretics, calcium channel blockers, beta-blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, alpha-blockers, centrally acting drugs, and vasodilators. Selection of therapy depends on age, severity of hypertension, comorbidities, contraindications, tolerability, cost, and guideline recommendations. (3)

Rational prescribing of antihypertensive drugs is important because hypertension usually requires long-term or lifelong treatment. Inappropriate drug selection, unnecessary polypharmacy, irrational fixed-dose combinations, poor adherence, and high cost may adversely affect blood pressure control. (4)

Drug utilization research is defined as the study of marketing, distribution, prescription, and use of drugs in society with special emphasis on resulting medical, social, and economic consequences. It provides information about prescribing trends and helps identify gaps between actual practice and standard recommendations. (5)

Antihypertensive drug utilization studies are important because prescribing patterns change over time with emerging evidence, availability of newer agents, cost considerations, physician preference, and patient factors. Such studies help evaluate whether treatment practices are consistent with rational pharmacotherapy principles. (6)

Combination therapy is often required in patients with stage 2 hypertension, diabetes mellitus, chronic kidney disease, ischemic heart disease, or inadequate response to monotherapy. Fixed-dose combinations may improve adherence by reducing pill burden but should be used rationally. (7)

The present study was conducted to analyze the drug utilization pattern of antihypertensive medications among patients attending a tertiary care hospital and to assess commonly prescribed drug classes, monotherapy versus combination therapy, and prescribing indicators.

2 | MATERIALS AND METHODS

This cross-sectional observational study was conducted in the Department of Pharmacology in 2015. A total of 300 diagnosed hypertensive patients attending outpatient and inpatient departments were included.

Patients aged 18 years and above with a diagnosis of hypertension and receiving at least one antihypertensive medication were included. Newly diagnosed and previously diagnosed hypertensive patients were considered. Patients with incomplete prescriptions, pregnancy-induced hypertension, emergency hypertensive crisis requiring intensive care, and unwillingness to participate were excluded.

Data were collected from prescriptions and patient records using a structured proforma. Information recorded included age, gender, duration of hypertension, blood pressure category, comorbidities, number of drugs prescribed, antihypertensive drug classes, individual drugs, monotherapy or combination therapy, use of fixed-dose combinations, route of administration, and whether drugs were prescribed by generic or brand name. Antihypertensive drugs were classified into calcium channel blockers, angiotensin receptor blockers, angiotensin-converting enzyme inhibitors, beta-blockers, diuretics, alpha-blockers,

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centrally acting drugs, and others. Prescriptions were analyzed for number of antihypertensive drugs per prescription and total number of drugs per prescription.

Monotherapy was defined as prescription of a single antihypertensive drug. Combination therapy was defined as prescription of two or more antihypertensive drugs. Fixed-dose combination was defined as two or more active antihypertensive ingredients present in a single formulation. Comorbidities such as diabetes mellitus, ischemic heart disease, chronic kidney disease, dyslipidemia, and stroke history were recorded where available.

Data were entered in Microsoft Excel and analyzed using descriptive statistics. Frequencies and percentages were calculated. Institutional ethical approval was obtained before commencement of the study. Patient identity and prescription details were kept confidential.

3 | RESULTS

3.1 | Total of 300 hypertensive patients were included in the study

Males constituted 56.0% of the study population. The most common age group was 51–60 years, followed by 61–70 years. This indicates that hypertension was more common among middle-aged and elderly patients.

Diabetes mellitus was the most common comorbidity, observed in 92 (30.7%) patients. Dyslipidemia and ischemic heart disease were also common. Comorbidities influenced the choice of antihypertensive therapy.

Monotherapy was prescribed in 126 (42.0%) patients, while combination therapy was used in 174 (58.0%) patients. Two-drug therapy was the most common combination pattern.

Calcium channel blockers were the most commonly prescribed drug class, followed by angiotensin receptor blockers and diuretics. Beta-blockers and ACE inhibitors were prescribed less frequently.

Amlodipine was the most frequently prescribed individual drug. Telmisartan was the most commonly

prescribed angiotensin receptor blocker.

Among two-drug combinations, ARB with diuretic was the most common, followed by calcium channel blocker with ARB. These combinations are commonly used for better blood pressure control.

The average number of antihypertensive drugs per prescription was 1.78. Generic prescribing was low. Lifestyle advice was documented in 39.3% prescriptions.

4 | DISCUSSION

The present study evaluated the drug utilization pattern of antihypertensive medications among 300 patients attending a tertiary care hospital. The majority of patients were middle-aged or elderly. Combination therapy was more commonly used than monotherapy. Calcium channel blockers were the most frequently prescribed antihypertensive class, followed by angiotensin receptor blockers and diuretics. Amlodipine was the most common individual drug.

Neutel and Smith reported that hypertension often requires more than one drug for adequate control, especially in patients with comorbidities or higher baseline blood pressure. (8) In the present study, 58.0% patients received combination therapy, indicating that monotherapy was insufficient in many patients.

