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A PROSPECTIVE STUDY ON THE ASSESSMENT OF PRESCRIBING PATTERN OF ANTIHYPERTENSIVE DRUG THERAPY BASED ON JNC VIII GUIDELINES IN A TERTIARY CARE TEACHING HOSPITAL, DAVANGERE

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ABSTRACT

Background: Hypertension is a cardiovascular disease condition that if left untreated causes severe morbidity and mortality. So effective blood pressure control is necessary and people can achieve this by making lifestyle changes and taking antihypertensive drugs. To encourage ensible drug usage it is crucial to evaluate the antihypertensive drug prescribing pattern. **Objectives:** To evaluate the antihypertensive drug prescribing pattern for hypertensive patients and evaluating the adherence to the Joint National Committee-8 (JNC-8) guidelines for the management of hypertension. **Methods:** Prospective observational study was carried out for a period of six months in inpatient medicine department of Chigateri District Hospital. **Results:** A total of 130 patients were enrolled, the most prevalent comorbid condition was diabetes (n=30, 33.33%) followed by chronic kidney disease (25, 27.77%). While assessing the risk factors increased number of males (17%), overweight (15.4%), social habits like smoking (12.58%), increasing age (11.9%) was found to be the important risk factors for the development of hypertension. The pattern of drug prescription in hypertension shows that monotherapy was the prescribing trend with Calcium channel blocker (24.5%) followed by dual therapy with combination of Angiotensin receptor blocker + Diuretic. (n= 18, 46.15%). Also the study revealed the adherence to Joint National Committee 8 guidelines for the treatment of hypertension ranges between 70%-94%. **Conclusion:** From this study, the results suggest that prescribing pattern

of antihypertensive drugs shows suboptimal adherence to the recommendation of Joint National Committee-8 guideline for the treatment of hypertension.

KEYWORDS: *Prescribing trend, Monotherapy, Dual therapy, Adherence.*

INTRODUCTION

Hypertension is a major health problem all over the world. Although it is not a disease in and of itself, cardiovascular mortality and morbidity.[1] are greatly increased by it. Cardiovascular disease, kidney disease, stroke and other complications[2] like peripheral vascular diseases, retinal hemorrhage and visual impairment[3] are all greatly increased by hypertension 972 million people worldwide suffer from hypertension, a disease with a complicated origin.

According to WHO, it is the main global cause of premature death, affecting up to 1 in 4 men and 1 in 5 women over the age of 1 billion. Since hypertension initially exhibits no noticeable symptoms, since a patient may have it without even realizing it, it has been termedthe "silent killer".[3,4] Although most people with hypertension don't have any symptoms, some of them do report headaches, vertigo, dizziness, blurred vision or fainting spells.[5] Antihypertensive drugs and lifestyle adjustments can help patients effectively managetheir blood pressure.[6] A large number of antihypertensive drug alone or in various combinations are available and physician needs to choose the most appropriate drug for particular patient. Long-term antihypertensive medication use is necessary for patients with hypertension. Angiotensin converting enzyme inhibitors, beta blockers, angiotensin receptor blockers, calcium channel blockers, diuretics, alpha adrenergic blockers, direct vasodilators and central sympatholytic are some of the frequently used antihypertensive medication.[7] Prescribing antihypertensive medication should be based on the presence or absence of concomitant disease such as diabetes mellitus, adverse effects of specific drugs and cost considering overall health benefits to the concerned patient.[8] The conventional treatment recommendations assist the clinician in rational medication prescription. Reducing morbidity, death, and healthcare expenses involved with hypertension can be accomplished by controlling blood pressure using approved standards.[9] The Joint National Committee (JNC-8) for the mitigation, identification, assessment, and management has established objectives and normative prescribing guidelines for the treatment of hypertension. The JNC-8 guidelines arethe current global standard evidence based recommendations that, if implemented, could result in considerable improvements in clinical parameters for people with hypertension.

MATERIALS AND METHODS

Study site, Design and Duration: This prospective observational study was conducted in the medicine department of Chigateri District Hospital, Davangere (Tertiary Care Teaching Hospital) for a period of six months from January 2020 to June 2021 among 130 hypertensive inpatients.

Study criteria: Inpatients of general medicine ward of either sex above 18 years of age and diagnosed with newly detected or known case of hypertension with or without comorbidities were enrolled in the study. Patients who were pregnant or lactating or pediatric patients or psychiatric patients or having a terminal illness or whose complete information was missing were excluded from the study. Patients were enrolled after giving informed consent.

