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DRUG UTILISATION STUDY OF ANTI-HYPERTENSIVE DRUGS IN A TERTIARY CARE HOSPITAL

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Abstract

Hypertension is a major public health problem, and rational prescribing of antihypertensive drugs is critical for optimizing patient outcomes. The present prospective observational study was conducted over six months in the Department of General Medicine, SVS Medical College and Hospital, Mahbubnagar, to evaluate drug utilization patterns of antihypertensive medications. A total of 150 hypertensive patients were enrolled after applying inclusion criteria, and prescriptions were analyzed for demographic distribution, comorbidities, and prescribing trends. The majority of patients were aged 51–60 years (34.0%), with males being more commonly affected (60%). Diabetes mellitus was the most frequent comorbidity (40%), followed by hypertension alone (37.3%), cerebrovascular accident (8.7%), thyroid disorders (6.7%), hypertensive urgency (3.3%), bronchiolitis (2.7%), and heart failure (1.3%). Monotherapy was predominant, with ACE inhibitors (26.7%) being the most prescribed class, followed by angiotensin receptor blockers (ARBs, 23.3%), calcium channel blockers (20.0%), thiazide diuretics (13.3%), β-blockers (10.0%), and loop diuretics or other agents (3.3%), while fixed-dose combinations were used sparingly (3.3%). Comorbidity profiles largely guided prescribing: ACEI/ARBs were preferred in diabetes, CVA, and heart failure; β-blockers were selectively used in thyroid disorders and heart failure; and non-selective β-blockers were avoided in bronchiolitis. The findings highlight that comorbidity-based prescribing patterns largely aligned with evidence-based recommendations. Early detection, rational drug selection, and reinforcement of lifestyle modifications remain essential to preventing complications and improving long-term management of hypertension.

***Keywords*:** Hypertension, Drug utilisation study, Antihypertensive drugs, Telmisartan, Amlodipine, ARBs, Calcium channel blockers, Comorbidities.

Introduction

Hypertension is one of the most common chronic non-communicable diseases worldwide and a leading risk factor for cardiovascular morbidity and mortality, contributing to stroke, ischemic heart disease, renal impairment, and premature death [1]. According to the World Health Organisation, an estimated 1. 28 billion adults globally are hypertensive, with nearly two- thirds residing in low- and middle- income countries, where detection and control rates remain suboptimal [2]. In India, the prevalence of hypertension ranges between 25–30% among adults, and the rising burden is closely linked to urbanisation, sedentary lifestyles, obesity, diabetes, and dietary factors [3]. Rational use of antihypertensive drugs is crucial, as inappropriate prescribing may lead to poor blood pressure control, unnecessary polypharmacy, adverse drug reactions, and increased healthcare costs [4]. Drug utilisation studies (DUS) offer insights into prescribing patterns and help assess whether pharmacotherapy aligns with current evidence-based guidelines, thereby enhancing treatment outcomes [5]. International guidelines such as the Joint National Committee (JNC 8) and the European Society of

Cardiology/European Society of Hypertension (ESC/ESH) recommend first- line use of thiazide diuretics, calcium channel blockers (CCBs), angiotensin- converting enzyme inhibitors (ACEIs), or angiotensin receptor blockers (ARBs), with the choice guided by patient comorbidities and tolerability [6,7]. For example, ACEIs/ARBs are preferred in patients with diabetes and nephropathy due to their renoprotective effects, CCBs and diuretics are widely utilised in the elderly, while β-blockers are recommended in cases of ischaemic heart disease and heart failure but avoided in asthma and bronchiolitis [8,9]. Studies from India have indicated variable prescribing practices, with a tendency towards polytherapy in complex cases, although monotherapy remains common in newly diagnosed hypertension [10]. Evaluating prescribing patterns in tertiary care hospitals is essential to identify gaps between actual practice and guideline-directed therapy, thus promoting rational drug use. Therefore, this study was undertaken to assess the utilisation pattern of antihypertensive medications in a tertiary care hospital, focusing on prescribing trends concerning comorbid conditions and therapeutic outcomes.

