

Original Research Article

ANALYSIS OF DEMOGRAPHIC PROFILE AND DRUG UTILIZATION PATTERN AMONG HYPERTENSIVE PATIENTS ATTENDING A NON-COMMUNICABLE DISEASE OUTPATIENT DEPARTMENT IN A TERTIARY CARE CENTER

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ABSTRACT

Background: Hypertension is a major public health problem and an important modifiable risk factor for cardiovascular, cerebrovascular, and renal diseases. Drug utilization studies help evaluate prescribing patterns and promote rational use of antihypertensive medications.

Materials and Methods: A cross-sectional study was conducted among 958 hypertensive patients attending the NCD outpatient department from July 2023 to September 2023. Data regarding demographic characteristics, blood pressure parameters, and prescribed medications were collected from outpatient records. Statistical analysis was performed using SPSS 21.0 version, and categorical variables were reported as frequencies and percentages.

Results: The mean age of the study population was 57.1 ± 10.8 years, with most patients in the 51–60-year age group (38.6%). Males constituted 54.6% of participants. Monotherapy was prescribed in 74.2% of patients, whereas combination therapy was used in 25.8%. Amlodipine was the most frequently prescribed antihypertensive drug (90.2%), followed by enalapril (32.0%). Amlodipine monotherapy was the most common regimen (64.8%), while the combination of amlodipine and enalapril accounted for 23.0% of prescriptions. Metformin was the most prescribed antidiabetic medication (26.4%). Patients with a family history of non-communicable diseases had significantly higher mean diastolic blood pressure ($P = 0.007$).

Conclusion: The study demonstrated a predominance of amlodipine-based therapy and greater utilization of monotherapy among hypertensive patients. The prescribing pattern was largely rational and consistent with standard hypertension management practices. These findings provide valuable insight into current antihypertensive drug utilization trends in a tertiary care NCD setting.

Keywords: Hypertension; Drug utilization pattern; Antihypertensive agents; Demographic profile; non-communicable diseases; Tertiary care hospital.

INTRODUCTION

Hypertension is one of the most important public health challenges worldwide and a major modifiable risk factor for cardiovascular disease, stroke, renal disease, and premature mortality.^[1] The prevalence

of hypertension has been steadily increasing because of urbanization, sedentary lifestyle, obesity, dietary changes, and increasing life expectancy. Globally, hypertension contributes significantly to cardiovascular morbidity and mortality and remains a major burden on healthcare systems.^[2]

Drug utilization research is defined as the marketing, distribution, prescription, and use of drugs in society, with special emphasis on the medical, social, and economic consequences. Evaluation of prescribing patterns is essential to ensure rational use of medicines, minimize adverse effects, reduce drug interactions, and improve patient compliance. Antihypertensive medications are frequently prescribed in outpatient departments, and monitoring their utilization pattern is important for evaluating adherence to standard treatment guidelines.^[3]

Several classes of antihypertensive drugs are available for the treatment of hypertension, including calcium channel blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, beta blockers, and diuretics. The selection of therapy depends on age, comorbidities, severity of hypertension, and associated risk factors.^[4]

Understanding the demographic characteristics and prescribing patterns among hypertensive patients helps identify trends in disease burden and therapeutic practices. Therefore, the present study was undertaken to analyze the demographic profile and drug utilization pattern among hypertensive patients attending the Non-Communicable Disease outpatient department in a tertiary care center.

MATERIALS AND METHODS

Study Design and Setting: A cross-sectional study was conducted in the Non-Communicable Disease outpatient department of a tertiary care teaching hospital over a 3-month period, from July 2023 to September 2023.

Study Population: All hypertensive patients attending the outpatient department during the study period who met the inclusion criteria were enrolled.

Sample Size and Sampling Method: According to the study by Krunal C. Solanki et al⁵, 33.2% of patients received monotherapy for hypertension. Based on the above parameters, with a 95% confidence interval and 3% absolute precision, the sample size was estimated at 947. During the study period, a total of 958 hypertensive patients were interviewed and included in the study using convenience sampling.

