



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.03  
TPI 2018; 7(10): 404-407  
© 2018 TPI  
www.thepharmajournal.com  
Received: 09-08-2018  
Accepted: 10-09-2018

**Dr. M Gangadevi MD**  
Asst. Professor of Pharmacology,  
Govt. Villupuram Medical  
College, Villupuram,  
Tamil Nadu, India

**Dr. S Jeyaponmari MD**  
Associate Professor of  
Pharmacology, Govt.  
Villupuram Medical College,  
Villupuram, Tamil Nadu, India

## Prescribing pattern of anti-hypertensive drugs by general practitioners in a semi urban area in South India

**Dr. M Gangadevi MD and Dr. S Jeyaponmari MD**

### Abstract

**Background:** Hypertension is one of the major chronic diseases with high mortality and morbidity today. The monitoring of trends in hypertension treatment and control can provide an important insight into the effectiveness of primary prevention efforts for cardiovascular disease.

**Objective:** To analyze the prescribing pattern of anti-hypertensive drugs in a semi urban area by general practitioners.

**Methodology:** This is an observational study wherein patients suffering from hypertension attending general practitioners in a semi urban area were analyzed. Totally 200 prescriptions were collected and demographic details such as name, age, gender were noted. The prescription data obtained as per proforma was evaluated as per JNC VIII guidelines.

**Results:** 200 patients were included in the study out of which 57% were females and 43% were males. Mean number of antihypertensive drugs prescribed was 1.58. Most of the patients (54%) were treated with a single antihypertensive drug. Of the patients on combination therapy, 34.5% (69) and 11.5% (23) were on two and three drugs respectively. The use of calcium channel blockers was predominant in monotherapy as well as 2 or 3 drug regimens.

**Conclusion:** Our study shows that calcium channel blockers were the drugs of choice for hypertensive patients as a single drug therapy and overall utilization and the results were only partly consistent with the JNC VIII guidelines for the treatment of hypertension.

**Keywords:** Prescription pattern, hypertension, antihypertensive drugs

### Introduction

Hypertension is a leading contributor to the global burden of cardiovascular morbidity and mortality<sup>[1]</sup>. Epidemiological studies conducted in many parts of the world have consistently identified an important and independent link between hypertension and various disorders, especially coronary heart disease, stroke, congestive heart failure and impaired renal function<sup>[2]</sup>.

Hypertension is currently the leading risk factor resulting in considerable death and disability worldwide and accounted for 9.4 million deaths and 7% of disability adjusted life years in 2010<sup>[3]</sup>. In India, the situation is more alarming as hypertension attributes for nearly 10% of all deaths<sup>[4]</sup>. A recent review showed that, in 2000, the prevalence of hypertension in the adult population worldwide was about 25% (972 million subjects) and that in 2025, this proportion is expected to increase to 29.2% (1.56 billion subjects)<sup>[5]</sup>. In India, hypertension is reported to vary from 4-15% in urban and 2-8% in rural population<sup>[6]</sup>. Epidemiological studies also demonstrate that prevalence of hypertension is increasing rapidly among Indian urban and rural populations<sup>[7]</sup>.

Apart from unhealthy lifestyles, lack of awareness about hypertension, distorted public health systems, physicians treating hypertension also lag behind in treating hypertension according to standard guidelines. Noncompliance to antihypertensive therapy is also a reason for uncontrolled hypertension<sup>[8]</sup>. Elderly patients commonly have multiple pathologies leading to polypharmacy and altered pharmacokinetics and pharmacodynamics, are prone to adverse drug reactions from inappropriate medication.<sup>[9, 10]</sup>

Several guidelines have been developed worldwide for the management of hypertension and these serve as reference standards for clinical practitioners. However, many clinicians practice their own prescribing pattern in treating hypertensive patients according to their clinical experience. Primary care physicians need to be empowered in appropriate and evidence-based management of hypertension.

