

Prospective study on prescribing pattern of antihypertensive drugs at a tertiary care hospital

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ABSTRACT

Background: Hypertension is the leading non-communicable disease risk attributing to cardio vascular morbidity and mortality. Various reasons are socio-economic, behavioural, sedentary life style, nutritional, age, obesity and poor health maintenance. A wide range of antihypertensive drugs belonging to different pharmacological classes are available alone or in combinations. Present study was done to evaluate the prescribing pattern of antihypertensive drugs at a tertiary care hospital.

Methods: A prospective, observational, non-interventional, hospital-based study was carried out in hypertensive patients attending outpatient department of General Medicine at Medical College Hospital attached to Vijayanagar Institute of Medical Sciences, Ballari. Data was collected from outpatient slip of patients in a predesigned case record form, which was analysed using descriptive statistics.

Results: Among 200 patients analysed 95 (47.5%) were males and 105 (52.5%) were females, with maximum number of patients falling in the age group 61-70years. Among antihypertensives prescribed, amlodipine (78.5%) was most frequently prescribed drug. Frequently used drugs for monotherapy - amlodipine (37.5%), for two drug therapy - amlodipine + atenolol (25.5%), and for three drug therapy - amlodipine + atenolol + telmisartan (2.5%). WHO prescribing indicators: Average number of drugs per encounter is 2.38 (± 1.19). Percentage of drugs prescribed by generic name is 76.47%. Percentage of drugs prescribed from essential drug list is 97.89%.

Conclusions: Present study shows current trends in prescription of antihypertensives in tertiary care hospital and their rational use. Study emphasizes need for preventive and educative measures about hypertension in population.

Keywords: Antihypertensives, Drug utilization, Hypertension, Prescription pattern

INTRODUCTION

Hypertension is defined as elevated systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg. Hypertension is the leading non-communicable disease risk attributing to cardio vascular morbidity and mortality. The overall prevalence of hypertension in India is estimated to be 29.8%, about 33% urban and 25% rural Indians are hypertensive.¹ It is reported to be the fourth contributor to premature death in developed countries and the seventh in developing countries.²

The various reasons for hypertension are socio-economic, behavioural, sedentary life style, nutritional, age, obesity and poor health maintenance.

Poor controlling of hypertension leads to further progression of cardiovascular complications like ischemic heart disease, heart failure, stroke, diabetes and chronic renal insufficiency.³ This situation is graver in our country since with modernization, we are trading healthy traditional diets for fatty foods; physical jobs for desk bound once and calm rural life for stressful city life.⁴

A wide range of antihypertensive drugs belonging to different pharmacological classes are available alone or in combinations. Choice of drugs for a particular patient depends on factors like efficacy, side effects and effects on other systems, cost and development of newer drugs.⁵ In addition to drug therapy, treatment of hypertension also includes lifestyle modifications like weight reduction, quitting smoking, eating healthy diet, reducing sodium intake, exercising regularly, and limiting alcohol consumption.

Drug utilization research was defined by WHO in 1977 as “the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences”.⁶ Drug utilization research provides an insight into the drug use pattern and rational use of a drug. The study of prescribing pattern is a part of the medical audit and seeks to monitor, evaluate and if necessary, suggest modification in prescribing practices to make medical care rational and cost effective.⁷

Various international committees have published guidelines on the treatment of hypertension. The JNC 7 (Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure) recommends the use thiazides type diuretics as the first choice when used alone or in combination with drugs from other classes of anti-hypertensive in uncomplicated essential hypertension. For >20/10mm Hg above goal BP, combination of two agents is recommended with one of them is usually being thiazides diuretic.⁸ But in recent JNC 8 guidelines it do not consider diuretics as the first choice, rather, considers first-line and later-line treatments to be limited to 4 classes of medications: thiazides type diuretics, calcium channel blockers (CCBs), angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) followed by second-line and third-line alternatives included higher doses or combinations of ACE inhibitors, ARBs, thiazides-type diuretics and CCBs.⁹

The National Institute for Health and Clinical Excellence (NICE) guideline recommend angiotensin converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) as first choice antihypertensive drug under 55 years, whereas calcium channel blockers (CCBs) are preferred first choice over 55 years.¹⁰

With the increasing prevalence of hypertension, there is an increase in the use of antihypertensive drugs, which can improve the quality of life and decrease the attributed morbidity and mortality. Thus, appropriate use of antihypertensive drugs, in an efficient manner is an utmost requirement. Further there is also a requirement for educating the people about hypertension and the consequences of its inadequate management, and also for implementing strategies for prevention as well.¹¹ Hence; the present study was done to evaluate the prescribing pattern of antihypertensive drugs at a tertiary care hospital.

