



## STUDY ON PRESCRIPTION PATTERN OF ANTIHYPERTENSIVES IN CHRONIC RENAL FAILURE PATIENTS

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### ABSTRACT

The Aim of the study is to observe the prescription pattern of Antihypertensive's among CKD patients with or without co-morbidities. A Prospective observational study was conducted for period of 6 months at VIMS hospital, Bellary, Karnataka. Data collected from 150 enrolled subjects from patients profile sheets. A total of 150 patients were enrolled in this study. Majority of patients were Male n=105 (70%), and Female were n=45 (30%). The occurrence was higher in age group between 40-69 years n=105 (70%). CKD with co-morbidities were n=98 ( 65.3% ),among them 70 were Male (71.4%) and 28 were Females (28.6%).Among 150 patients 52 patients were diagnosed as CKD, among them 35(67.30%) were Male and 17(32.70%) were Female. The study reveals about the prescription pattern monitoring of Antihypertensive in CKD population. The study concluded that prescription pattern monitoring plays vital role to find out rational and irrational use of drugs and to improve patients quality of life and clinical pharmacist also plays the crucial role in the chronic diseases thereby, prescription pattern monitoring studies helps to observe drug interactions, duplication of the drugs and irrationalities. Therefore, PPM studies helps to select the appropriate choice of drugs based on the standard treatment guidelines to promote the rational use of medicines. Moreover, this kind of studies is helpful to the health care professionals to provide the quality treatment for the benefit of patients. Prescription pattern observed and it has not deviated from the KDIGO guidelines.

**Key Words:-**Prescription pattern monitoring, Rational use of drugs, Quality of life.

### Access this article online

Home page:

<http://ijptjournal.com/>

Quick Response code



DOI:

<http://dx.doi.org/10.21276/ijpt.2020.11.1.5>

Received:22.10.19

Revised:12.11.19

Accepted:22.11.19

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### INTRODUCTION

The aim of our study is to observe the prescription pattern of anti-hypertensive's among the Chronic Kidney Disease patients with or without co morbidities. The objective of our study are to study the

prescription pattern of anti hypertensive's in chronic kidney disease as per guidelines ( Kidney Disease Improving Global Outcome) and to facilitate the effective use of drugs in the chronic kidney disease patients thereby may improve patient health related quality of life.

Prescription pattern monitoring studies are a tool for assessing the prescribing, dispensing and administration of medicines. Main aim of prescription pattern monitoring studies is to facilitate rational use of medicines. It was observed in the majority of studies that if physician do not adhere to the guidelines made by regulatory agencies leading to irrational use of medicines. This intern leads to increased incidence of treatment failure, antimicrobial resistance and economical burden of patient (Shipra J *et al.* 2015).

There is no universally agreed of definition of god prescribing. World Health Organization promotes the rational use of medicines which requires that patient receives medications appropriate to their clinical needs,

in doses that need their own individual requirements for an adequate period of time, in at the lowest cost to them. The prescription pattern monitoring should have the following goals:

- Maximize effectiveness
- Minimize the risk mortality
- Minimize cost

In appropriate prescription pattern can results in morbidity and mortality particularly in geriatric, paediatric and chronic disease population (hypertension, diabetes, epilepsy and mental disorders) are being treated (Roger W and Cate W, 2012).

Chronic Kidney Disease is an abnormality in kidney structure or kidney function for a period of more than three months to several years. The Glomerular filtration rate versus serum creatinine is chosen to categorize the stages of kidney disease, because serum creatinine is an accurate index of glomerular filtration rate. Normal kidney function in adults approximately 120ml/min.

Stages	Glomerular Filtration rate	Terms
1	90-120	Normal
2	60-89	Moderately decreased
3A	45-59	Mild-moderate
3B	30-44	Moderate-severe
4	15-29	Severely decreased
5	<15	Kidney failure

The epidemiology of stage 5 chronic kidney disease has been well documented through the efforts of the United Renal Data System, in national data system that collects, analyses and distributes information about united states patients on haemodialysis and peritoneal dialysis, as well as kidney transplant recipients. Information on the epidemiology of the earlier stages of Chronic Kidney Disease is well categorized.

Incidence estimates of stage 5 are obtained from united state renal data system. During the two decades spanning 1980-2000, the number of patients entering stage 5 increased by 5% to 10% per year, however, beginning in 2003 and continuing to the present, the rate of increase has declined to less than 1%. The main factor attributed to this decline has been the implementation of angiotensin converting enzyme inhibitor and angiotensin receptor blocker therapy as a standard of care for those with early stage Chronic Kidney Disease.

The four most common causes of stage 5 Chronic Kidney Disease in the United States are Diabetes Mellitus, Hypertension, Glomerular Nephritis and Polycystic kidney disease the causes and incidence rate include diabetic nephropathy, hypertensive nephropathy, glomerular nephritis and polycystic kidney disease. Individuals over 65 years of age and black race are at

higher risk of Chronic Kidney Disease (Joseph TD, Robert LT, 2008).

Hypertension is defined as persistently elevated blood pressure. Emergency hypertension is categorized as >180/120 mm of Hg.

Approximately 31% of Americans have elevated blood pressure, defined as greater than or equal to 140/90 mm of Hg. The overall incidence is similar between men and women, but varies depending on age. However, after the age of 64, a much higher percentage of women have blood pressure than men. Prevalence rates are highest in non-Hispanic blacks followed by non-Hispanic whites, Mexican Americans, Americans Indians/ Alaska Natives and Asians.