Materials and Methodology

Data Collection Procedure, Type, and Duration of Study

The present study was designed to evaluate the drug utilisation pattern of antihypertensive medications in a tertiary care setting. Data collection was conducted on a sample size of 150 patients diagnosed with hypertension. The study followed a prospective observational design and was carried out in the Department of General Medicine, SVS Medical College and Hospital, Mahbubnagar. The total study duration was six months. Data related to patient demographics, diagnosis, clinical profile, and prescribed antihypertensive medications were systematically collected, recorded, and subsequently analysed using appropriate statistical methods for interpretation and evaluation [11-14].

Study Setting and Source of Data

The study was conducted in the Department of General Medicine at SVS Medical College and Hospital, Mahbubnagar. The primary sources of data included patient case sheets, findings from physical examinations, complete blood picture (CBP) reports, and details of the antihypertensive treatment regimen.

Sample Size and Its Determination

A total of 150 hypertensive patients were included in the study. The sample size was determined to provide adequate representation for the statistical analysis of prescribing patterns within the study duration [15-17].

Sample Selection Criteria

Inclusion Criteria

- Patients aged >18 years.
- Patients with a confirmed diagnosis of hypertension.
- Patients willing to provide informed consent for participation.
- Patients with hypertension and severe comorbidities.

Exclusion Criteria

- Patients with autoimmune disorders (e.g., rheumatoid arthritis, lupus, multiple sclerosis).
- Patients who had changed their antihypertensive regimen within the last six weeks.
- Pregnant women and breastfeeding mothers.

Methodology

Hypertension, or persistently elevated blood pressure in the arteries, was diagnosed according to standard clinical guidelines. Data collected from eligible patients were systematically entered into Microsoft Excel spreadsheets. Descriptive statistics were used for preliminary analysis. The chi-square test and analysis of variance (ANOVA) were applied to assess associations and differences between study variables. Prevalence and incidence rates were also calculated. Results were expressed as mean ± standard deviation (SD), and a p-value of less than 0.05 was considered statistically significant at a 95% confidence interval. Additional statistical methods were applied as required to ensure robustness of results [18-22].

Study Procedure

This was a prospective observational study, and eligible patients were enrolled after obtaining informed consent. A structured proforma was designed to collect data, which included patient demographics, case history, physical examination findings, CBP results, and treatment details. Data were collected from both inpatients and outpatients of the General Medicine Department. Collected data were analysed using appropriate statistical tools, and findings were interpreted in relation to current clinical practice guidelines [23-27].

Materials, Investigations, and Instruments

No additional investigations, interventions, or invasive procedures were performed specifically for the study. Data were derived from routine clinical examinations, laboratory investigations (including serum biochemistry and complete blood count), and treatment records. Instruments used included standard laboratory equipment and hospital medical record systems [28-31].

Anticipated Risks

The study did not involve any experimental interventions beyond routine clinical practice. Therefore, no adverse events, lethal or sub-lethal risks were anticipated for the study participants [32, 33].

Data Analysis Procedure

All hypertensive patients presenting to the General Medicine Department during the study period were

screened. Eligible patients who fulfilled the inclusion criteria and provided informed consent were enrolled. Patient data were recorded using the structured proforma. After the completion of data collection, statistical analysis was carried out, the results were interpreted, and conclusions were drawn based on the findings to highlight prescribing trends and their clinical relevance [34, 35].

Statistical Methods

Data were systematically entered into Microsoft Excel. Frequency distribution tables were constructed, and descriptive statistics were calculated. Associations between categorical variables were tested using the chi-square test, while ANOVA was applied to test the significance of differences within and between groups. A p-value<0.05 was considered statistically significant at a 95% confidence interval [36-38].

Statistical Package

Statistical analysis was performed using SPSS software, version 23, and GraphPad Prism, version 9, for validation, graphical representation, and advanced statistical applications.

Collaboration

No external collaboration was involved in this study.

Ethical Clearance

Ethical clearance for the study was obtained from the Institutional Ethics Committee of SVS Medical College and Hospital, Mahbubnagar, prior to the initiation of the study. The reference number for ethical approval is IEC/DHR-01/(02/06)/2025/021/6.

Results and Discussion

Age-wise Distribution of Hypertensive Patients

In the present study of 150 hypertensive patients, the maximum number of cases were observed in the 51–60 years age group, comprising 51 patients (34%). This was followed by 34 patients (23%) in the 61–70 years group, and 30 patients (20%) in the 41–50 years group. Only 9 patients (6%) belonged to the 31–40 years group, while no patients were recorded below 30 years, making it the least prevalent category. This indicates that the prevalence of hypertension increases with advancing age, peaking in the sixth decade of life. These findings are presented in Table 1 and illustrated graphically in Fig. 1.

