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A Study on Prescribing Pattern of Antihypertensive in Chronic Kidney Disease Patients

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ABSTRACT

Background: Chronic kidney disease causes progressive loss of function which gradually occur overtime leading to decrease in GFR levels leading to dysfunction of renal system. Hypertension is found to be intermingled cause and overlapping complication in CKD. It is important to intervene the progression by controlling the blood pressure to prevent kidney failure by administration of anti-hypertensive. **Objectives:** To study current trends in anti-hypertensive prescription pattern in CKD patient and to evaluate the concurrent patterns are in adherence according to the guidelines mentioned. **Methods:** Prospective observational study was undertaken in patients who were satisfying the inclusion criteria and was enrolled into the study conducted for a 6months period in a tertiary care hospital in Bangalore. **Results:** 150 CKD patients were examined out of which 72% prevalence seen in males compared to females 28%. Dual drug therapy was most preferred combination seen in 48% of the prescriptions. CCB was the most preferred class of drug and least preferred class of drug was ACE. More than 85% deviation from JNC-8 was seen. 20% of mono-therapy was found in adherence to JNC-8. **Conclusion:** A 15% adherence to JNC-8 guidelines was observed in the treatment indicating need for clinical pharmacist who play vital role in management of CKD by adherence to JNC-8 to ensure safety, efficacy and rationality.

Keywords: Chronic kidney disease, Hypertension, Prescription pattern, JNC-8 guidelines, Compliance, Anti-Hypertensive.

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INTRODUCTION

Chronic kidney disease leads to progressive loss of renal function which concomitant on the elevated blood pressure which is managed by administration of Anti-hypertensives. So the main objective of the study is to assess the drug prescription pattern of anti-hypertensive in chronic kidney disease considering the adherence to the JNC-8[1]. According to JNC-8 patients of any age with diabetes or CKD have a goal of less than 140 mmHg systolic and less than 90 mmHg diastolic. The focus of the JNC-8 is to target on the blood pressure values. However, it also provides recommendations to promote the safer use of specific anti-hypertensive agents[2]. There is deviation from the regular therapy of ACE inhibitors and ARBs, other combinations of the 4 agents that can be administered to achieve the ideal goal of blood pressure is also recommended. ACE inhibitors or ARBs are an essential part of hypertensive management in patients up to the age of 75years with CKD, though currently patients with greater than the age of 75years with CKD there is no authentication supporting renin-angiotensin system inhibitor treatment. While ACE inhibitors or ARBs are been used, CCBs and Thiazide Diuretics can also be considered[3].

MATERIALS AND METHODS

The study was a prospective observational study conducted for 6 months period to assess prescribing pattern of anti-hypertensive in chronic kidney disease was carried out at a tertiary care hospital in Bangalore. The study was carried out on both inpatients and outpatients of the tertiary care hospital, who were currently diagnosed with chronic kidney disease along with hypertension. Pediatric patients, pregnant patients and psychiatric patients were excluded from this study.

All necessary and relevant information were collected from patient case sheet, laboratory data report and treatment chart. A separate data entry format for incorporating patient's details was designed. The format included the details such as Name, Age, Gender, IP number, Data of

admission, Date of discharge, Patient medical history, Medication history, Laboratory investigation and Treatment chart.

Ethical clearance was obtained for the protocol of the present study which was approved by the ethical committee of Aditya Bangalore Institute for Pharmacy Education and Research and informed consent was agreed by Nephrology Department at the tertiary care hospital,

Statistical Analysis was done by data entered in MS Excel 2007 and analyzed. Descriptive statistics was expressed in terms of actual numbers and percentage was used for data analysis.

RESULTS

During the 6month period based on the inclusion and exclusion criteria 150 prescriptions were collected from the tertiary care hospital. The demographic characteristics of 150 patients are depicted in Table 1.

