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EVALUATION OF ANTIHYPERTENSIVE DRUG PRESCRIPTION PATTERNS AT A TERTIARY CARE HOSPITAL, BANGALORE

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ABSTRACT

Background: Irrational prescribing of drugs is strongly linked with poor control of hypertension. The present study was conducted with an objective to audit the pattern of prescribing of antihypertensive drugs at and asses the comorbidities among the hypertensive patients at Apollo Hospitals, Bangalore. **Method:** A hospital based prospective cross-sectional study was conducted for a period of 6 months. Patients diagnosed with HTN with or without co-morbidities and prescribed with antihypertensive drugs, above 18 years of age of both genders were included in the study. A well-designed data collection form was used to collect the necessary information which was later analysed. **Results:** Study included 115 patients A total of 115 patients were included in the study which consisted of 82(71.30%) male subjects and 33 (28.70%) of female patients. Majority of the patients 73 (63.47%) were aged above 60 years. The most common co-morbidity was Diabetes mellitus, 69 (37.50 %) followed by ischemic heart disease, 49 (26.63%). Single-drug prescriptions were found to be common 50 (43.48%). Calcium channel blockers and β-blockers were the most commonly prescribed group with frequency 63 (54.78%) and 50 (40.87%) respectively. In two drug combination therapy study shows that ARB + β-Blockers (13.04%) were the most commonly prescribed drug. In three drug combination therapy study shows that ARB + Diuretics + β-blockers (2.61%) were the most commonly prescribed drugs. In four drug combination therapy study shows that ARB + CCB + β-blockers + Diuretics (1.74%) were the most commonly prescribed drugs. **Conclusion:** The use of antihypertensive drugs largely follows the

international guidelines but there still exits a room for improvement in terms of rational drug utilization which demands the clinicians to be vigilant in adjusting the frequency of dosing. Further research on larger sample size and longer study period is necessary to provide more robust epidemiology and drug utilisation data.

KEYWORDS: Hypertension, Antihypertensives, Prescribing patterns, Rational Drug Use

INTRODUCTION

Hypertension is defined as 'systolic blood pressure (SBP) of 140 mm Hg or greater, diastolic blood pressure (DBP) of 90 mm Hg or greater, or taking a medication for hypertension.[1]

Globally, an estimated 26% of the world's population (972 million people) has hypertension, and the prevalence is expected to increase to 29% (1.56 billion adults) by 2025, driven largely by increases in economically developing nations.[2] It is one of the commonest Non-Communicable Disease, and a major public health concern accounting for 19% of all NCD deaths globally.[3] In South Asia, HTN is estimated to be the third leading cause of death and disability, after household air pollution and tobacco smoking.[4] Hence, HTN exerts a substantial public health burden on cardiovascular health status and healthcare systems in India. Blood pressure control is essential to prevent end-organ complications, such as stroke, myocardial infarction, heart failure, or kidney disease.[5]

Hypertension in most patients is the result of unknown pathophysiological etiology (essential or primary hypertension). Though it does not have a complete cure, this form of hypertension but it can be managed to be within the normal limits. A small percentage of patients have a particular cause of their high blood pressure (secondary hypertension). There are many potential side causes that are either concurrent medical conditions or are induced endogenously. Hypertension in these patients can be mitigated or potentially cured if the cause can be identified.[6]

Table 1: Different Stages of high blood pressure in adults (Age ≥ 18 Years).[7]

Sl. No.	Blood pressure category	Systolic (mm/hg)		Diastolic (mm/hg)
1.	Normal	<120	And	<80
2.	Pre-hypertension	120-139	Or	80-89
3.	Hypertension			
	Stage 1	40-159	Or	90-99
	Stage 2	>160	Or	>100

Effective management of hypertension has been shown to reduce the risk of stroke, coronary heart disease, congestive cardiac failure, and overall mortality. Hence, the treatment of HTN should be directed towards achieving BP control by adhering to the recommended guidelines in order to reduce hypertension-related morbidity, mortality, and healthcare expenditure. Prescription pattern monitoring studies (PPMS) are studies of drug utilization with a focus on prescribing, distributing and administering drugs. Auditing antihypertensive prescription patterns and assessing individuals with hypertension for blood pressure (BP) control can play key roles in the efforts to mitigate the burden of hypertension.[8,9]

Keeping in view, the present study was conducted with an objective toaudit the pattern of prescribing of antihypertensive drugs at and asses the comorbidities among the hypertensive patients at Apollo Hospitals, Bangalore.

