

## Prescribing Modules of Antihypertensive Agents in Tertiary Level Health Care Setting of Central India

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### Abstract

**Objective:** The present study was undertaken to analyze the prescribing modules for hypertensive patients. **Material and Methods:** In this retrospective study, analysis of five hundred case sheets of hypertensive patients admitted in this teaching hospital was done. These case sheets were analyzed for risk stratification, treatment strategies and the drugs prescribed to control the blood pressure.

**Results:** In the study population age range was between 40 to 70 years including 73% male and 27% female. Smoking was most common risk factor. Amlodipine was most commonly prescribed drug in study. **Conclusion:** The result obtained from present study indicates that a regular therapeutic audit for analysis of drug efficacy will provide regular feed back to clinical scientists and prescribers and there by motivate and promote rational and economical antihypertensive drug therapy.

**Keywords:** Amlodipine, Antihypertensive agents, Prescribing modules, Risk Stratification.

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### Introduction

Hypertension is one of the major disorders of present century and is a leading contributor of cardiovascular morbidity and mortality globally.<sup>1</sup> In India, prevalence of hypertension in 2000 was 60.4 million males and 57.8 million females at that time it was projected that the problem will increase upto 107.3 million and 106.2 million respectively in 2025.<sup>2</sup> Prevalence of hypertension is a major concern in developing countries because it is stable in developed nations but dramatically rapidly increasing in underdeveloped or developing nations.<sup>3,4</sup> Before 1950, practically no drugs were available for the treatment of hypertension. But antihypertensive drug therapy has been remarkably improved in last 50 to 60 years. Different classes of drugs have received prominence with the passage of time in this period.<sup>5</sup> During the passage of time there was rise and fall in the popularity of the various classes of antihypertensive drugs. Over last 20 years prescribing of diuretics fell down but these agents are now regaining for more popularity.<sup>5,6</sup> During the same period calcium channel

antagonist gained increasing favor but after most frequently prescribed class of drugs they have recently been pushed backward.<sup>7</sup> Many researchers are investigating whether the drugs like calcium channel blockers, angiotensin converting enzyme inhibitors, and alpha adrenergic blockers etc. are really superior to diuretics and beta adrenergic receptor blockers in improving the prognosis and life of hypertensive patients.<sup>8,9,10</sup> Several trials in hypertensive patients have concluded that antihypertensive drug therapy minimizes the risk of cardiovascular, renal, cerebral, and visual complications.<sup>9,10,11,12</sup>

The present study was undertaken to analyze the risk stratification, treatment strategies, and prescribing modules for hypertensive patients, in tertiary level health care setting NKP Salve Institute of Medical Sciences and Research Centre, Digdoh, Hingna Road, Nagpur.

### Materials and Methods

The present study was conducted in N.K.P Salve Institute of Medical Sciences and RC Digdoh, Hingna Road, Nagpur. Where the inflow of patients is mainly from rural area of Vidharbha

and near by area of Madhya Pradesh. The study was carried out in hypertensive patients who were admitted during January 2009 to December 2010. The protocol of the research study was approved by Institutional Ethical Committee. After getting approval from Institutional Ethical Committee, the permission of In charge of Medical Record Department was obtained for data collection.

In this retrospective study, 500 case sheets of hypertensive patients admitted to indoor patient department of medicine were studied. Data were collected in a master chart and then analyzed. General factors such as age, sex, height, weight, body mass index and blood pressure was noted. Risk factors such as obesity, smoking, alcohol intake, low density lipid, high density lipid, triglycerides, family history of diabetes mellitus, hypertension, past history of diabetes mellitus, hypertension were also noted.

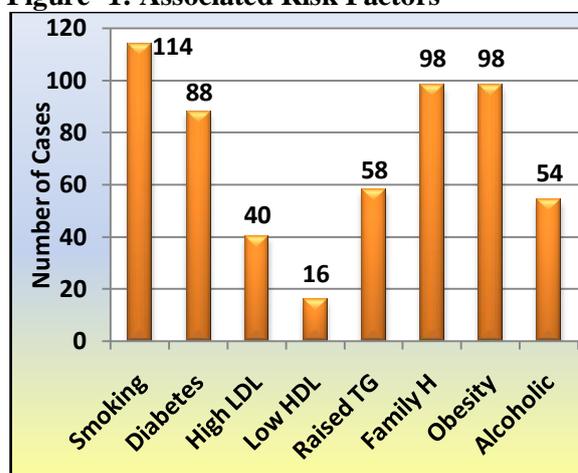
Newly diagnosed hypertensive patients with or without family history of hypertension or hypertensive patients associated with diabetes mellitus were included in study group. Hypertensive patients complicated or non-complicated who were taking the drug that could modified the blood pressure (e.g. antihistaminics, tricyclic antidepressant etc.) were excluded from the study.