Table 1: Age-wise Distribution of Hypertension Patients

Age (Years)	Frequency	Percentage (%)
<30 years	0	0
31–40 years	9	6
41–50 years	30	20
51–60 years	51	34
61–70 years	34	23
71–80 years	26	17
Total	**150**	**100**

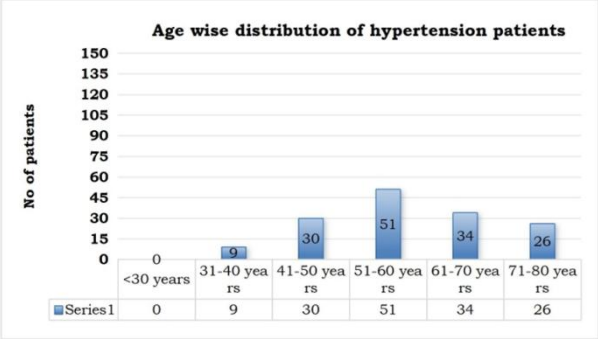

Fig.1: Bar graph showing the distribution of patients based on age

Gender-wise Distribution of Hypertensive Patients

Among the study population, males predominated with 90 patients (60%), while females constituted 60 patients (40%). This demonstrates a clear male predominance in the prevalence of hypertension. The difference may be attributed to lifestyle factors, hormonal differences, and higher exposure to cardiovascular risk factors among men. The findings are shown in Table 2 and visually represented in Figure 5.2 as a pie chart.

Table 2: Gender-wise Distribution of Hypertension Patients

Gender	Frequency	Percentage (%)
Male	90	60
Female	60	40
Total	**150**	**100**

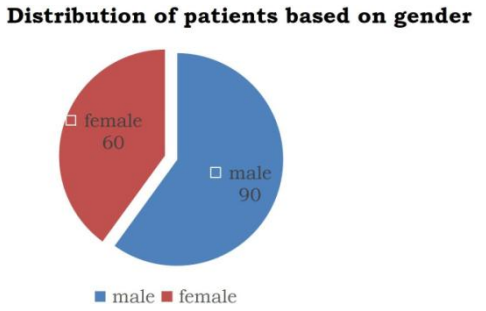

Fig. 2: Pie chart showing the distribution of patients based on gender

Distribution Based on Comorbidities

The distribution of comorbidities among hypertensive patients is summarised in Table 3. The most frequent comorbidity was diabetes mellitus (40%), followed by patients with hypertension alone (37.3%). Other associated conditions included cerebrovascular accidents (8.7%), thyroid disorders (6.7%), hypertensive urgency (3.3%), bronchiolitis (2.7%), and heart failure (1.3%). The predominance of diabetes highlights the coexistence of metabolic syndrome in this population, requiring careful

drug selection. These results are illustrated in Figure 3 as a bar graph.

Table 3: Distribution of Patients Based on Comorbidities

Comorbidity	No. of Patients (n)	Percentage (%)
Hypertension only	56	37.3
Hypertension + Diabetes Mellitus	60	40.0
Hypertension + Thyroid disorder	10	6.7
Hypertension + Bronchiolitis	4	2.7
Hypertension + CVA	13	8.7
Hypertension + Hypertensive urgency	5	3.3
Hypertension + Heart failure	2	1.3
Total	**150**	**100**

