

## **AN OVERVIEW OF RATIONAL PRESCRIBING PATTERN IN HYPERTENSIVE PATIENTS IN TERTIARY CARE HOSPITAL**

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### **ABSTRACT**

**Objective:** To study the prescribing patterns of antihypertensive (AHT) drugs in hypertensive (HTN) patients and hypertension with diabetes mellitus (HTN with DM) patients in tertiary care hospital, to assess the rationality of prescribing patterns, to compare the hypertension management with Joint National Committee-7 guidelines (JNC-7).

**Methods:** A prospective study was conducted over a period of 6 mo in the medicine department of Bharati Hospital and Research Centre, Pune. HTN and (HTN with DM) patients. Who met the study criteria were enrolled in the study. The pattern of antihypertensive medications prescribed was studied and analyzed using Microsoft excel 2010 and Statistical. The rational prescribing pattern was assessed by using JNC 7 guidelines and World Health Organization (WHO) indicators.

**Results:** Total of 60 patients included in this study, 43 (71.7 %) were HTN patients, and 17 (28.3 %) were HTN with DM patients. There were 29 (48.33 %) males and 31 (51.66 %) female patients were involved. 45 % of patients had pre-hypertension, 33.33 % had stage-1 hypertension, 8.4 % had stage-2 hypertension other 13.33 % patients are on Antihypertensive medications and whose Blood Pressure (BP) were normal according to JNC-7. In hypertensive 47.05 % patient had prescribed Calcium Channel Blockers (CCBs) as monotherapy along with 87.5 % Angiotensin Receptor Blockers (ARBs) with diuretics as combination therapy. In HTN with DM 46.15 % patients had prescribed Angiotensin Converting Enzymes (ACEs) as monotherapy along with 62.5 % CCBs with BBs were prescribed according to JNC-7. As per WHO indicators, average no. of medicines prescribed per prescription was 2.91 and all antihypertensive medicines in the study population were prescribed rationally.

**Conclusion:** The present study represents the current prescribing trend for antihypertensive agents. It implies that. In hypertensive patients ARBs are the leading group of antihypertensive agents as monotherapy and ARBs with diuretics as a combination therapy according to JNC 7.

**Keywords:** Joint National Committee (JNC-7), World Health Organization (WHO), Hypertension (HTN), Diabetes mellitus (DM)

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### **INTRODUCTION**

Hypertension is an important public health challenge because of associated morbidity and mortality caused by cardiovascular diseases. Hypertension is a very common chronic disease in rural and urban areas of today's world, which needs continuous monitoring and treatment throughout the life [1].

It affects 26 % of the adult population worldwide. By 2025 it is projected that 29 % of world's population (1.56 billion adults) will have Hypertension, 2000 over 972 million or 26.4 % of the adult population were estimated to have hypertension. India population accounts those 66 million Hypertensive patients (34 million are in urban areas and 32 million in rural areas) [1,2]. Hypertension is disproportionately higher in diabetics. In India the overall prevalence of Hypertension among individual is about 65 %. So it is very essential to control Hypertension in diabetes mellitus patients to prevent macrovascular and microvascular complications. Higher age along with socioeconomic, behavioral, stressful lifestyle and nutritional issues in people can lead to increased incidence of hypertension with diabetes mellitus [3].

Hypertensive patients with diabetes have low rates of blood pressure (BP) control and often required combination therapy. Approximately 2/3<sup>rd</sup> of people with diabetes do not reach recommended target blood pressure value of 130/80 mmHg, a much higher proportion than patients without diabetes mellitus [3].

Hypertension requires suitable treatment to minimize the cardiovascular complications. There are various guidelines available worldwide for treating hypertension. Some of them are JNC-7 guidelines, British Hypertension Society Guidelines for Hypertension Management 2004 and WHO guidelines. The Joint National

Committee (JNC 7) defines normal BP as a systolic BP less than 120 mmHg and diastolic BP less than 80 mm Hg. It is clearly recognized that an increasing BP level is associated with a greater risk of heart attack, stroke and kidney disease. For persons aged 40-70 y, each increment of 20 mmHg in systolic BP or 10 mmHg in diastolic BP doubles the risk of cardiovascular disease across the entire range of BP range from 115/75 mmHg to 185/115 mmHg [4-6].