MATERIALS AND METHODS

The present study is a prospective cross- sectional observational study. It was carried out after obtaining the approval of Institutional Ethics Committee - Clinical Studies (IEC-CS) of Apollo Hospitals, Bangalore over a period of 6 months. Inclusion criteria were as follows: Inpatients diagnosed with HTN with or without co-morbidities and prescribed with antihypertensive drugs, above 18 years of age of both genders. Patients with acute heart failure, cardiomyopathy, or valvular heart disease or those who did not provide consent to participate in the study were excluded.

Data collection

Patients were interviewed with guidance of a well-designed data collection form to obtain following information: age, gender, educational status, duration of hypertension, and history of diabetes mellitus (if any). Information about antihypertensive medication, including specific drugs and doses, were obtained from the clinic's patient files.

Data analysis

The results were analysed using Excel 2019 and are expressed as descriptive statistics in the form of numbers and percentages.

RESULTS

A total of 115 patients were included in the study which consisted of 82(71.30%) male subjects and 33 (28.70%) of female patients. Majority of the patients 73 (63.47%) were aged above 60 years.

Out of 115 patients, co-morbidity was found in 107 patients and most of patients had more than one co-morbidity. The most common one being Diabetes mellitus, 69 (37.50 %) followed by ischemic heart disease, 49 (26.63%) and others shown in Table 2.

Table 2: Comorbidities of the patients.

Comorbidity	Number of Patients	Percentage (%)
Diabetes mellitus	69	37.50
Ischemic heart disease	49	26.63
Chronic kidney disease	20	10.87
Hypothyroidism	14	7.61
Angina	13	7.07
Asthma	4	2.17
Chronic Obstructive Pulmonary Disease (COPD)	4	2.17
Lower Respiratory Tract Infection (LRTI)	4	2.17
Dyslipidemia	3	1.63
Ischemic stroke	2	1.09
Hypoglycemia	2	1.09
Bronchietasis	1	0.54

Calcium channel blockers and β-blockers were the most commonly prescribed group with frequency 63 (54.78%) and 50 (40.87%) respectively, the next common group in the order was Diuretics – 42 (36.52%), angiotensin receptor blockers-36 (31.30%), angiotensin converting enzyme inhibitors – 6 (5.22%), central sympatholytics – 11 (9.57%), α-blocker- 7 (6.09 %), mixed α & β – blockers- 6 (5.22%) and vasodilator were 1 (0.87%) prescribed as shown in Figure 1.