Inclusion Criteria

1. Patients diagnosed with hypertension attending the Non-Communicable Disease outpatient department.
2. Both newly diagnosed and known hypertensive patients.
3. Patients of all age groups.
4. Patients with associated comorbidities such as diabetes mellitus, chronic obstructive pulmonary disease, and post-stroke status.

Exclusion Criteria

1. Pregnancy-induced hypertension.
2. Hypertension during pregnancy.

Data Collection: After obtaining approval from the Institutional Human Ethics Committee (Ref No. 3019/ME1/2023 Project No. 21/2023), demographic information, including age, gender, occupation, dietary habits, family history of non-communicable diseases, blood pressure measurements, and prescribed medications, was collected from outpatient records. Details regarding antihypertensive drugs, antidiabetic drugs, and other concomitant medications were recorded.

Statistical Analysis: Data were entered and analyzed using the Statistical Package for the Social Sciences software. Continuous variables were expressed as mean \pm standard deviation, whereas categorical variables were expressed as frequency and percentage. Independent-samples t-test and analysis of variance were used to compare blood pressure parameters. A P value of less than 0.05 was considered statistically significant.

RESULTS

A total of 958 hypertensive patients were included in the study. The mean age of the study population was 57.1 ± 10.8 years, with an age range of 26–88 years. Most patients were in the 51–60 years age group (38.6%), followed by the 61–70 years (25.3%) and 41–50 years (20.0%) age groups. Only 0.9% of patients were aged ≤ 30 years. Males accounted for 54.6% of the study population, whereas females accounted for 45.4%. Regarding occupation, coolie workers represented the largest group (49.8%), followed by homemakers (27.2%). Most patients (97.7%) consumed a mixed diet, whereas only 2.3% followed a vegetarian diet. A family history of non-communicable diseases was present in 18.1% of patients. Family history of systemic hypertension in fathers and mothers was reported in 8.1% and 6.4% of participants, respectively. The mean pulse rate among 486 patients was 83.1 ± 7.8 beats/minute. The mean systolic blood pressure was 139.3 ± 19.8 mmHg, and the mean diastolic blood pressure was 85.3 ± 12.0 mmHg [Table 1].

Drug Utilization Pattern: Among the 958 hypertensive patients studied, monotherapy was the predominant treatment approach, prescribed in 711 patients (74.2%), while combination therapy was used in 247 patients (25.8%). This indicates that most patients achieved blood pressure control with a single antihypertensive agent, whereas combination therapy was reserved for patients requiring intensified treatment, possibly due to uncontrolled hypertension, associated comorbidities, or resistant disease [Table 2].

Amlodipine was the most frequently prescribed antihypertensive medication and was prescribed to 90.2% of patients. Enalapril was prescribed in 32.0% of patients. Other antihypertensive medications included telmisartan (1.7%), atenolol

(1.1%), furosemide (0.5%), spironolactone (0.3%), and propranolol (0.2%) [Table 2].

Drug-wise analysis showed that amlodipine alone was the most prescribed regimen, accounting for 621 prescriptions (64.8%), suggesting that calcium channel blockers formed the foundation of antihypertensive management in the study population. The second most common regimen was the combination of amlodipine and enalapril, prescribed to 220 patients (23.0%), indicating the frequent use of dual therapy with a calcium channel blocker and an angiotensin-converting enzyme inhibitor to improve blood pressure control [Table 2].

Enalapril alone was prescribed in 78 patients (8.1%), whereas other regimens, such as amlodipine with telmisartan (0.9%), telmisartan alone (0.6%), amlodipine with atenolol (0.4%), and atenolol alone (0.3%), were used less frequently. Diuretic-containing combinations such as amlodipine with Lasix and triple-drug regimens were rarely prescribed, indicating limited use of aggressive multidrug therapy in this population [Table 2].

Overall, the prescribing pattern shows a strong preference for amlodipine-based therapy, either as monotherapy or in combination, highlighting adherence to commonly recommended antihypertensive practices that favor calcium channel blockers as first-line agents.

Among antidiabetic drugs, metformin was the most prescribed medication (26.4%), followed by glimepiride (8.0%). Among concomitant medications, atorvastatin was prescribed to 7.8% of patients, aspirin to 5.7%, and clopidogrel to 3.5% [Table 3].