The rational prescribing pattern is the use of the least number of drugs to obtain the best possible effects in the shorter period of time. The present prescription monitoring study of antihypertensive agents has undertaken in the Outpatient medicine department as well as Inpatient Department of a tertiary care hospital. The management of hypertension requires nonpharmacological as well as pharmacological methods. Pharmacological and non-pharmacological benefits can be achieved through the patient understanding of the disease, medications and lifestyle modifications. [5].

There is a need to be assessed the prescribing pattern in HTN as well as HTN with DM patients. The present prescription monitoring study of There is a need to be assessing the prescribing pattern in HTN as well as HTN with DM patients, The present prescription monitoring study of antihypertensive agents to promote efficient prescribing and proven to improve the rational use of medicines. If the difference seen in the prescribing pattern which helps to improve patient health status, helps inadequate control of hypertension and gives positive impacts of drugs on health status worldwide.

### **MATERIALS AND METHODS**

The study was carried out at the Bharati Hospital (BH) and Research Center, Dhankawdi, Pune, Tertiary Care Hospital. It was a prospective study, approved by the Ethics Committee of Bharati

Medical College, Pune (BVDU/MC/14). The study was conducted for 6 mo, i.e. from August 2014 to March 2015. In this study there were 60 patients of either sex were included after taking written informed consent. The inclusion criteria for study subjects were Hypertensive patients above 18yrs male/female, Primary hypertensive patients with BP $\geq$ 160 (Systolic) and  $\geq$ 110 (Diastolic) and Hypertensive with diabetes mellitus patients. ICU patients, Hypertension with other Comorbid conditions patients, pregnant women were excluded. Demographic data and medicines were collected in the patient profile form. All the collected data were entered in Microsoft excel spreadsheet and prescriptions were analyzed, assessed and compared with the standard therapeutic guideline JNC 7. Assessment of all collected data was done with statistical analysis. Microsoft Excel 2010 was used to calculate the sets and interpret in terms of percentage, mean, the standard deviation was considered as significant. Microsoft Excel 2010 was used to calculate mean, the percentage of medications prescribed in patients. Standard deviation (SD) was used to calculate deviation in weight and age (years) groups of male and female in the study. Microsoft excel 2010 was also used for graphical presentation in the overall study.

## RESULTS

A total of 60 patients included in this study, 43 (71.7 %) were primary hypertensive patients and 17 (28.3 %) were hypertensive with diabetes mellitus patients. There were 29 (48.33%) males and 31 (51.66%) female patients were involved. (table 1), Maximum patients were within the age interval of 40-50 y (26.67%) and

minimum were 30-40 y (11.66 %). (table 2). The family history of the patients revealed that majority of the patients (78.33%) does not have any family history of hypertension, followed by (21.66%) in whom there was underlying family history of Hypertension (table 3). The social habits of the study population were observed and found to be that, most of the patients were having the habit of cigarette smoking 9 (15 %) followed by 8 (13.33 %) were having chewing tobacco (fig. 1).

In BH, most of the patients were diagnosed with pre-hypertension 27 (45%), stage 1 hypertension 20 (33.33%) and stage 2 hypertension 5 (8.33%) whose BP categorized according to JNC 7 (table 4)

In hypertensive 47.05 % CCBs, 52.93 % patient had prescribed with ARBs as monotherapy (table 5) and 87.5 % patients were prescribed with ARBs+diuretics, 12.5% patients were prescribed with CCBs+BBs as combination therapy (table 7) according to JNC 7. In hypertension with diabetes mellitus 53.84 % patients had prescribed with ACEs, 7.69% patient had prescribed with BBs, 7.69 % patient had prescribed with CCBs, 30.76 % patient had prescribed with ARBs as monotherapy (table 6) and 62.5 % patient had prescribed with CCBs+BBs, 25 % patient had prescribed with CCBs+ARBs, 12.5 % patient had prescribed with ARBs+diuretics as combination therapy (table 8) were prescribed according to JNC 7. Out of 60 total prescriptions, there were 175 prescribed drugs, i.e. 2.91 % medicines prescribed per encounter (table 9).

All the AHT medicines prescribed in the study population were prescribed according to JNC 7 Guidelines (table 10).