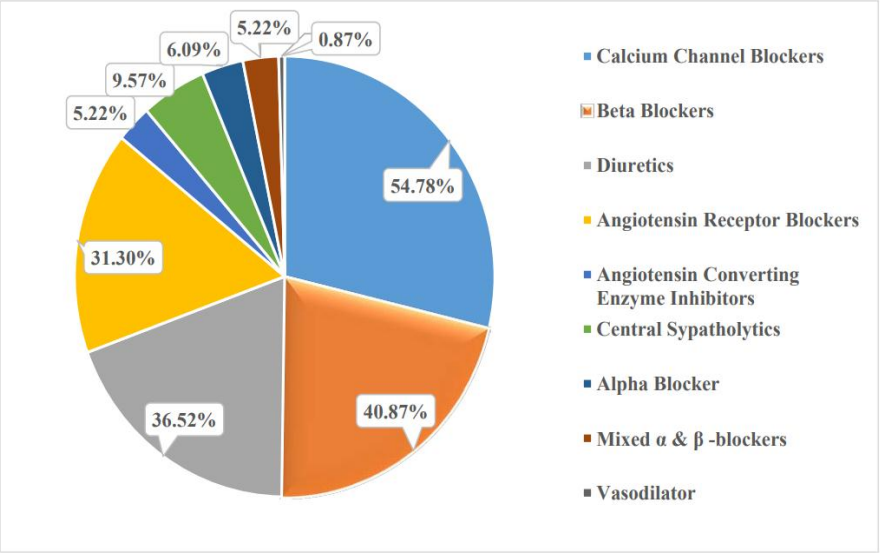

Figure 1: Frequency of antihypertensives prescribed.

The numbers of combinational drugs which were prescribed are shown in Figure 2.

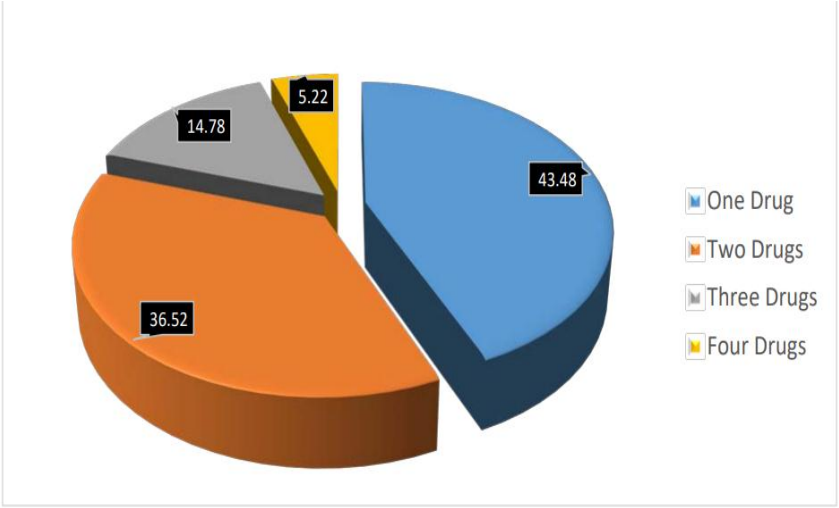

Figure 2: Number of drugs per prescription (%).

Our study shows that CCB were the most commonly prescribed drug under monotherapy (25.22%) followed by β-Blockers (8.70%), diuretics (5.22%) and ARB (4.35%) respectively. In two drug combination therapy study shows that ARB + β-Blockers (13.04%) were the most commonly prescribed drug followed by CCB + β-Blockers (5.22%), ARB + Diuretics (3.48%), CCB + ARB (3.48%), CCB + Diuretics (2.61%), CCB + α-blockers (1.74%), CCB + Central Sympatholytics (1.74%), Diuretics + β-blockers (1.74 %), ACEI + β-blockers (1.74%), ACEI+ Diuretics (0.87%), CCB + ACEI (0.87%) respectively.

In three drug combination therapy study shows that ARB + Diuretics + β-blockers (2.61%) were the most commonly prescribed drugs followed by CCB + Diuretics+β-blockers, CCB+ Central Sympatholytics + β-blockers, α-blockers+ β-blockers + Central Sympatholytics with 1.74% and remaining combination drugs were 0.87% respectively.

In four drug combination therapy study shows that ARB + CCB + β-blockers + Diuretics (1.74%) were the most commonly prescribed drugs and remaining combination drugs were 0.87% respectively.

DISCUSSION

The results of our study suggest that out of the total 115 hypertensive patients included in the study, 82 (71%) were male while 33 (28%) were female, indicating the more prevalence of hypertension in male than in female population. The above pattern was similar to studies conducted by Malpani et al., 2018[10] Krishna Murti et al., 2015[11] in India had reported a higher prevalence of hypertension in males than in females. However, the above pattern was anomalous to studies conducted by Tiwari et al., 2004[12] in India, Etuk E. et al., 2008[13] in Nigeria had reported a higher prevalence of hypertension in females than in males.