No statistically significant difference in systolic blood pressure or diastolic blood pressure was observed between male and female patients. Similarly, no statistically significant association was found between age groups and blood pressure values. Dietary habits also did not show statistically significant differences in blood pressure parameters. However, patients with a family history of non-communicable diseases had a significantly higher mean diastolic blood pressure than those without a family history (87.6 ± 13.2 mmHg vs. 84.8 ± 11.6 mmHg; $P = 0.007$) [Table 4].

Table 1: Socio-demographic and Clinical Characteristics of Study Participants (N = 958)

Variable	Category	n (%) / Mean \pm SD
Age group (years)	≤ 30	9 (0.9)
	31–40	61 (6.4)
	41–50	192 (20.0)
	51–60	370 (38.6)
	61–70	242 (25.3)
	71–80	70 (7.3)
	> 80	14 (1.5)
Age (years)	Mean \pm SD (Range)	57.1 ± 10.8 (26–88)
Gender	Male	523 (54.6)
	Female	435 (45.4)
Occupation	Coolie	477 (49.8)
	Homemaker	261 (27.2)
	Tailor	68 (7.1)
	Company worker	64 (6.7)
	Others*	88 (9.2)
	Diet	Vegetarian
	Mixed diet	936 (97.7)
Family history of NCD	Present	173 (18.1)
	Absent	785 (81.9)
Family members having Hypertension	Father	78 (8.1)
	Mother	61 (6.4)
Pulse rate (beats/min)	Mean \pm SD	83.1 ± 7.8
SBP (mmHg)	Mean \pm SD	139.3 ± 19.8
DBP (mmHg)	Mean \pm SD	85.3 ± 12.0

*Includes farmer, driver, business, security, unemployed, electrician, mechanic, carpenter, and other less frequent occupations.

Table 2: Pattern of Antihypertensive Drug Utilization among Study Participants (N = 958)

Variable	Category	n (%)
Antihypertensive drugs prescribed	Amlodipine	864 (90.2)
	Enalapril	307 (32.0)
	Telmisartan	16 (1.7)
	Atenolol	11 (1.1)
	Lasix	5 (0.5)
	Metoclopramide	4 (0.4)
	Spironolactone	3 (0.3)
	Propranolol	2 (0.2)
Therapy pattern	Monotherapy	711 (74.2)
	Combination therapy	247 (25.8)
Drug combination pattern	Amlodipine alone	621 (64.8)

	Amlodipine + Enalapril	220 (23.0)
	Enalapril alone	78 (8.1)
	Amlodipine + Telmisartan	9 (0.9)
	Telmisartan alone	6 (0.6)
	Amlodipine + Atenolol	4 (0.4)
	Atenolol alone	3 (0.3)
	Amlodipine + Lasix	3 (0.3)
	Amlodipine + Enalapril + Lasix	2 (0.2)
	Metoclopramide alone	2 (0.2)
	Amlodipine + Enalapril + Atenolol	2 (0.2)
	Other rare combinations*	8 (0.8)

*Includes infrequently prescribed antihypertensive combinations with frequencies <0.2%.

Table 3: Concomitant Drug Utilization among Study Participants (N = 958)

Drug category	Drug	n (%)
Anti-diabetic drugs	Metformin	253 (26.4)
	Glimepiride	77 (8.0)
	Gliptins	1 (0.1)
Other drugs	Atorvastatin	75 (7.8)
	Aspirin	55 (5.7)
	Clopidogrel	34 (3.5)

Table 4: Association of Blood Pressure with Selected Variables among Study Participants

Variable	Category	SBP Mean ± SD	p value	DBP Mean ± SD	p value
Gender	Male	138.9 ± 19.2	0.486	85.6 ± 11.4	0.515
	Female	139.7 ± 20.5		85.1 ± 12.7	
Diet	Vegetarian	135.0 ± 13.0	0.307	81.8 ± 10.1	0.164
	Mixed diet	139.4 ± 19.9		85.4 ± 12.0	
Family history of NCD	Present	140.9 ± 19.4	0.221	87.6 ± 13.2	0.007*
	Absent	138.9 ± 19.9		84.8 ± 11.6	

*Statistically significant at p < 0.05.