Table 1: Prescriptions observations

Particulars	Numbers		Percentage	
Gender distribution				
Number of males patients	107		72.33%	
Number of males patients	43		.28.66%	
Based on Age	Males	Females	Males	Females
20-29	4	0	3.7%	0
30-39	11	4	10.28%	9.3%
40-49	12	7	11.21%	16.27%
50-59	29	14	27.10%	32.55%
60-69	36	14	33.64%	32.55%
70-79	11	4	10.28%	9.3%
80-89	4	0	3.7%	0
Based on co-morbidity of Diabetes mellitus along with HTN and CKD	Males	Females	Males	Females
Diabetic	61	29	57%	67.44%
Non-Diabetic	46	17	42.99%	39.53%
Type of Therapy				
Mono therapy	40		26.66%	
Dual Therapy	72		48%	
Triple Therapy	22		14.66%	
Quadruple Therapy	11		8.66%	
Other (more than 4)	3		2%	

1. Monotherapy of Anti-hypertensive Drug

Out of the 40 Prescriptions (26.66%) had monotherapy. Out of monotherapy treatment given to patients in the study (67.5%) were given calcium channel blockers followed by 7.5% Diuretics and Alpha blockers respectively.

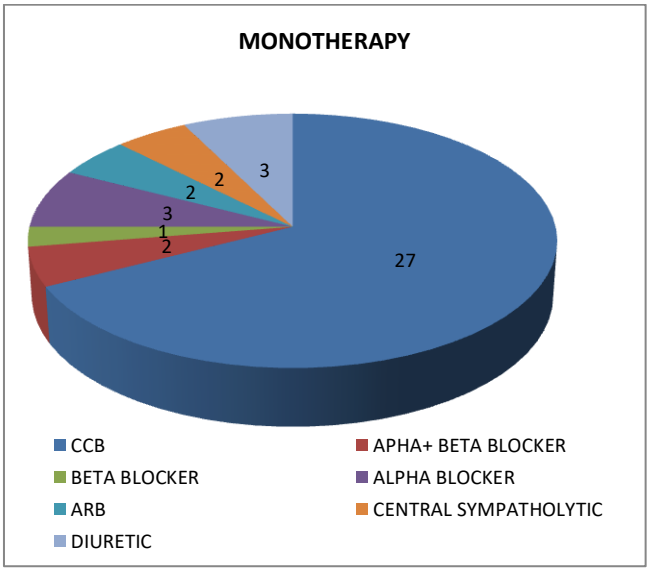

Figure 1: Drugs in Monotheraphy

2. Dual therapy of Anti-hypertensives

Out of the 48% of dual therapy treatment given to the patients in the study; 27.7% were treated with CCB+Beta blockers, CCB+Central sympatholytic (20.08%) and CCB+[Alpha+Beta blockers](18.05%) respectively which was found in the prescriptions.

Table 2: Dual Therapy of Anti-hypertensive.

CLASS OF DRUG	NO OF PRESCRIPTION	PERCENTAGE
CCB+ APHA+ BETA BLOCKER	4	5.55%
CCB+ DIURETIC	6	8.33%
CCB+ ACE	2	2.77%
CCB+ BETA BLOCKER	20	27.77%
CCB + APHA+ BETA BLOCKER	13	18.05%
CCB+ CENTRAL SYMPATHOLYTIC	15	20.8%
DIURETIC+ BETA BLOCKER	3	4.16%
DIURETIC+ APHA+ BETA BLOCKER	3	2.77%
DIURETIC+ DIURETIC	1	1.3%
ALPHA BLOCKER+ BETA BLOCKER	2	2.77%
CENTRAL SYMPATHOLYTIC+ APHA+ BETA BLOCKER		1.3%
CENTRAL SYMPATHOLYTIC+ ALPHA BLOCKER	1	1.3%
BETA BLOCKER + ARB	1	1.3%

3. Triple therapy of Anti-hypertensive

Out of the 14.66% of Triple therapy treatment given to patients in the study it was found that 31.8% were given CCB +Beta blockers+ Alpha blocker and CCB + Diuretic +Beta blockers respectively.

Table 3: Triple Therapy of Anti-hypertensive.