### Correspondence

**Dr. S Jeyaponmari MD**  
Associate Professor of  
Pharmacology, Govt.  
Villupuram Medical College,  
Villupuram, Tamil Nadu, India

Since the hypertensive patients are managed by general practitioners and its proper management can reduce the risk of hypertension-related morbidity and mortality, it is important to know the prescribing pattern in rural and semi urban area. Hence, this study was designed with the following objective.

**Objective:** To analyze the prescription pattern of antihypertensive drugs and its adherence to JNC VIII guidelines

**Material and methods**

Study Design: A prospective observational study  
 Study site: Villupuram town  
 Sample size: 200 patients suffering from hypertension with or without co-morbidities  
 Study period: 3 months

**Study criteria**

**Inclusion criteria:** Hypertensive patients aged 50 years and above of either gender with or without co- morbidities. Patients willing to participate and give informed consent in writing

**Exclusion criteria:** 1. Patients below the age of 50 years 2. Patients who are critically ill and admitted to intensive care units

**Procedure:** After obtaining clearance from the institutional ethics committee, the patients eligible as study criteria were enrolled in the study. The information such as demographic data, medication and clinical data was collected and documented in specially prepared patient data collection form. The prescribing pattern of antihypertensive in patients with or without co-morbidities was assessed based on drug class, dosage and frequency of prescription and compared with the prescribing guidelines (JNC VIII). Collected data were subjected to descriptive analysis by microsoft excel.

**Results**

A total of 200 prescriptions were analyzed for the study. The age distribution of the prescriptions included 122 (61%) patients aged between 61 and 70 years, whereas 54 (27%) were in the age group of 71-80 years [Table 1]. The proportion of females (57%) was slightly more than the males (43%). [Table 2]

**Table 1:** Age distribution

| Age in years | Number of patients (%) |
|--------------|------------------------|
| 50-60        | 9 (4.5)                |
| 61-70        | 122 (61)               |
| 71-80        | 54 (27)                |
| >81          | 15 (7.5)               |

**Table 2:** Gender distribution

| Gender | Number of patients (%) |
|--------|------------------------|
| Male   | 86 (43)                |
| Female | 114 (57)               |

Table 3 shows the distribution of co-morbidities amongst the prescriptions studied and analyzed. Type 2 diabetes 72 (36%), cardiovascular system disease 48 (24%) and osteoarthritis 46 (23%) being the most common amongst them.

**Table 3:** Distribution of Co-morbidities

| Co-morbidities          | Number of patients (%) |
|-------------------------|------------------------|
| Type 2 diabetes         | 72 (36)                |
| Cardiovascular diseases | 48 (24)                |
| Osteoarthritis          | 46 (23)                |
| CKD                     | 13 (6.5)               |
| Others                  | 19 (9.5)               |

Regarding drug prescription pattern, it was found that mono antihypertensive therapy was prescribed to 108 patients (54%), 69 patients (34.5%) received two antihypertensive drugs and 23 patients (11.5%) were given three antihypertensive drugs.

Table 4 demonstrates the groups of antihypertensive drugs that were prescribed to patients receiving only one drug to control their high blood pressure. As shown, Ca++ Channel Blockers (CCBs), Angiotensin Receptor Blockers (ARBs), Angiotensin Converting Enzyme inhibitors(ACEIs), Diuretics(DU) and Beta blockers(BB) were given to 60 (55.6%), 25 (23.2%), 12 (11.1%), 7 (6.5%) and 4 (3.7%) patients receiving monotherapy, respectively.