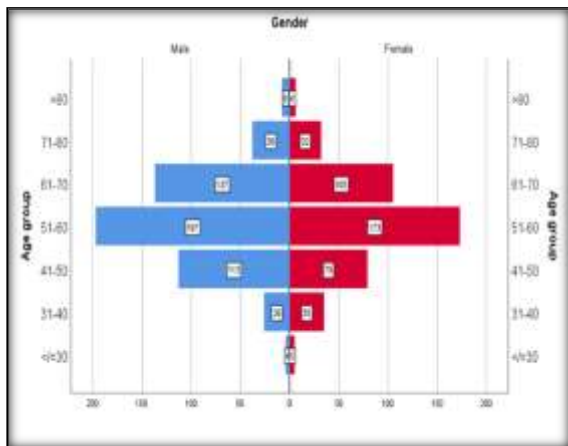


Figure 1: Age-Sex Distribution of the study population

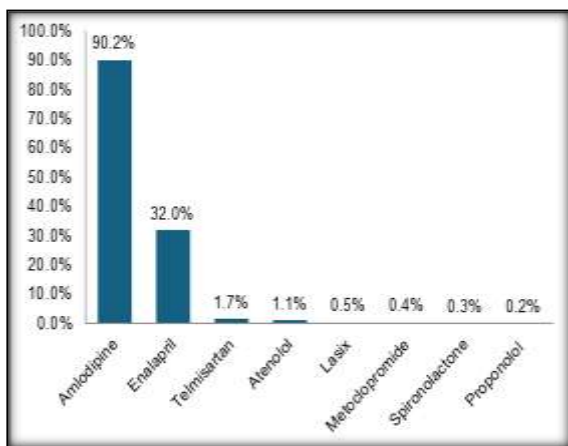


Figure 1: Drug utilization pattern among the study population

DISCUSSION

The present study evaluated the demographic characteristics and drug utilization patterns among hypertensive patients attending the NCD outpatient department of a tertiary care center. The mean age of the study population was 57.1 ± 10.8 years, and most patients were in the 51–60-year age group. Similar age distribution has been reported in several Indian drug utilization studies, where middle-aged and elderly individuals constituted the predominant hypertensive population. Krunal et al,^[5] reported that 33.5% of hypertensive patients were in the 51–60 years age group, while Varghese et al,^[6] observed that 40.17% were in the same age group. The increasing prevalence of hypertension with advancing age may be attributed to vascular aging, increased arterial stiffness, endothelial dysfunction, and cumulative exposure to cardiovascular risk factors. The global burden of hypertension among elderly populations has also been emphasized by Mills et al,^[1] who identified hypertension as one of the leading contributors to cardiovascular morbidity and death worldwide.

In the present study, males constituted 54.6% of the study population. Similar male predominance was reported by Anuradha et al,^[7] where males accounted for 56.2% of hypertensive patients, and by Mirza et al., who observed a male-to-female ratio of 1.2:1. This gender difference may be related to daily habits, occupational stress, smoking, alcohol consumption, and greater healthcare-seeking behavior among men. However, no statistically

significant difference in systolic or diastolic blood pressure was observed between males and females in the present study, suggesting comparable disease severity across genders.

Most patients in the present study belonged to lower socioeconomic occupational groups, particularly coolie workers. Socioeconomic status is an important determinant of hypertension because unhealthy diet, physical inactivity, psychosocial stress, and restricted access to healthcare are more prevalent among economically disadvantaged populations. The predominance of mixed dietary habits observed in the present study is consistent with dietary patterns commonly seen in South Indian populations. However, dietary habits were not significantly associated with blood pressure parameters, possibly due to the limited number of vegetarian participants.

A significant finding of the present study was the higher mean diastolic blood pressure among patients with a family history of non-communicable diseases. Family history is a well-established risk factor for hypertension and reflects the combined influence of genetic susceptibility and shared environmental exposures.