CLASS OF DRUG	NO	PERCENTAGE
CCB+ APHA BLOCKER + BETA BLOCKER	7	31.8%
CCB+ DIURETIC+ APHA BLOCKER	2	9.09%
CCB+ CENTRAL SYMPATHOLYTIC+ APHA BLOCKER	2	9.09%
CALCIUM CHANNEL +DIURETIC+ BETA BLOCKER	5	22.72%
CALCIUM CHANNEL + CALCIUM CHANNEL +DIURETIC	1	4.54%
CCB+ CENTRAL SYMPATHOLYTIC+ DIURETIC	2	9.09%
CCB +CENTRAL SYMPATHOLYTIC+ BETA BLOCKER	2	9.09%
CCB +CENTRAL SYMPATHOLYTIC+ ALPHA+BETA BLOCKER	1	4.54%
CCB +CENTRAL SYMPATHOLYTIC+ARB	1	4.54%
APHA BLOCKER + BETA BLOCKER+ DIURETIC	2	9.09%

4. Quadruple therapy of Anti-hypertensive

Out of the 8.66% of Quadruple therapy treatment given to the patients in the study it was found that 30.76% were given CCB+Beta blockers+ Alpha blocker + Central Symphatholytic.

Table 4: Quadruple Therapy of Anti-hypertensive.

CLASS OF DRUG	NO OF PRESCRIPTION	PERCENTAGE
CCB +CENTRAL SYMPATHOLYTIC+ ALPHA BLOCKER +BETA BLOCKER	4	30.76%
CCB +CENTRAL SYMPATHOLYTIC+BETA BLOCKER+ DIURETIC	1	7.69%
CCB +CENTRAL SYMPATHOLYTIC+ARB+ALPHA BLOCKER	2	15.38%
CCB +APHA BLOCKER + BETA BLOCKER+ DIURETIC	2	15.38%
CCB +CENTRAL SYMPATHOLYTIC+ ALPHA BLOCKER +APHA BLOCKER	2	15.38%
CCB +APHA + BETA BLOCKER+ DIURETIC+ CENTRAL SYMPATHOLYTIC	1	7.69%

5. Others

In this therapy more than four drug combinations of Anti-hypertensives were used in 3 prescriptions it was found that in 1 prescription CCB +Beta blockers+ Alpha blocker + Central Symphatholytic+ Diuretics was prescribed and CCB+Beta blockers+ Alpha blocker + ARB+ Diuretic in other 2 prescriptions containing more than four anti-hypertensives.

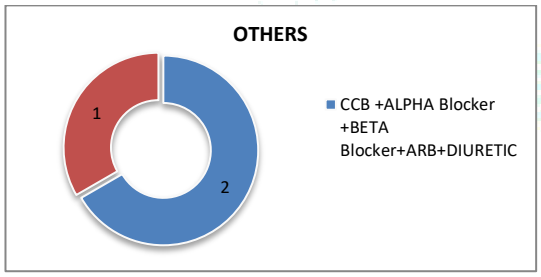

Figure 2: Others (more than 4).

6. Different class of Prescription

In management of hypertension in CKD patient with antihypertensives in 150 prescription the most preferred class of drugs was CCB (Calcium channel blocker)which was found in 120 prescriptions followed by Beta blockers in 53 prescription.

Table 5: Different class of Anti-hypertensive

NAME OF PATIENT	NO OF PRESCRIPTION
CALCIUM CHANNEL BLOCKER	120
APHA BLOCKER	39
ALPHA+BETA BLOCKER	12
BETA BLOCKER	53
DIURETIC	26
CENTRAL SYMPHATHOLYTIC	30
ACE	2
ARB	7

7. Calcium Channel Blocker

In 150 prescription charts assessed most frequently used class of drug was calcium channel blockers which were found in 120 prescriptions:

Table 6: Calcium Channel Blockers in Prescription.

NAME OF DRUG	NO	PERCENTAGE
AMLODEPINE	27	22.5%
NIFEDEPINE	49	40.83%
CLINIDIPINE	42	35%
OTHER	2	1.6%

Out of 120 prescription having CCB (40.83%) have used Nifedepine followed by Amlodepine (22.5%), Clinidepine (35%).