**Table 4:** Single drug therapy (N=108)

| Drug class    | Number of patients (%) |
|---------------|------------------------|
| CCBs          | 60 (55.6)              |
| ARBs          | 25 (23.2)              |
| ACEIs         | 12 (11.1)              |
| DU            | 7 (6.5)                |
| Beta blockers | 4 (3.7)                |

Concerning patients who were on two antihypertensive drugs the data of different groups of antihypertensive drugs used are presented in Table 5. Sixty nine (34.5%) of patients were on two antihypertensive drugs. The most frequently used combinations were a Ca++ Channel Blocker with a thiazide diuretic (46.4% of patients) followed by a Ca++ Channel Blocker with an ACE inhibitor (17.4% of patients).

**Table 5:** Dual drug therapy (N=69)

| Drug combination | Number of patients (%) |
|------------------|------------------------|
| CCB+TDU          | 32 (46.4)              |
| CCB+ACEI         | 12 (17.4)              |
| CCB+ARB          | 11 (16)                |
| ACEI+DU          | 9 (13)                 |
| CCB+BB           | 2 (2.9)                |
| BB+ARB           | 2 (2.9)                |
| BB+ACEI          | 1 (1.5)                |

Regarding patients who were on three antihypertensive therapy, 23 patients (11.5%) were on three drugs, 39.1% (9 patients) of whom were on a Ca++ Channel Blocker with a diuretic and an ARB and the rest of the triple therapy combinations were shown in Table 6.

**Table 6:** Triple drug therapy (N= 23)

| Drug combination | Number of patients (%) |
|------------------|------------------------|
| CCB+DU+ ARB      | 9 (39.1)               |
| CCB+BB+DU        | 7 (30.4)               |
| ACEI+CCB+BB      | 4 (17.4)               |
| CCB+BB+ ARB      | 3 (13)                 |

## Discussion

Majority of our participants were in the age group of 61-70 years (61%), 27% were in the age range of 71-80 years while only 7.5% were > 80 years of age and 4.5% were in the age group of 50-60 years which was similar to studies conducted by Tiwari *et al.* and Manisha *et al.* [11, 12]. In our study 114 (57%) were females while 86 (43%) were males which was consistent with the studies done by E. Etuk *et al.*, Essam Al-Drabah *et al.* and Qiuping Gu *et al.* [13, 15].

In our study, the total number of antihypertensive drugs, in 200 prescriptions analyzed, were 315. Therefore average number of drugs per prescription was 1.58 which was similar to the mean number of drugs used by the patients in the studies conducted by Cheng H *et al.* and Manisha *et al.* [16, 12]. The concurrent use of several drugs not only increases the chance of drug interactions but also leads poor compliance and ADRs. In this study, it was found that 36% of our patients had Type 2 DM while 24% were diagnosed with cardiovascular diseases.

54% of patients were treated with monotherapy. The JNC 7 guidelines also recommend implementing monotherapy as first line for most of the hypertensive patients and only if necessary, adding other drugs based on the level of control of BP. It also recommends caution in initiating therapy with multiple agents, particularly in older persons and in those at risk for orthostatic hypotension, such as diabetics with autonomic dysfunction [17]. The overall utilization pattern of antihypertensives in our study showed that the maximum utilization was for calcium channel blockers (44.4%), followed by Thiazide diuretics (20.3%) and ARBs (15.9%). The other drugs less commonly used were ACEIs (12.1%) and  $\beta$ -blockers (7.3%). These results were similar to a study done by Mateti *et al.* [18]. The results were similar to studies done in India and abroad [16, 18]. The maximum use of calcium channel blockers in our study is explained because of the fact that CCBs are well tolerated by elderly with deranged metabolic profile. This is in accordance with JNC 8 guidelines [19].

In two drug therapy, majority of patients were treated with a combination of CCB+ thiazide diuretic (46.4%) followed by a combination of CCB+ACEI (17.4%). Most commonly used three drug combination was CCB+diuretic+ARB (39.1%) followed by CCB+BB+diuretic (30.4%) in triple drug regimen.

Overall, there was a clear dominance of CCB with thiazide diuretics, ACEI/ARBS and  $\beta$ -blockers class of drugs being underutilized.