In the present study, monotherapy was prescribed to 74.2% of patients, whereas combination therapy was prescribed to 25.8%. This finding differs from several earlier Indian studies, in which combination therapy predominated. Anuradha et al,^[7] reported that most patients received combination therapy, with double-drug regimens being the most common. Similarly, Pathapati et al,^[9] observed that only 34.2% of patients received monotherapy, while 43.6% received two-drug combinations. Sharma et al,^[10] also reported a higher use of combination therapy (67.97%) than monotherapy. The higher prevalence of monotherapy in the present study may indicate adequate blood pressure control with single agents, earlier stages of hypertension, or physician preference for gradual stepwise escalation of therapy. Amlodipine was the most frequently prescribed antihypertensive drug in the present study and was prescribed in 90.2% of patients. Amlodipine monotherapy solely accounted for 64.8% of all prescriptions. Similar findings were reported by Anuradha et al,^[7] who found calcium channel blockers to be the most prescribed antihypertensive class and amlodipine to be the most frequently used individual drug. Varghese et al,^[6] also observed that calcium channel blockers were utilized in 50.84% of patients. Altaf et al,^[11] reported amlodipine as the most prescribed antihypertensive agent among geriatric patients. The preference for amlodipine may be attributed to its efficacy, once-daily dosing, affordability, favorable safety profile, and effectiveness in elderly and salt-sensitive hypertensive patients. The combination of amlodipine and enalapril was the second most common regimen in the present study (23.0%). Combination therapy involving calcium channel blockers and ACE inhibitors is considered rational

because the two classes have complementary mechanisms of action and improved tolerability. Similar observations were made by Mohammad Arief et al,^[12] who reported ACE inhibitor-calcium channel blocker combinations as the most frequently prescribed dual-therapy regimen. Combination therapy is often recommended in patients with uncontrolled hypertension, high baseline blood pressure, or associated comorbidities.

Enalapril was the second-most-prescribed antihypertensive agent in the present study. In contrast, several earlier studies demonstrated greater utilization of ACE inhibitors than calcium channel blockers. Jainaf Nachiya et al,^[13] reported ACE inhibitors as the most frequently prescribed antihypertensive class, accounting for 45.21% of prescriptions. Krunal et al,^[5] similarly identified enalapril as the most prescribed antihypertensive drug. Differences in prescribing patterns throughout studies may be due to variations in institutional protocols, physician preferences, medication availability, patient comorbidities, and evolving treatment guidelines.

The present study showed relatively lower utilization of beta-blockers, angiotensin receptor blockers, and diuretics. Similar trends have been observed in some Indian tertiary care studies where these agents were mainly reserved for patients with compelling indications such as ischemic heart disease, chronic kidney disease, heart failure, or resistant hypertension. Limited use of aggressive multidrug therapy and triple-drug regimens in the present study suggests that most patients had reasonably controlled hypertension. Metformin was the most prescribed antidiabetic drug among hypertensive patients with diabetes mellitus. This observation is consistent with current diabetes management guidelines, which recommend metformin as first-line therapy for its efficacy, safety profile, and cardiovascular benefits. The concomitant use of atorvastatin, aspirin, and clopidogrel in some patients indicates the coexistence of cardiovascular risk factors and reflects comprehensive cardiovascular risk-reduction strategies. Overall, the prescribing pattern identified in the present study appears rational and largely consistent with contemporary hypertension management guidelines. The predominant use of amlodipine-based therapy, selective use of combination regimens, and limited use of multidrug therapy reflect evidence-based prescribing practices in a tertiary care NCD setting. The findings of this study afford valuable insight into current antihypertensive prescribing trends and may help improve rational drug utilization and optimize blood pressure control among hypertensive patients.

CONCLUSION

The study showed that amlodipine-based monotherapy was the most prescribed

antihypertensive regimen, whereas combination therapy was used in patients requiring more intensive blood pressure control. Overall, prescribing patterns were rational and largely consistent with standard hypertension management guidelines. Regular drug utilization evaluations, adherence to evidence-based treatment protocols, patient counseling on lifestyle modifications, and periodic monitoring of blood pressure control may further improve treatment outcomes and promote the rational use of antihypertensive medications in tertiary care settings.

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