Gu et al. analyzed trends in antihypertensive medication use and observed increasing use of combination therapy over time. (9) The present study also showed frequent use of two-drug therapy, particularly ARB with diuretic and CCB with ARB combinations.

Johnson et al. discussed the role of calcium channel blockers in hypertension management and emphasized their effectiveness in older patients and diverse populations. (10) In the present study, calcium channel blockers were the most commonly prescribed class, with amlodipine being the leading individual drug.

Chobanian et al. recommended thiazide diuretics either alone or in combination for many hypertensive patients. (11) In the present study, diuretics were

TABLE 1: Demographic Characteristics of Study Participants

Variable	Frequency (%)
Male	168 (56.0)
Female	132 (44.0)
Age 18–40 years	34 (11.3)
Age 41–50 years	62 (20.7)
Age 51–60 years	96 (32.0)
Age 61–70 years	74 (24.7)
Age >70 years	34 (11.3)

TABLE 2: Comorbidities Among Hypertensive Patients

Comorbidity	Frequency (%)
Diabetes mellitus	92 (30.7)
Ischemic heart disease	48 (16.0)
Chronic kidney disease	22 (7.3)
Dyslipidemia	54 (18.0)
History of stroke	12 (4.0)
No documented comorbidity	126 (42.0)

TABLE 3: Pattern of Antihypertensive Therapy

Therapy Pattern	Frequency (%)
Monotherapy	126 (42.0)
Two-drug therapy	118 (39.3)
Three-drug therapy	44 (14.7)
Four or more drugs	12 (4.0)

TABLE 4: Antihypertensive Drug Classes Prescribed

Drug Class	Frequency (%)
Calcium channel blockers	138 (46.0)
Angiotensin receptor blockers	112 (37.3)
Diuretics	94 (31.3)
Beta-blockers	76 (25.3)
ACE inhibitors	48 (16.0)
Alpha-blockers	12 (4.0)
Centrally acting drugs	10 (3.3)

TABLE 5: Commonly Prescribed Individual Antihypertensive Drugs

Drug	Frequency (%)
Amlodipine	112 (37.3)
Telmisartan	78 (26.0)
Hydrochlorothiazide	56 (18.7)
Atenolol	42 (14.0)
Enalapril	30 (10.0)
Losartan	28 (9.3)
Metoprolol	26 (8.7)
Chlorthalidone	22 (7.3)

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TABLE 6: Common Two-Drug Combinations

Combination	Frequency (%)
ARB + Diuretic	46 (39.0)
CCB + ARB	34 (28.8)
CCB + Beta-blocker	18 (15.3)
ACE inhibitor + Diuretic	12 (10.2)
Beta-blocker + Diuretic	8 (6.8)

TABLE 7: Prescribing Indicators

Indicator	Result
Average number of antihypertensive drugs per prescription	1.78
Prescriptions with fixed-dose combinations	86 (28.7%)
Drugs prescribed by generic name	42 (14.0%)
Prescriptions containing lifestyle advice	118 (39.3%)
Prescriptions with documented follow-up advice	212 (70.7%)

commonly used, especially in combination with angiotensin receptor blockers or ACE inhibitors.

Mancia et al. emphasized individualized antihypertensive therapy based on cardiovascular risk, comorbidities, and tolerability. (12) In the present study, angiotensin receptor blockers were frequently prescribed, particularly among patients with diabetes mellitus and other metabolic comorbidities.

Bangalore et al. reported that fixed-dose combinations can improve adherence by reducing pill burden. (13) In the present study, fixed-dose combinations were prescribed in 28.7% prescriptions. Rational fixed-dose combinations may be useful when components are appropriate and dose flexibility is not compromised.

Tandon et al. reported that drug utilization studies are useful for evaluating prescribing practices and improving rational medicine use. (14) The present study provides information on local prescribing trends and highlights the need for improved generic prescribing and documentation of lifestyle advice.

Sharma et al. studied antihypertensive prescribing trends in India and observed frequent use of calcium channel blockers and angiotensin receptor blockers. (15) The present findings are comparable, as these two classes were among the most commonly prescribed.

Diabetes mellitus was the most common comorbidity in the present study. Antihypertensive therapy in

diabetic patients requires careful selection because blood pressure control reduces the risk of nephropathy, stroke, and cardiovascular events. Drugs acting on the renin-angiotensin system are commonly preferred in such patients when not contraindicated.

Ischemic heart disease was present in 16.0% patients. Beta-blockers were prescribed in selected patients, especially those with ischemic symptoms or prior cardiac history. Beta-blockers are useful in specific cardiovascular indications but may not be preferred as routine first-line monotherapy in all uncomplicated hypertensive patients.

Chronic kidney disease was present in 7.3% patients. In such patients, blood pressure control is essential to slow progression of renal damage. Renin-angiotensin system blockers may be beneficial in proteinuric kidney disease, but renal function and potassium levels require monitoring.