METHODS

This prospective, observational, non-interventional, hospital-based study was carried out for the period of three months from June 2018 to August 2018 in hypertensive patients attending outpatient department (OPD) of General Medicine at Medical College Hospital (MCH) attached to Vijayanagar Institute of Medical Sciences (VIMS), Ballari, Karnataka. This study was started after obtaining approval from the Institutional Ethics Committee.

Inclusion criteria

- Aged 18 years and above, of either sex, diagnosed with hypertension
- Patient with co-morbidities
- Patients who gave informed consent.

Exclusion criteria

- Pregnant females
- Unconscious patients
- Patients who were not willing to give informed consent.

After taking an informed consent from the patients, data was collected from the outpatient slips of these patients in a predesigned case record form. The case record form included demographic data like age, sex, education, disease data like diagnosis, duration, co-morbidities and drug data included the drugs prescribed both antihypertensives and non-antihypertensives. The data collected was assessed and WHO prescribing indicators were analysed.

Statistical analysis

Data was analysed using descriptive statistics namely total numbers, average, standard deviation and percentage wherever applicable.

RESULTS

Age and sex distribution

A total of 200 hypertensive patients were included in present study. Among them 95 (47.5%) were males and 105 (52.5%) were females.

Maximum numbers of patients were in the age group of 61-70years which were 55 (27.5%), followed by 51-60years which were 48 (24%). Table 1 show the age and sex distribution of the patients.

Antihypertensive drugs prescribed

The antihypertensive drugs prescribed, and their frequency was analysed, among them amlodipine was the most commonly prescribed drug with a frequency of 157

(78.5%), followed by atenolol with a frequency of 67 (33.5%) and enalapril with a frequency of 27 (13.5%), and clinidipine was the least commonly prescribed antihypertensive with a frequency of 2 (1%) (Table 2).

Table 1: Age and sex distribution of patients.

Gender	No. of patients (%)
Male	95 (47.5%)
Female	105 (52.5%)
Total	200
Age (years)	No. of patients (%)
18-30	5 (2.5%)
31-40	23 (11.5%)
41-50	41 (20.5%)
51-60	48 (24%)
61-70	55 (27.5%)
71-80	20 (10%)
81-90	8 (4%)
Total	200

Table 2: List of antihypertensive drugs prescribed.

Drugs	No. of encounters	%age of encounters
Calcium channel blockers (CCBs)		
Amlodipine	157	78.5
Nifedipine	7	3.5
Clinidipine	2	1
Beta blockers (BBs)		
Atenolol	67	33.5
Metoprolol	14	7
Labetalol	4	2
ACE inhibitors (ACEIs)		
Enalapril	27	13.5
Angiotensin receptor blockers (ARBs)		
Telmisartan	23	11.5

Table 3: Antihypertensive drug therapy among patients.

Therapy	No. of patients	%age of patients	Most commonly used drugs
Single drug therapy	113	56.5	Amlodipine (37.5% of patients)
Two drug therapy	73	36.5	Amlodipine + Atenolol (25.5% of patients)
Three drug therapy	14	7	Amlodipine + Atenolol + Telmisartan (2.5% of patients)

The number of patients who were on single drug therapy, two drug therapy and three drug therapy for treatment of hypertension were noted, which shows that, out of 200

patients, 113 patients (56.5%) were on single drug therapy, 73 patients (36.5%) were on two drug combination therapy and 14 patients (7%) were on three drug combination therapy (Table 3).

Table 4: Utilization pattern of different antihypertensive drugs.