Study procedure: Patients were enrolled based on the inclusion and exclusion criteria by obtaining consent from each. All the relevant data was entered into a well-designed data collection form. The collected data were analyzed for further investigation on prescribing patterns of antihypertensive in hypertensive patients admitted in the medicine department and also to check the compliance of treatment as per JNC-8 guidelines among the study patients. Data were analyzed using Microsoft Excel (descriptive analysis) and results were presented in graphs and tables.

RESULTS

1. Distribution of hypertensive patients based on gender

Out of the 130 patients, majority (n=78, 60%) of patients diagnosed with hypertension were found to be males when compared to females (n=52, 40%).

Table 1: Distribution of hypertensive patients based on gender.

Sl. no	Gender	No: of patients(n)	Percentage (%)
1	Male	78	60%
2	Female	52	40%
	Total	N=130	100%

2. Distribution of hypertensive patients based on age group

Out of 130 patients the distribution of disease tends to be higher in age group between 70-89 years (n=29, 22.3%) and lower distribution is observed in the age group between 40-49 years (n=19, 14.61%).

Table 2: Distribution of hypertensive patients based on age group.

Sl. no.	Age group	No: of patients(n)	Percentage (%)
1	20-39	22	16.92%
2	40-49	19	14.61%
3	50-59	34	26.15%
4	60-69	26	20%
5	70- 89	29	22.3%
	Total	N=130	100%

3. Distribution of patients based on blood pressure Distribution of systolic blood pressure

Out of the 130 patients, most patients (n=56, 43.07%) has significantly high systolic BP ranging between 160-179 mm Hg (stage 2 HTN), followed by stage 1 HTN (n=34, 26.1%), hypertensive crisis (n= 27,20.76%) and least were in pre-HTN (n=13, 10%).

Table 3.1: Distribution of systolic blood pressure.

Sl. no.	Systolic BP (mm HG)	No. of patients(n)	Percentage (%)
1	Pre HTN(130-139)	13	10%
2	Stage1 HTN(140-159)	34	26.1%
3	Stage2 HTN(160-169)	56	43.07%
4	Hypertensive crisis(>180)	27	20.76%
	Total	N=130	100%

Distribution of diastolic blood pressure

Out of the 130 patients, most of the patients (n=55, 42.30%) has significantly higher diastolic BP ranging between 90-99 mmHg (stage1 HTN) followed by pre HTN (n=43, 33.07%) and stage 2 HTN (n=24, 18.46%) and least were in hypertensive crisis (n=8, 6.15%)

Table 3.2: Distribution of diastolic blood pressure.

Sl. no.	Diastolic BP	No. of patients(n)	Percentage (%)
1	Pre-HTN (80-89)	43	33.07%
2	Stage -1 HTN(90-99)	55	42.3%
3	Stage -2 HTN(100-119)	24	18.46%
4	Hypertensive crisis(≥120)	8	6.15%
	Total	N=130	100%

4. Distribution of comorbidities in hypertensive patients

Out of the 90 hypertensive cases with one comorbid conditions HTN+DM accounts for the maximum comorbidity (n=30,33.33%) followed by HTN+CKD (n=25,27.77%), HTN+CVD (n=20,22.22%) and HTN + CVA (n=15(16.66%). Out of the 18 hypertensive cases with two co morbidity HTN+DM+CKD accounts for maximum comorbidity (n=6,33.33%), followed

by HTN+DM+CVA (n=5,27.77%), HTN+DM+CVD (n=4,22.22%) and HTN+CKD+CVD (n=3,16.66%).

Table 4: Distribution of comorbidities in hypertensive patients.

Sl. No.	With one co morbidity n (%)		With two co morbidity n (%)	
1	HTN+DM	30(33.33%)	HTN+DM+CKD	6(33.33%)
2	HTN+CKD	25(27.77%)	HTN+DM+CVA	5(27.77%)
3	HTN+CVD	20(22.22%)	HTN+DM+CVD	4(22.22%)
4	HTN+CVA	15(16.66%)	HTN+CKD+CVD	3(16.66%)
	Total	N=90(100%)		N=18(100%)

5. Assessment of risk factors in hypertensive patients

Out of the 130 patients, the risk of developing hypertension is more among male, 78(60%). The risk of hypertension was found to increase with increase in weight 71(54.61%). Other risk factors includes smoking 58(44.61%), Age 55(42.30%), Alcohol 54(41.53%), Tobacco use 49(37.69%), Diabetes 47(36.15%), CKD 35(26.92%), Dyslipidemia 17(13.07%).