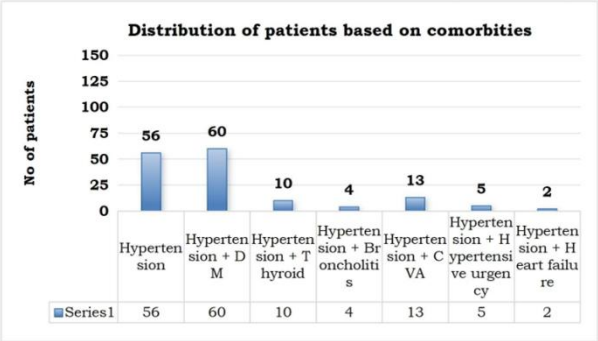

Fig.3: Bar graph showing distribution of patients based on comorbidities

Treatment for Hypertension and Its Comorbidities

The therapeutic approach varied depending on whether hypertension occurred alone or with comorbidities. As seen in Table 4, ACE inhibitors (26.7%) were the most frequently prescribed class, followed by ARBs (23.3%), CCBs (20%), thiazide diuretics (13.3%), and β-blockers (10%). In heart failure and CVA, combination therapies (ACEI + Diuretics or ARBs + β-blockers) were preferred. In diabetes, ACEI/ARBs were the mainstay due to their renoprotective effects, while in thyroid disorders, β-blockers were widely used to control tachycardia. Importantly, non-selective β-blockers were avoided in bronchiolitis due to risk of bronchospasm. Overall, prescribing patterns aligned with evidence-based recommendations.

Table 4: Distribution of Antihypertensive Drug Classes and Indications

Drug Class / Therapy	No. of Patients	Percentage (%)	Most Common Indications
ACE inhibitors (e.g., Enalapril, Ramipril)	40	26.7	Diabetes, CVA, Heart failure
ARBs (e.g., Losartan, Telmisartan)	35	23.3	Hypertension, Diabetes, Bronchiolitis
Calcium Channel Blockers (e.g., Amlodipine, Diltiazem)	30	20.0	Elderly HTN, Hypertensive urgency
Thiazide Diuretics (e.g., HCTZ, Chlorthalidone)	20	13.3	Hypertension only, CVA prevention
β-blockers (e.g., Metoprolol, Bisoprolol)	15	10.0	Thyroid disorders, Heart failure
Loop/Other Diuretics (Furosemide, Spironolactone)	5	3.3	Heart failure, resistant HTN
Fixed-dose combinations	5	3.3	Diabetes, CVA, uncontrolled HTN
Total	**150**	**100**	—

Conclusion

The present prospective observational study conducted on 150 hypertensive patients in a tertiary care hospital provides essential insights into prescribing patterns and their alignment with evidence-based recommendations. The study revealed that hypertension was most prevalent among individuals aged 51–60 years and was more common in males than females, consistent with global epidemiological trends. A significant proportion of patients presented with comorbidities, most notably diabetes mellitus, which accounted for 40% of cases, thereby influencing the choice of antihypertensive therapy. The drug utilization pattern demonstrated that ACE inhibitors (26.7%) and ARBs (23.3%) were the most frequently prescribed agents, particularly in patients with diabetes, cerebrovascular accidents, and heart failure, reflecting their established benefits in cardiovascular and renal protection. Calcium channel blockers (20%) and thiazide diuretics (13.3%) were commonly used in elderly patients and uncomplicated hypertension, while β-blockers (10%) were selectively prescribed in thyroid disorders and heart failure but were deliberately avoided in bronchiolitis. Fixed-dose combinations were rarely used, highlighting a reliance on monotherapy in most cases. Overall, the findings emphasize that prescribing patterns were largely guided by patient comorbidities and followed rational, guideline-directed practices. However, the limited use of fixed-dose combinations suggests scope

for optimizing therapy to enhance compliance. This study underscores the importance of individualized treatment strategies, early diagnosis, and lifestyle modifications in the long-term management of hypertension to minimize complications and improve patient outcomes.

Limitations and Recommendations

This study was limited by its single-centre setting, relatively small sample size (150 patients), and short duration of six months, which may restrict the generalizability of findings. Exclusion of certain groups, such as patients with autoimmune disorders, pregnant or breastfeeding women, and those recently changing therapy, further narrowed applicability. Future studies should include larger cohorts over extended periods, incorporate diverse populations, and correlate prescribing patterns with clinical outcomes, adherence, and adverse events to provide more robust and comprehensive evidence for rational antihypertensive drug use.

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Nil

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Author Contributions

Musarrath Mubeen designed the study and supervised the work. Gohar Jamali and Bushra Fatima handled patient recruitment and data collection. M. Bindu Bhashini and Samreen Begum performed statistical analysis and interpretation. Azra Namreen and Saniya Naaz contributed to the literature review and drafting. Kaneez Fathima critically revised and approved the final manuscript. All authors approved the final version.

Ethical Statement

The Institutional Ethics Committee approved the study, SVS Medical College and Hospital, Mahabubnagar (IEC/DHR-01/(02/06)/2025/021/6).

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