Therapy	No. of patients	Percentage of patients (%)
Single drug therapy		
Amlodipine	75	37.5
Nifedipine	4	2
Atenolol	11	5.5
Metoprolol	6	3
Enalapril	11	5.5
Telmisartan	6	3
Two drug therapy		
Amlodipine + atenolol	51	25.5
Amlodipine + enalapril	11	5.5
Amlodipine + Telmisartan	6	3
Amlodipine + Metoprolol	3	1.5
Enalapril + clinidipine	2	1
Three drug therapy		
Amlodipine + atenolol + telmisartan	5	2.5
Amlodipine + telmisartan + labetalol	4	2
Metoprolol + enalapril + nifedipine	3	1.5
Amlodipine + telmisartan + metoprolol	2	1

The utilization pattern of different antihypertensive drugs was assessed, among them; the frequently used drug for single drug therapy is amlodipine accounting for 37.5%, followed by atenolol and enalapril with a frequency of 5.5% each, the frequently prescribed drugs for two drug therapy are amlodipine + atenolol which counts to 25.5%, followed by amlodipine + enalapril a frequency of 5.5%, and frequently used drugs for three drug therapy are amlodipine + atenolol + telmisartan with a frequency of 2.5%, followed by amlodipine + telmisartan + labetalol accounting for 2% (Table 4).

Co-morbidities in hypertensive patients

The co-morbidities seen in hypertensive patients and their frequency are presented in Table 5.

Fifty five (27.5%) of patients were having diabetes mellitus along with hypertension, which is followed by patients with ischemic heart disease which counts to 19 (9.5%) and cerebrovascular accidents with frequency of 14 (7%). 92 (46%) hypertensive patients had no co-morbidities.

Table 5: Co-morbidities in hypertensive patients.

Co-morbidity	No. of patients	Percentage of patients (%)
No co-morbidities	92	46
Diabetes mellitus	55	27.5
Cerebrovascular accidents	14	7
Ischemic heart disease	19	9.5
Chronic kidney disease	10	5
Chronic obstructive pulmonary disease	6	3
Epilepsy	4	2

Non-antihypertensive drugs prescribed

The non-antihypertensive drugs that were prescribed along with antihypertensives are listed in Table 6. They are antidiabetic drugs like metformin, glimepiride, insulin, antiplatelet drugs like aspirin, clopidogrel, and diuretic furosemide, multivitamins, phenytoin, isosorbide dinitrate, ranitidine and others.

Table 6: List of non-antihypertensive drugs prescribed.

Drugs	No. of encounters	Percentage of encounters (%)
Aspirin	36	18
Atorvastatin	23	11.5
Metformin	30	15
Glimepiride	17	8.5
Insulin	5	2.5
Furosemide	19	9.5
Clopidogrel	9	4.5
Isosorbide dinitrate	9	4.5
Ranitidine	3	1.5
Multivitamins	9	4.5
Phenytoin	5	2.5
Phenobarbitone	2	1
Miscellaneous	8	4

WHO prescribing indicators

The WHO prescribing indicators analysed from the data are:

- Average number of drugs per encounter = 2.38 (±1.19)
- Percentage of drugs prescribed by generic name = 76.47%
- Percentage of drugs prescribed from essential drugs list (EDL) = 97.89%
- Percentage of encounters with an injection prescribed = 4.62%

A total of 476 drugs were prescribed that includes both antihypertensives and non-antihypertensives. Out of this,

364 (76.47%) drugs were prescribed by generic name and the remaining 112 (23.53%) drugs by brand name (Figure 1). And 466 (97.89%) drugs were prescribed from essential drugs list (EDL) and the remaining 10 (2.11%) drugs were not in EDL (Figure 2).

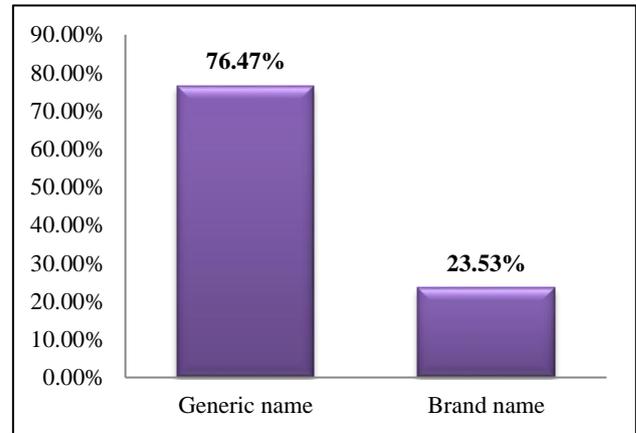


Figure 1: Drugs prescribed by generic name.