## Results

The data collected were presented in the tabular form and interpreted logically. The collected data were analyzed for risk stratification, treatment strategies and prescribing modules. Maximum number of hypertensive patient were in between the age group of 61 to 70 years (34.3%) followed by 51-60 years age group (26.4 %) and 41-50 years (23.2 %). In the age group of 70 years and above 12% cases

recorded while less than 40 years constituted only 4%. Percentage of hypertensive male patient was 73% and in females hypertensive patients it was lesser (27%). Out of 500 cases most 22.8% (114) of them were chronic smokers followed by positive family history 19.6% (98), obesity 19.6% (98) and associated diabetes mellitus 17.6% (88). Raised Total Triglyceride (TG) level was seen in 11.6% (58). In 10.8% (54) Low Density Lipoprotein was raised. Low level of high density lipid was seen in 3.2 % patients. E.C.G. changes were found in 18.4% of hypertensive patients. 31.2% hypertensive patients had past history of hypertension (Figure-1).

Figure- 1: Associated Risk Factors



All the cases were divided into three risk groups as per our observation from the case sheets of the 500 cases (Table- 1).

In category of risk group-A and B, life style modification was advised to high normal and grade-1 hypertension cases. While in all the remaining categories active pharmacotherapy was initiated (Table- 2).

Table -1: Categorization of Risk Groups

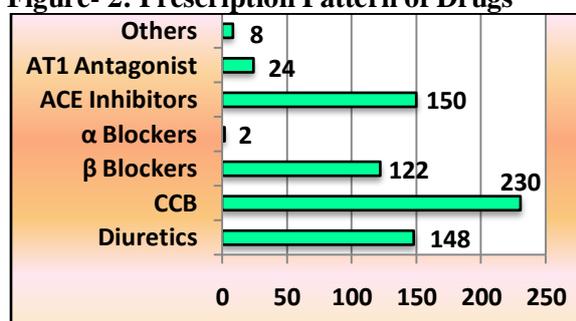
Risk Group – A	Risk Groups - B	Risk Groups - C
<ul style="list-style-type: none"> <li>• No risk factor</li> <li>• No target organ damage</li> <li>• No clinical cardiovascular disease</li> <li>• No diabetes mellitus</li> </ul>	<ul style="list-style-type: none"> <li>• At least one risk factor</li> <li>• No target organ damage</li> <li>• No clinical cardiovascular disease</li> <li>• No diabetes mellitus</li> </ul>	<ul style="list-style-type: none"> <li>• ± Risk factor</li> <li>• + Target organ damage</li> <li>• + Clinical cardiovascular disease</li> <li>• ± Diabetes mellitus</li> </ul>

**Table- 2: Risk Stratification and Treatment Strategy**

Blood Pressure Stages Systolic/ Diastolic (mm Hg)	Risk Group - A	Risk Groups - B	Risk Groups - C
High Normal (131-139/85-89)	L.S.M.	L.S.M.	Pharmacotherapy
Grade-I Hypertension (140-159/90-99)	L.S.M.	L.S.M.	Pharmacotherapy
Grade-II Hypertension (160-179/100-109)	Pharmacotherapy	Pharmacotherapy	Pharmacotherapy
Grade-III Hypertension (>180/>110)	Pharmacotherapy	Pharmacotherapy	Pharmacotherapy

L.S.M.: Life Style Modification

**Figure- 2: Prescription Pattern of Drugs**



CCB= Calcium Channel Blockers

Calcium channel blockers were the most frequently prescribed group of drugs as this group was prescribed to 46.0% (230 cases). Angiotensin Converting Enzyme Inhibitors (ACE inhibitors) were the 2<sup>nd</sup> leading group of drugs which were prescribed to 150 cases (30.0%) followed by diuretics 29.6% (148 cases) and beta blockers to 122 cases (24.4%).

Angiotensin II receptor antagonists were prescribed to 4.8% cases while alpha blockers to 0.4% and others drugs to 1.6 % cases figure- 2.