Table 1: Gender-wise distribution

Gender	Number of patients (n=60)	Percentage (%)
Male	29	48.33
Female	31	51.66

Table 2: Age-wise distribution of study population

Age (years)	No of patients (n=60)	Percentage (%)
30-40	7	11.66
40-50	16	26.67
50-60	12	20.01
60-70	11	18.33
70-80	14	23.33

Table 3: Family history

Category	No. of patients (n=60)	Percentage (%)
Family history	13	21.66
No family history	47	78.33

Table 4: Classification of blood pressure category in study population according JNC 7

Classification	SBP (mmHg)	DBP (mmHg)	No. of patients (n=60)	Percentage (%)
Normal	<120	<80	8	13.33
Pre-hypertension	120-139	80-89	27	45
Stage 1	140-159	90-99	20	33.33
Stage 2	$\geq$ 160	$\geq$ 100	5	8.33

Table no. 5: Monotherapy according to JNC 7 guidelines in HTN

Drug	Dose (mg)	Frequency	No. of patients (n=34)	Percentage (%)
Amlodipine	2.5,5	OD	16	47.05
Telmisartan	20,40	OD	10	29.41
Olmesartan	20	OD	8	23.52

**Table 6: Monotherapy according to JNC 7 Guidelines in HTN with DM**

Drugs	Dose (mg)	Frequency	No. of patients (n=13)	Percentage (%)
Enalapril	2.5, 5	OD	6	46.15
Ramipril	25	OD	1	7.69
Atenolol	40	OD	1	7.69
Amlodipine	2.5,5	OD	1	7.69
Telmisartan	20, 40	OD	3	23.07
Olmesartan	20	OD	1	7.69

**Table 7: Combination therapy in HTN according to JNC 7 guidelines**

Combination therapy of drugs	Dose (mg)	Frequency	No. of patients (n=8)	Percentage (%)
Telmisartan+Hydrochlorothiazide	40/5 or 40/12.5	OD	5	62.5
Olmesartan+Hydrochlorothiazide	20/12.5 or 40/12.5	OD	2	25
Amlodipine+Atenolol	5/25	OD	1	12.5

**Table 8: Combination therapy in HTN with DM according to JNC 7 guidelines**

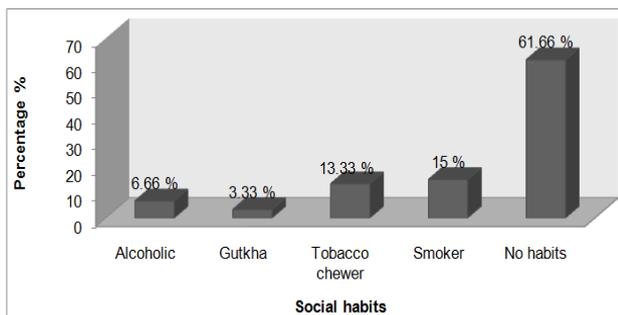
Combination therapy	Dose (mg)	Frequency	No. of patients (n=8)	Percentage (%)
Amlodipine+Atenolol	5/25	OD	4	50
Amlodipine+Nebivolol	5/2.5	OD	1	12.5
Amlodipine+Telmisartan	5/40	OD	1	12.5
Amlodipine+Olmesartan	5/25	OD	1	12.5
Telmisartan+Hydrochlorothiazide	40/5	OD	1	12.5

**Table 9: Assessment of rationality by using WHO indicators**

No. of prescription	Total no. of medicines prescribed	Average no. of medicines prescribed per prescription	Recommendations (NMT 4 or more medicines prescribed/encounter)
60	175	2.91	No polypharmacy

**Table 10: Percent (%) of medicines prescribed according to JNC 7**

Total of medicines prescribed	175
Total no. of AHT medicines prescribed	63
Out of 69 AHT medicines prescribed according to JNC 7	63
Percent of medicines prescribed according to JNC 7	100%
Recommendations	Rational prescribing pattern.
(Medicines prescribed according to JNC 7)	

**Fig. 1: Social history**

## DISCUSSION

Our study includes 60 patients. Of these, 31 (51.66 %) were females, and 29 (48.33 %) were males, which suggests a number of female patients are more as compared to male patients which were a similar study conducted by [2]. Female cases were more occurrences due to lack of awareness, high salt intake and lifestyle modifications.