8. Beta Blocker

In 150 prescription charts assessed most frequently used class of drug was beta blockers which were found in 53 prescriptions:

Table 7: Beta Blockers in Prescription.

NAME OF DRUG	NO	PERCENTAGE
NEBIVOLOL	8	15.08%
METOPROLOL	37	69.81%
BISOPROLOL	8	15.08%

Out of 53 prescriptions having Beta Blocker Metoprolol was the most frequently used Beta blocker in (69.81%) followed by Bisoprolol and Nebivolol (15.08%) in 8 prescriptions each.

9. Different drugs of Prescription

Out of all prescription obtained from the 150 cases that was collected; the most frequently prescribed drug were Nifedipine(49) followed by Clinidipine(42), Prazosin(38), Metoprolol(37), Clonidine(30), Amlodepine(27) respectively.

Table 8: Drug in different prescription

Name of Drug	No of Prescription
Nifedipine	49
Clinidipine	42
Prazosin	38
Metoprolol	37
Clonidine	30
Amlodepine	27
Furosemide	13
Torsemide	12
Carvedilol	12
Nebivolol	8
Bisoprolol	8
Telmisartan	3
Losartan	3
Enalapril	2
Others	6

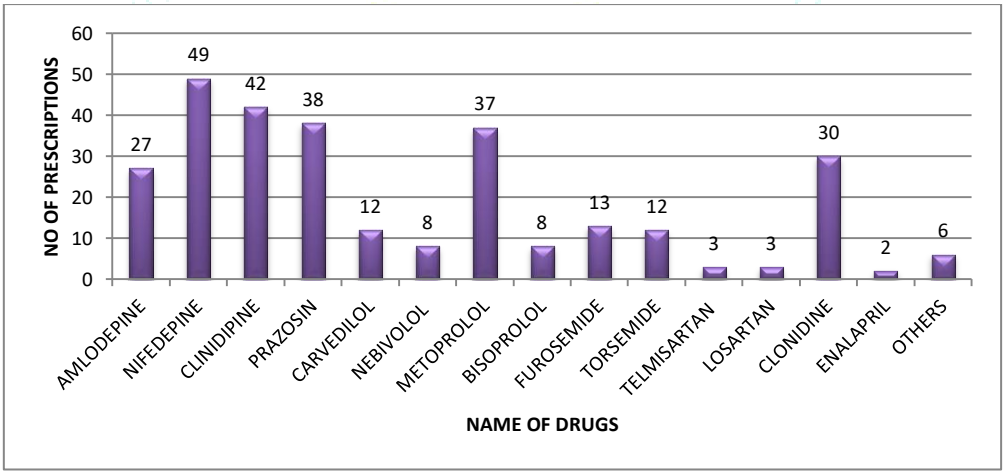

Figure 3: Different types of Drugs.

10. Prescription comparison with JNC-8

According to JNC-8 patients with CKD +HTN +Diabetes should be given ACE/ARB/CCB or Diuretic; out of 90 prescriptions under this category adherence to JNC- 8 was seen only in 21 prescriptions. In case of CKD +HTN ACE or ARB should be given and out of 60 prescriptions under this category adherence to JNC- 8 was seen only in 1 prescription.

Table 9: Drug Comparison with JNC-8.

Comorbidity	Drugs According to JNC-8	Total Number of Prescrpition	Prescription Adherance to JNC-8	Prescription Non-Adherance to JNC-8
CKD+HTN+ DIABETES	ACE/ARB/CCB Diuretic	90	21	69
CKD+HTN	ACE/ARB	60	1	59

11. Therapy Based Adherences to JNC-8

The therapy based Adherence to JNC-8 guidelines showed adherence only in case of Monotherapy(19) and Dual Therapy (2) prescriptions.

Table 10: Therapy Comparison with JNC-8.