Amlodipine (44%) was the most commonly prescribed calcium channel blocker with nifedipine (2%) following it. In ACE inhibitors group, Enalapril (27.6%) was common drug followed by Lisinopril (2.4%). Among diuretics Frusemide (18%) was the most commonly prescribed agent followed by chlorthalidone (11.2%) and Amiloride (4.8%). Cardioselective long acting beta blockers Atenolol (23.2%) was the lead drug in beta blocker group followed by Propranolol (0.4%), Metoprolol (0.4 %) and Esmolol (0.4%).

In optimal cases follow up was not advised while in normal cases revaluation was advised in every 2 years. In borderline cases it was advised every year while in grade-1 hypertensive it was every 2 months (Table- 3).

**Table- 3: Follow up policy in hypertensive cases**

Category	Blood Pressure (mmHg)		Recommended follow - up
	Systolic	Diastolic	
Optimal	< 120	< 80	Not Applicable
Normal	< 130	< 85	Revaluation in 2 years
High Normal (Border Line)	131-139	85-89	Revaluation in 1 year
Grade -I Hypertension	140-159	90-99	Revaluation in 2 months
Grade-II hypertension	160-179	100-109	Revaluation in 1 month
Grade - III Hypertension	> 180	> 110	Revaluation in 1 week
Isolated Systolic Hypertension ((ISH)	> 140	< 90	-

## Discussion

In the present study it was found that cases in between the age group of 41 to 70 years are mainly affected with hypertension with male

predominance which is more than double female cases. Smoking was most common risk factor (22.8 %). This matched with the findings of Bulpitt et al.<sup>8</sup> Hypertension is more common in male population in comparison to females.

Females suffer with high blood pressure more often after menopause. Psaty also commented the same.<sup>3</sup> As the age advances the risk of hypertension increases in elderly population and also in middle age.<sup>3,13,14</sup> Over all there were no significant differences in regarding the risk factor. The risk factors were similar more or less to previous researcher's findings.<sup>7,8,15</sup>

In the present study association of obesity, family history of hypertension, diabetes mellitus, increased triglycerides levels, high alcohol intake, increased low density lipid, low level of high density lipid were seen, ECG changes, and past history were seen with hypertension. Arshad HM also found that obesity, alcohol and past history are significant contributor for the development of hypertension.<sup>1</sup>

Calcium channel blockers were the leading class of drugs followed by angiotensin converting enzyme inhibitors, diuretics, beta blockers and angiotensin II receptor antagonists. Thus our study findings do not support the findings of Edward D et al.<sup>5</sup> But Arshad HM et al<sup>1</sup> found similar trend of calcium channel blockers in geriatric hypertensive population followed by angiotensin II receptor antagonist. Amlodipine was the most common drug in our study and the study of Arshad HM et al.<sup>1</sup> Datta S and Sharma in 2010 also found the similar trend.<sup>16</sup> Almas et al in Pakistan also opinioned about calcium channel blockers utility in hypertension.<sup>17</sup>

The data obtained from the present study is expected to open a window to future therapeutic audit scheme comprising more parameters for critical analysis to provide regular feedback to clinical scientists and prescribers to motivate and promote rational and economical antihypertensive drug therapy.

## Conclusion

From the study we conclude that maximum number of hypertensive cases belongs to age group of 40-70 years in either sex with prevalence of hypertension more commonly in male patients. Smoking is the most common risk factor followed by obesity and family history of hypertension, diabetes mellitus, increased triglycerides, high alcohol intake, increase low density lipid and decrease high density lipid are the risk factors in descending order. Calcium

channel blockers are the leading class of drugs which are useful followed by ACE inhibitors diuretics, beta blockers in the present study. The result obtained from present study indicates that a regular therapeutic audit for analysis of drug efficacy can provide regular feed back to clinical scientists and prescribers and there by motivate and promote rational and economical antihypertensive drug therapy.

## Suggestions

After the study we have the following suggestions for hypertensive patients or for prescribers.

1. The patients should be motivated for self care. They should keep log book of B.P recording which will be follow of patients.
2. The approach for non-pharmacotherapeutic intervention should be multifactorial-
  - a) Avoidance of smoking.
  - b) Avoidance of high alcohol intake.
  - c) Prevention and correction of obesity.
  - d) Regular physical activity like aerobics or brisk walking should be encouraged as a part of strategy for risk factor control.
  - e) A uniform policy should be adopted for measurements of B.P. because accurate measurements are essential for valid comparison between persons or groups over time to time to assess the response of antihypertensive therapy.
  - f) The drug should be prescribed by generic name. It should be cost effective and reasonable from pharmaco-economic point of view.

The recommendation must be individualized and well supported with the health education; counseling and the medication should be provided as per requirement.

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