Of the 60 Hypertensive and hypertensive with diabetes mellitus patients evaluated, a maximum number of patients 16 (26.67 %) were within the age group 40-50 y, followed by 14 (23.33 %) were within the age group 60-70 y. A similar study carried out on the HTN

patients showed that a maximum number of HTN patients belonged to the age group of 41-50 y and within the age group 60-70 y [2]. This could be because age is one of major risk factors and this age group has low rates of BP control.

As per social habits, patients were concerned out of these 8 (13.33 %) were having tobacco chewing, 9 (15 %) were having the habit of smoking among 4 (4.66 %) male patients were consuming alcohol was also observed in a study conducted by [7]. Cigarette Smoking is considered as a major risk factor for mortality in hypertension and in diabetes mellitus patients, drinking alcohol raise blood pressure and decrease the effectiveness of antihypertensive medications and increased a risk of stroke.

In our study, it was found that about 21.66 % patients had a family history of HTN and HTN with DM followed by 78.33 % who did not have a family history. A similar study conducted by [17]. And it was reported that maximum patients had no history of hypertension. The reason could be a family history of hypertension reinforces the fact that there is a no strong genetic predisposition in hypertension [8]. In our study, most of the patients were diagnosed with Pre-hypertension 27 (45 %), Stage-1 HTN 20 (33.33 %). In a study conducted by V. Pavani *et al.* in which most of the patients were diagnosed with Stage-1 HTN [8].

For the purpose of analyzing the prescribing patterns of antihypertensive drugs in the treatment of hypertension and HTN with diabetes mellitus, the pharmacotherapy was classified as monotherapy and combination therapy, In our study the prescribing

pattern in Hypertensive patients prescribed with monotherapy of ARBs (52.93 %), CCBs (47.05%) followed by ARBs+diuretics (87.5%). The study conducted by Mahanjit konwar *et al.* showed that CCBs is most commonly used drugs followed by ARBs. As per physicians, clinical empirical Practice ARBs were mostly prescribed because it is more beneficial first line Monotherapy. Combination therapy prescribed ARBs+Thiazide. CCBs were commonly prescribed because of better BP control, less incidence of side effects [9]. Thiazide diuretic given in combination with either CCBs, ARBs, BBs because they enhance the antihypertensive efficacy of multiple regimen and help to achieve blood pressure control [10].

In our study the prescribing pattern in Hypertensive with co-existing Diabetes mellitus patients prescribed with Monotherapy of ACEs 53.84 %, ARBs 30.76 %, CCBs (7.96%) and combination therapy of CCBs+BBs were 62.5 %. A study conducted by J. Keerthi Sagar *et al.* showed that CCBs and ARBs drugs are most commonly used as Monotherapy followed by combination therapy of CCBs+BBs [11,12]. A similar study conducted by Y. N Clement *et al.*, concluded that there was Angiotensin-converting enzyme inhibitors, Calcium Channel Blockers, B-blockers as monotherapy or CCBs with BBs as combination therapy, were more likely to be prescribed in diabetic hypertensive patients [13]. ACEs, CCBs, ARBs, and BBs in Diabetic hypertension are beneficial in reducing cardiovascular events and progression of kidney disease. ACEs or ARBs reduces the progression of protein urea [10]. Therefore initial, antihypertensive therapy for a patient with diabetes should ideally consist of an ACEs or ARBs first line as per JNC 7 guideline [10].

The average number of medicines prescribed per prescription in our study was found to be (2.91) Alam k *et al.*, showed that the average number of drugs per prescription were found to be 2.91 which is exactly similar to our study and which is lesser as compared to other countries [14]. In our study all the AHT medicines were prescribed to study population was, according to JNC 7 Guidelines, i.e. found to be 100 % [10].

#### CONCLUSION

The present study represents the current prescribing trend for antihypertensive agents. It implies that In hypertensive patients ARBs are the leading group of antihypertensive agents as monotherapy and ARBs with diuretics as a combination therapy according to JNC 7.

In hypertension with diabetes mellitus, ACEs are the leading group of antihypertensive agents as monotherapy and CCBs with BBs as combination therapy according to JNC 7.

#### CONFLICT OF INTERESTS

Declared none

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