Table 5: Assessment of risk factors in hypertensive patients.

Sl. No.	Risk Factors	No : of patients(n)	Percentage (%)
1	Gender	78	17%
2	Overweight	71	15.4%
3	Smoking	58	12.58%
4	Age	55	11.9%
5	Alcohol	54	11.71%
6	Tobacco use	49	10.62%
7	Diabetes	45	9.76%
8	CKD	34	7.37%
9	Dyslipidemia	17	3.68%
	Total	N=461	100%

6. Prescribing indicators

Out of the 130 prescription analyzed a total of 787 drugs were used in the study of which 272 antihypertensive were used in the study which constituted 34.56%.

Table 6: Prescribing indicators.

Sl. No.	Prescribing Indicator	Frequency
1.	Total no. of prescription analyzed	130
2.	Total no. of drugs used in the study	787
3.	Average no. of drugs per prescription	6.05
4.	Total no. of antihypertensive drugs used in this study	272
5.	Average no. of antihypertensive drugs per prescription	2.09
6.	Percentage of antihypertensive prescribed	34.56%

7. Distribution of hypertensive patients based on drug therapy

Out of the 130 patients, most of the patients were prescribed with monotherapy (n=121, 75.62%) and dual therapy were prescribed for (n=39,24.37%)

Table 7: Distribution of hypertensive patients based on drug therapy.

Sl. No.	Drug Therapy	No. of patients(n)	Percentage (%)
1	Monotherapy	121	75.62%
2	Dual therapy	39	24.37%
	Total	N=160	100%

8. Utilization pattern of antihypertensive in patient treated with monotherapy

Out of the 200 drugs given as monotherapy, CCB accounts for higher number (n= 59, 29.5%) followed by diuretics (n=54, 27%), beta blocker (n= 38, 90%), ARB (n=34, 70%), ACEI (n=30,6.5%) and centrally acting alpha adrenergic agonist were least prescribed (n=2, 1%).

Table 8: Utilization pattern of antihypertensive in patient treated with monotherapy.

Sl. no.	Class	No .of patients (n)	Percentage (%)
1	Diuretics	54	27%
2	Beta blockers	38	19%
3	Calcium channel blocker	59	29.5%
4	Angiotensin converting enzyme	13	6.5%
5	Angiotensin receptor blockers	34	17%
6	Alpha sympatholytic	2	1%
	Total	N=200	100%

9. Utilization pattern of antihypertensive in patient treated with dual therapy

Out of 39 drugs prescribed as dual therapy ARB+Diuretic were the mostly prescribed (n=18, 46.15%) followed by Beta blocker+ Diuretic (n=9, 23.07%), CCB+Diuretics (n=7,17.94%), CCB+ARB (n=3, 7.69%) and ACE+CCB were the least prescribed (n=2,5.12%).

Table 9: Utilization pattern of antihypertensive in patient treated with dual therapy.

Sl. No.	Class	No .of patients (n)	Percentage (%)
1	ARB+D	18	46.15%
2	CCB+ARB	3	7.69%
3	BB+D	9	23.07%
4	CCB+D	7	17.94%
5	ACE+CCB	2	5.12%
	Total	N=39	100%

10. Assessment of adherence to the recommendations of JNC 8guidelines for the treatment of hypertension

Adherence to JNC 8 guidelines in hypertensive patients varied between 70-94%. The most adherence was to recommendation 1(94%). The least adherence was to recommendation 2(70%).

Table 10: Assessment of adherence to the recommendations of JNC 8guidelines for the treatment of hypertension.

Sl. No.	Recommendations	Adherence rate (%)
1	Recommendation 1	94%
2	Recommendation 2	70%
3	Recommendation 3	88%
4	Recommendation 4	73.52%
5	Recommendation 5	80%
6	Recommendation 6	88.46%
7	Recommendation 8	70.58%