The highest number of male hypertensive patients -54 (46.96%) belonged to the age group of greater than 60 years while the highest number of female hypertensive patients -19 (16.52%) also belonged to the same age group greater than 60 years. Whereas male hypertensive patients belonged to the age group of less than 40 years were 5 (4.34%) and 40-60 years were 23 (20%) with the highest number than the female hypertensive patients belonged to the age group of less than 40 years were 2 (1.74%) and 40-60 years were 12 (10.43%).

In our study, most patients had multimorbidity or multiple comorbidities i.e., mostly diabetes mellitus along with ischemic heart disease. The most common co-morbidity was diabetes mellitus-37.50% followed by ischemic heart disease 26.63% then by chronic kidney disease10.87%, hypothyroidism-7.61%, angina-7.07%. Whereas asthma, chronic obstructive pulmonary disease, lower respiratory tract infection was 2.17%, dyslipidemia-1.63%, ischemic stroke & hypoglycemia were 1.09% and bronchiectasis was 0.54%.

Monotherapy and combination therapy were used at rates of 43.48% and 56.52%, respectively. Out of 56.52% of combination therapy, 36.52% of patients were on two-drug therapy, 14.75% of patients on three-drug therapy, and 5.22% on four-drug therapy. Among

the monotherapy category, the various hypertensive classes prescribed were CCB's (54.78%) followed by βBlockers (8.70%), diuretics (5.22%), and ARB (4.35%) respectively which revealed that calcium channel blockers were the drugs of choice for hypertensive patients as mono drug therapy. As a monotherapy, amlodipine was the most frequently prescribed drug followed by metoprolol. In two-drug combinations, β-blocker with ARB were most often prescribed (13.04%, Table 7) while the most frequently prescribed 3 drugs regimen was found to be combination therapy of ARB + Diuretics + β-blocker (2.61%) whereas the most frequently prescribed 4 drugs regimen was found to be combination therapy of ARB + CCB + β-blockers + Diuretics (1.74%) . In the overall prescription pattern of antihypertensive drugs, calcium channel blockers (54.78%) were the most frequently prescribed class of drugs followed by β-Blockers (40.87%), diuretics (36.52 %), angiotensin receptor blockers (31.30 %), angiotensin-converting enzyme inhibitors (5.22%), central sympatholytic (9.57%), α-blocker (6.09 %), mixed α & β - blockers (5.22%), a vasodilator (0.87%).

Other studies conducted in different states of India, namely, Maharashtra,[14] Punjab,[12] and U.P[15] also witnessed CCB as the highly prescribed drug followed by β-Blockers and in the study conducted in Karnataka[16] and Jammu[17] also witnessed CCB as the highly prescribed drug followed by ACEI. In contrast to the highly prescribed CCB, a study conducted in Telangana[18] have found the use of ACEI majorly, followed by CCB and study conducted in Bangladesh[19] have found CCB to be least prescribed whereas β-Blockers was most preferred in this area and the studies from Nigeria[13] and Bihar[11] have shown maximum use of Diuretics.

CONCLUSION

We identified the prescribing patterns of antihypertensive drugs at a tertiary care hospital in Bangalore over a 6 month period. Angiotensin Receptor Blocker (telmisartan) and β-blocker (Metoprolol) was the drug of choice for treatment of hypertensive patients as a combination therapy whereas calcium channel blockers (amlodipine) were the drug of choice for treatment of hypertensive patients as a mono therapy. The use of antihypertensive drugs largely follows the international guidelines but there still exits a room for improvement in terms of rational drug utilization which demands the clinicians to be vigilant in adjusting the frequency of dosing. Further research on larger sample size and longer study period is necessary to provide more robust epidemiology and drug utilisation data.

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