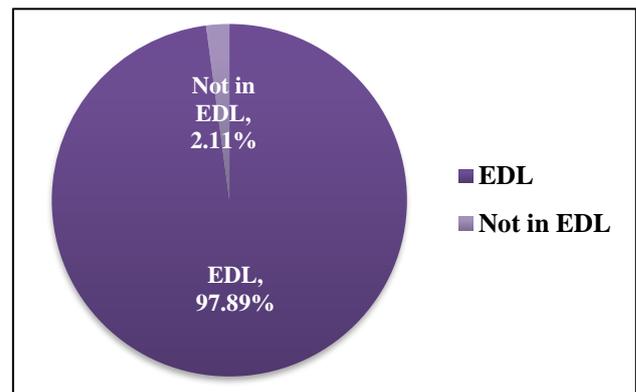


Figure 2: Drugs prescribed from essential drugs list (EDL).

DISCUSSION

The present study was carried out in hypertensive patients to evaluate the prescribing pattern of antihypertensive drugs at a tertiary care hospital. Antihypertensives constitute a major group of drugs prescribed due to increasing prevalence of hypertension. This study was conducted on 200 patients, including 95 (47.5%) males and 105 (52.5%) females. A slight predominance of female population over male population was observed. A study done by Kuchake VG et al, also shows similar predominance of female population in hypertensive cases and literature review reveals that some of studies have reported a higher percentage of hypertension in males.¹²⁻¹⁴ In present study maximum numbers of patients were in the age group of 61-70 years which were 55 (27.5%) (Table 1).

The antihypertensive drugs prescribed were, calcium channel blockers (CCBs) like amlodipine, nifedipine and clindipine, beta blockers (BBs) like atenolol, metoprolol

and labetalol, ACE inhibitors (ACEIs) like enalapril and angiotensin receptor blockers (ARBs) like telmisartan (Table 2). Out of these drugs, the antihypertensive with maximum frequency of use was amlodipine (78.5%), followed by atenolol (33.5%) and enalapril (13.5%). A study done by Gaikwad B et al, reveals that the most commonly prescribed antihypertensive drug was amlodipine.¹⁵

This study reveals, maximum number of patients were on single drug therapy accounting for 56.5%, followed by 36.5% of patients were on two drug therapy and 7% of patients were on three drug therapy for treatment of hypertension (Table 3). Amlodipine was most frequently used for single drug therapy (37.5%), the most commonly used drugs in two drug therapy were amlodipine + atenolol (25.5%) and the most frequently used drugs for three drug therapy were amlodipine + atenolol + telmisartan (2.5%) (Table 4). A similar study done by Bhavika D et al, shows amlodipine was most commonly used in single drug therapy, drugs for two drug therapy included amlodipine + enalapril, followed by amlodipine + atenolol.¹¹ Diabetes mellitus (27.5%) was the most common co-morbidity seen in study subjects followed by ischemic heart disease (9.5%) and cerebrovascular accidents (7%) (Table 5). Hypertension is one of the contributing risk factors for co-morbidities like ischemic heart disease and cerebrovascular accidents.

On assessment of non-antihypertensive drugs used (Table 6) shows aspirin (18%) was the most frequently prescribed drug, followed by metformin (15%), atorvastatin (11.5%), furosemide (9.5%), glimepiride (8.5%) and others. That is because these drugs were prescribed to treat the co-morbidities.

In present study WHO prescribing indicators were also analysed. The average number of drugs per encounter was 2.38 (± 1.19) per prescription. A study conducted by Bhavika D et al, shows average number of drugs per prescription was as high as 5.64 drugs per prescription.¹¹ Present study also shows that, percentage of drugs prescribed by generic name was 76.47% and 97.89% of drugs were prescribed from essential drugs list (EDL). Percentage of encounters with an injection prescribed was 4.62%. The drugs given in the form of injections were insulin and others to treat co-morbidities seen in hypertensive patients.

CONCLUSION

Present study shows the current trends in prescription of antihypertensive drugs at a tertiary care hospital and their rational use. The most common antihypertensive drug used was amlodipine (CCB). The most common combination used for two drug therapy was amlodipine and atenolol (CCB and BB), and for three drug therapy amlodipine, atenolol and telmisartan (CCB, BB and ARB). There was prevalence of co-morbidities, the most common being diabetes. The average number of drugs per prescription was

2.38 (± 1.19). Selection of drugs from essential drug list is highly encouraging. Prescribing drugs by generic name needs to be promoted. Study emphasizes need for preventive and educative measures about hypertension in population. Further studies are needed from time to time and in large scale to improve the prescribing pattern in hypertension.

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