## Conclusion

Our prospective observational study analyzed the prescription pattern of antihypertensive drugs and found that most of the cases were prescribed with monotherapy followed by combine therapy and calcium channel blockers were the drugs of choice for hypertensive patients as a single drug therapy and overall utilization. It also shows that the prescribing pattern was only partly consistent with the JNC VIII guidelines for the treatment of hypertension. Therefore, a continuing education program for physicians regarding the current international guidelines is recommended.

## References

1. Singh RB, Suh IL, Singh VP, Chaithiraphan S, Laothavorn P, RG Sy *et al.* Hypertension and stroke in Asia: Prevalence, control and strategies in developing

countries for prevention. *J Hum Hyper tens.* 2000; 14:749-63.

2. Kokiwar PR, Gupta SS, Durge PM. Prevalence of hypertension in a rural community of central India. *J Assoc Physicians India.* 2012; 60:26-29
3. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H *et al.* A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet.* 2013; 380:2224-60.
4. Patel V, Chatterji S, Chisholm D, Ebrahim S, Gopalakrishna G, Mathers C *et al.* Chronic diseases and injuries in India. *Lancet.* 2011; 377:413-28.
5. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J Global burden hypertension: analysis of worldwide data. *Lancet.* 2005; 365:217-23.
6. Sandozi T, Emani VK. Survey of prescription pattern of anti-hypertensivedrugs in hypertensives & hypertension associated diabetics. *International Journal of Pharma and Bio Sciences.* 2010; 1(4):23-26.
7. Gupta R, Gupta VP. Hypertension epidemiology in India: lessons from Jaipur Heart Watch. *Current science.* 2009; 97(3):349-55.
8. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988-2008. *JAMA.* 2010; 303:2043-50.
9. Cunningham G, Dodd TR, Grant DJ, Murdo ME, Richards RM. Drug-related problems in elderly patients admitted to Tayside hospitals, methods for prevention and subsequent reassessment. *Age Ageing.* 1997; 26:375-82.
10. Mannesse CK, Derx FH, Ridder MA, Man Veld AJ, Van D, Cammen TJ. Adverse drug reactions in elderly patients as contributing factor for hospital admission: Cross sectional study. *BMJ.* 1997; 315:1057-8.
11. Tiwari H, Kumar A, Kulkarni SK. Prescription monitoring of anti-hypertensive drug utilization at the Punjab University Health Centre in India. *Singapore medical Journal [Internet].* 2004; 45(3):117-20.
12. Manisha Nara, Lokesh Patil. Prescription patterns of antihypertensive drugs in geriatric population in a tertiary care hospital. *International Journal of Pharmacological Research.* 2017; 7(01):17-20.
13. Etuk E *et al.* Prescription pattern of antihypertensive drug sina tertiary institution in Nigeria. *Annals of African Medicine* 2008; 7(3):128-132.
14. Essam Al-Drabah *et al.* Prescription pattern of antihypertensive drugs in Family Practice Clinics at Jordan University Hospital. *Medicine Science.* 2013; 2(1):469-88.
15. Gu Q, Paulose-Ram R, Dillon CF, Burt VL. Antihypertensive medication use among US adults with hypertension. *Circulation.* 2006; 113:213-221.
16. Cheng H. prescribing pattern of antihypertensive drugs in a general hospital in central China. *International Journal of Clinical Pharmacy.* 2011; 33(2):215-20.
17. Mc lean AJ, Le Couteur DG. Aging biology and geriatric clinical pharmacology. *Pharamocological Reviews.* 2004; 56(2):163-84.
18. Mateti U *et al.* A study on prescribing patterns of antihypertensives in geriatric patients. *Perspectives in Clinical Research.* Med know Publications and Media Pvt. Ltd. 2012; 7:3(4):139.

19. James PA, Oparil SA, Carter BL *et al.* evidence- based guideline for management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). JAMA [Internet]. 2014; 311(5):507-52.