Therapy	Total Prescription	Prescription Adherence to JNC-8	Prescription Non-Adherence to JNC-8
Mono Therapy	40	**19**	21
Dual Therapy	72	**2**	70
Triple Therapy	22	**0**	22
Quadruple Therapy	13	**0**	13
Others	3	**0**	3

12. Compliance to JNC-8

The overall adherence of all the prescriptions to JNC-8 guideline in the study was found to be 14.6% which indicate irrationality in the prescribing pattern.

Table 11: Compliance with JNC-8.

Prescription Status	No of Prescription	% of Prescription
Prescription Adherence to JNC-8	22	14.6 %
Prescription Non-Adherence to JNC-8	128	85.3%

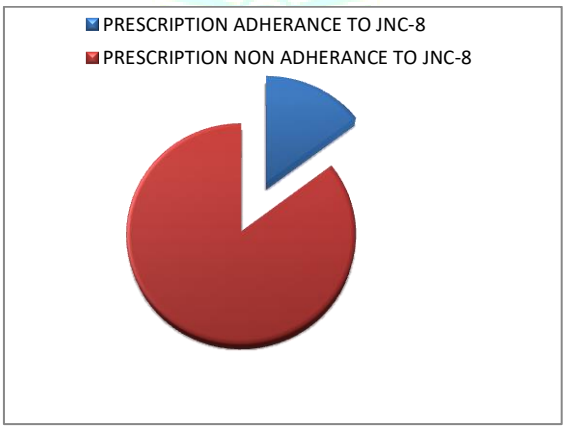

Figure 4: Compliance to JNC-8

DISCCUSION

The study involved 150 CKD patients with HTN to assess the prescription pattern of anti-hypertensive found that males of age group (60-69years) and (50-59years) are more prone to CKD than females this result is similar to the study conducted by Neethu Joseph *et al.*[4] depicts 72% of patients were male compared to 28% female and a similar result was found from the study conducted by Pavitra RY *et al.* [5]. In the current study 60% of patients had co-morbidity of DM-2 which is supported by the study of Sharminder Kaur *et al.*[6] and Kalpana Bharani *et al.*[7] which showed DM-2 as major co-morbidity which was observed in the patients. In the present study most of the patients were given multi-drugs therapy this result is supported by another study by Ashok Kumar Malpani *et al.*[8] that potrayed dual therapy in 78% of prescription but differ from the study performed by D.Giri Rajasekhar *et al.* [9] which shows monotherapy as most preferred type of therapy. In the present study most preferred class of drugs was CCB which is supported with the study done by Alwyn p Saju *et al.*[10] and Bhanu Priya B *et al.*[11] who found the similar result. The present study concludes 85% deviation from JNC-8 guideline which is similar to the non adherence to JNC-8 guidelines study conducted by Sivasakti Raju *et al.*[12] potrayed only 28 % of overall adherence to JNC-8 guidelines confirming physician's non adherence to prescribing pattern in the clinical step confirming need of clinical pharmacist in each department and to make the physician aware which will help to improve adherence to new guidelines in clinical setting.

CONCLUSION

The study concluded that the treatment of HTN helps to reduce cardiovascular risk associated with the progression of CKD and mortality rate. Medical prescriptions were assessed to find that males of age group (60-69 years) and (50-59 years) are more prone to CKD than the female patients. In this study co-morbidity of DM-2 along with HTN and CKD was seen more prevalent in female (60%) compared to males (57%). In multi-drug therapy dual

therapy was the most preferred among the other multi-drug therapy. The most widely preferred class after assessing all of the individual prescription was CCB and ARB were the least preferred. According to the results study concludes that there was deviation from JNC-8 guidelines (85%) indicating non adherence of the physician to the guideline, 20% of monotherapy were found to have adherence to JNC-8 guidelines. No prescriptions contain ARB +ACE combination and only 2.5 % of dual therapy prescriptions were found to have adhered to JNC-8 guidelines. The study concludes the need of clinical pharmacist who plays a vital role in management of CKD by adherence to JNC -8 guidelines to ensure safety, efficacy and rationality.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATION

CKD: Chronic Kidney Disease; **JNC:** Joint National Commission; **HTN:** Hypertension; **DM:** Diabetes Mellitus.

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