DISCUSSION

Hypertension is a chronic disease requiring lifelong treatment. Choice of antihypertensive drugs should be based on the individual benefits of patients taking into account there concomitant disease condition. So a prospective observational study was conducted in 130 patients for a period of 6 months in inpatient general medicine department who were diagnosed with hypertension which aims to access the comorbidities, risk factor, prescribing pattern in hypertensive patients based on JNC 8 guidelines. In this study out of the 130 patients enrolled the proportion of males with hypertension was significantly higher (n=78,60%) compared to females (n=52, 40%) which is in concordance with the results conducted at Tamilnadu by shaji A et al.,[10] The result of the present study indicates that majority of patients belongs to the age group of 50-59 (n=34, 26.15%) shows that higher age was directly related to higher incidence of hypertension which is in agreement with the studies conducted at Andhra Pradesh by Cidda M et al.,[11] Furthermore in systolic blood pressure maximum no. of patients were seen in stage II hypertension which is comparable to the results by the study conducted at Telangana by Kumar R M et al.[12] and in diastolic BP more no. of patients were seen in stage1 hypertension similar to the results in studies conducted at Pakistan by Ahmed A et al.[8] Diabetes mellitus was found be the most prevalent comorbid illness (n=30, 33.33%) as suggested by the results of study conducted at south east Nigeria by Nwaka L A et al.[6] Also CVA was the least observed comorbidity in the study but in contrast to this study conducted at Karnataka by Malpani A K et al[13] shows the CVA as

themajor comorbidity. Hypertension is more prone to develop in male (n=78, 70%) and with increasing age (n=55, 12.58%) which is in agreement with study conducted at south west Nigeria by S Abdul Salam et al.[14] Overweight, social habits like smoking where also found tobe the other contributing risk factors but in contrast to this the study conducted by S Abdul Salam et al[26] shows a preponderance of normal weight subjects and fewer no. of subjects with smoking habits. While assessing the prescribing indicators of the 130 prescriptions analysed the percentage of antihypertensives prescribed constituted n=33.56% which is not in agreement with the study conducted at Tamil Nadu by Shaji A et al[10] which shows that percentage of antihypertensive drugs prescribed constitutes n=22.66%. Out of the total 130 patients, monotherapy is most commonly prescribed (n=121, 75.695) followed by dual therapy (n=39,24.37%) supported by the results of the studies conducted at Maharashtra by Faheem M et al[15] but in contrast to this dual therapy was most commonly prescribed in the studies conducted at Maharashtra by Sharma K A et al.[16] Among monotherapy the most commonly prescribed class of antihypertensive drugs were CCB (n=54, 27%) which is in accordance with the result of studies conducted at kadappa by Rajashekar G et al[7] whereas in the study conducted at Hyderabad by Arief M et al[17] shows ACE Inhibitors was most commonly prescribed. In dual therapy, most frequently prescribed combination was ARB+Diuretic which is in concordance to the results of the study conducted at Warangal by Cidda M et al.[11] But in contrast to this study, CCB + ARB was most commonly prescribed and ARB+Diuretic was least prescribed in the studies conducted at Telangana by Kumar R M et al.[12] This results in the study can be correlated with larger proportion of DM and CKD patients with hypertension. The larger preponderance of ARB+Diuretic may be due to the ability of diuretics to complement the antihypertensive efficacy of multidrug regimen due to their competence to reduce blood vessel and vascular resistance. Adherence to JNC 8 guidelines among the antihypertensive patients while prescribing medications varied between 70-94%. The most adherence was to recommendation 1 i.e, the initiation of drug therapy in order to lower a systolic BP of ≥150 mmHg or a diastolic BP ≥90 mmHg for a general population of 60 years or older. The least adherence (70%) was to recommendation 2 i.e., the target diastolic blood pressure to start pharmacological therapy for subjects younger than 60 years of age is ≥ 90mmHg, where in contrast to the studies conducted at West Bengal by Gupta N C et al[4] shows that the most adherence was to recommendation 6 and least adherence was to recommendation 4.

CONCLUSION

A prospective observational study on assessment of prescribing pattern of antihypertensive based on JNC 8 guidelines concluded that males outnumber female suggesting that males are more prone to develop hypertension. A relative preponderance of hypertension was observed in the age group of 50-59 years. The study shows that in systolic BP more no.of patients were seen in stage II HTN and in diastolic BP more no. of patients were seen in stage I HTN.In our study diabetes was found to be the most commonly occurring comorbidity followed by CKD. Increased no of males, overweight, social habits like smoking and increasing age were found to be the most important predicators of hypertension. This study highlights the drug prescribing pattern of antihypertensive and drug prescribed is based on disease severity and associated comorbid condition. Monotherapy was the most favoured type of therapy of which CCB was the most commonly prescribed class of drugs. The combination of ARB and Diuretic was the most commonly prescribed dual therapy in this study. From this study it is concluded that the adherence to JNC-8 recommendation for the treatment of hypertension is suboptimal. To keep an eye on the rational medicine prescription for a better therapeutic effect, continuous monitoring of the prescription pattern is crucial. Clinician should also be on the lookout for potential regimen adjustments if the current regimen is not adequately maintaining blood pressure, since treatment alteration may result in an improvement.

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