Jhaj R et al Calcium channel blockers were commonly prescribed because they are effective, well tolerated, and convenient for once-daily administration (16) . Amlodipine has a long duration of action and is widely used in clinical practice. Common adverse effects include pedal edema, flushing, headache, and palpitations. Angiotensin receptor blockers were the second most common class. Telmisartan was commonly used, probably due to its long duration of action and tolerability. ARBs are generally well tolerated and are useful in patients

unable to tolerate ACE inhibitor-induced cough. ACE inhibitors were prescribed less frequently than ARBs. This may be due to cough, physician preference, and better tolerability of ARBs. However, ACE inhibitors remain useful and cost-effective drugs in many patients.

Diuretics were frequently used as part of combination therapy. Thiazide and thiazide-like diuretics improve blood pressure control and are particularly useful in salt-sensitive hypertension. Electrolyte monitoring is important, especially in elderly patients.

Generic prescribing was low in the present study. Prescribing by generic name can reduce cost and improve accessibility, especially for chronic diseases requiring long-term medication. Encouraging generic prescribing is an important aspect of rational drug use. Lifestyle advice was documented in only 39.3% prescriptions. Non-pharmacological measures such as salt restriction, weight reduction, regular physical activity, smoking cessation, reduced alcohol intake, and healthy diet are essential components of hypertension management. Better documentation and counseling should be encouraged. The present study has certain limitations. It was a single-center observational study. Blood pressure control outcomes were not followed longitudinally. Adherence, adverse effects, cost analysis, and patient knowledge were not assessed. Future studies should evaluate prescription quality, adherence, clinical outcomes, and cost-effectiveness of antihypertensive therapy.

5 | CONCLUSION

Combination antihypertensive therapy was more commonly prescribed than monotherapy in the present study. Calcium channel blockers were the most frequently prescribed drug class, followed by angiotensin receptor blockers and diuretics. Amlodipine was the most commonly prescribed individual drug. Diabetes mellitus was the most frequent comorbidity among hypertensive patients. Generic prescribing and documentation of lifestyle advice were low and need improvement. Periodic drug utilization studies are useful for evaluating prescribing trends, promoting rational antihypertensive therapy,

improving patient compliance, and supporting cost-effective healthcare.

REFERENCES

1. ; 2003.
2. ; 2002.
3. Whitworth JA. World Health Organization/International Society of Hypertension statement on management of hypertension. *J Hypertens*. 2003;21(11):1983–1992.
4. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. Seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. *Hypertension*. 2003;42(6):1206–1252.
5. Mancia G, Backer D, Dominiczak G, Cifkova A, Fagard R, Germano R, et al. guidelines for the management of arterial hypertension. *J Hypertens*. 2007;25(6):1105–1187.
6. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J. evidence-based guideline for the management of high blood pressure in adults. *JAMA*. 2014;311(5):507–520.
7. Gupta R. Trends in hypertension epidemiology in India. *J Hum Hypertens*. 2004;18(2):73–78.
8. Neutel JM, Smith D. Hypertension management: rationale for triple therapy based on mechanisms of action. *Cardiovasc Ther*. 2013;31(5):251–258.
9. Gu Q, Burt VL, Dillon CF, Yoon S. Trends in antihypertensive medication use and blood pressure control among United States adults. *Circulation*. 2012;126(17):2105–2114.
10. Johnson ML, Pietz K, Battleman DS, Beyth RJ. Prevalence of comorbid hypertension and dyslipidemia and associated cardiovascular disease. *Am J Manag Care*. 2004;10(12):926–932.

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11. Law MR, Morris JK, Wald NJ. Use of blood pressure lowering drugs in prevention of cardiovascular disease. *BMJ*. 2009;338:1665–1665.
12. Mancia G, Laurent S, Agabiti-Rosei E, Ambrosioni E, Burnier M, Caulfield MJ. Reappraisal of European guidelines on hypertension management. *J Hypertens*. 2009;27(11):2121–2158.
13. Bangalore S, Kamalakkannan G, Parkar S, Messerli FH. Fixed-dose combinations improve medication compliance: a meta-analysis. *Am J Med*. 2007;120(8):713–719.
14. Tandon VR, Sharma S, Mahajan A, Khajuria V, Gillani Z. Antihypertensive drug prescription patterns, rationality, and adherence to JNC 7 guidelines. *Int J Med Public Health*. 2014;4(1):78–81.
15. Sharma AK, Dahiya N, Kairi JK, Bharati SM. Prescription patterns of antihypertensive drugs in a tertiary care hospital. *Int J Basic Clin Pharmacol*. 2014;3(1):55–59.
16. Jhaj R, Goel NK, Gautam CS, Hota D, Sangeeta B, Sood A. Prescribing patterns and cost of antihypertensive drugs in an internal medicine clinic. *Indian Heart J*. 2001;53(3):323–327.

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