Blood pressure values increase with age, and hypertension is very common in elderly. The lifetime risk of developing hypertension among those 55 years of age and older who are normotensive is 90%. Most patients have pre hypertension before they are diagnosed with hypertension, with most diagnoses occurring between the third and fifth decades of life (Barbara GW *et al.*, 2017).

Hypertension is one of the causes of the renal disease and there is strong evidence that hypertension accelerates the progression of renal disease, on other hand the prevalence of hypertension in chronic disease patient is very high which may progress to high cardiovascular risk in Chronic Kidney Disease patients.

Patients with Chronic Kidney Disease have more chances to die, largely from cardiovascular disease. In this Chronic Kidney Disease population maintaining the target blood pressure goal, the administration of antihypertensive are necessary from initial stages, especially if the systolic blood pressure is >150mm of Hg. In such cases an anti-renin system drug and either a Diuretic or Calcium Channel Blocker are preferred. So present study was taken for assessing the prescription pattern of antihypertensive in chronic kidney patients. This helps in better controlling of hypertension, preventing of progression of Chronic Kidney Disease, cardiovascular complications, hence improve the health related quality of life in patients.

One of the important cause of End Stage Renal Disease is hypertension and there is a strong evidence that hypertension accelerates the progression of renal disease. On the other hand, the prevalence of hypertension in Chronic Kidney Disease patients are very high, which may progress to high cardiovascular risk in chronic kidney patients. Once they develop end stage renal disease, dialysis patients have eight times the mortality rate of their age matched counterparts in the general population, with cardiovascular causes accounting for more than 50% of deaths (Neethu J *et al.*, 2017).

## MATERIALS AND METHODS

A prospective observational study was conducted in the Department of General Medicine, Vijayanagara Institute of Medical Sciences, Ballari, Karnataka for a period of six months from October 2018-March 2019 and 150 patients were enrolled.

Ethical clearance was obtained by the Institutional Ethics Committee, patients information had collected from patient medical records or case sheets. The data carefully entered into the specially designed data collection form.

### Inclusion criteria

- Hospitalized Chronic Kidney Disease patients with or without co morbidities

- Dialysis patients

### Exclusion criteria

- Acute renal failure patients
- Out patients
- Emergency ward patients

## RESULTS

A prospective observational study conducted in the Department of General Medicine at VIMS, from October 2018 to March 2019, Bellary, Karnataka. A total number of 150 patients have included during the period of study, out of 150 patients 105 were males (70%) and 45 females (45%).

**Table 1. Distribution of Patients According to Gender**

GENDER	TOTAL NUMBER	PERCENTAGE
MALES	105	70%
FEMALES	45	30%

**Table 2. Distributions of Patients According to Age**

AGE GROUP (In YEARS)	Male ( n=105)	Female (n=45)	Total (n=150)
1-40	31	15	46
41-60	60	20	80
61-80	13	10	23
>80	1	0	1

**Table 3. Distribution of patients According to Diagnosis**

GENDER	CKD	CKD WITH CO-MORBIDITES	SAMPLE SIZE (n= 150)
MALE	35	70	105
FEMALE	17	28	45

**Table 4. Distribution of Patients CKD with Co-morbidities**

GENDER	CKD WITH CO-MORBID PATIENTS	PERCENTAGE
MALE	70	71.4%
FEMALE	28	28.6%

**Table 5. Distribution of Patients with CKD**

GENDER	CKD	PERCENTAGE
MALE	35	67.30%
FEMALE	17	32.70%

**Table 6. Distribution of Co-morbidities**

Co-morbidities	Male	Female
CKD with Hypertension	24	12
CKD with type -2 Diabetes Mellitus	2	0
CKD with Hypertension with type – 2 Diabetes	9	4
CKD with Acute Pulmonary Edema	10	2
CKD with HTN and Others (MI, LVF, CVA, LRTI, UTI, SEIZURES, GE,TB, PYELONEPHRITIS, ANAEMIA).	25	10

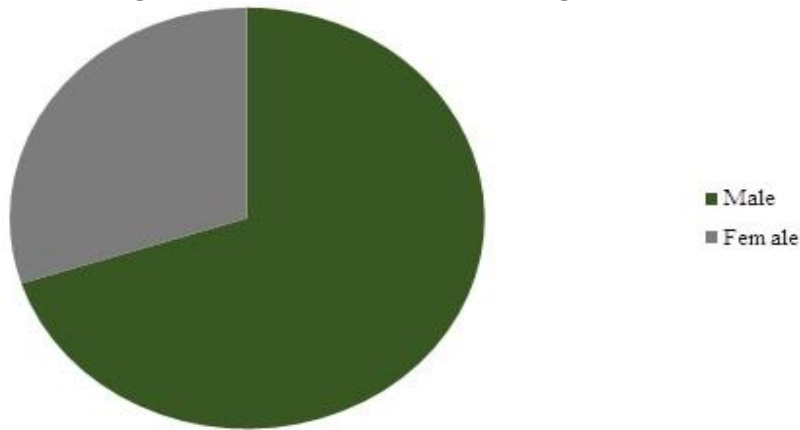
**Table 7. Type of Ant hypertensive's prescribed**

Class of antihypertensive's	Drugs prescribed
Loop diuretics	Furosemide , Torsemide
Osmotic diuretic	Mannitol
CCB	Amlodipine, Nifedipine, Nicardipine, Clonidipine
Beta blockers	Atenolol, Metoprolol, Propranolol, Carvedilol, Labetolol, Nebivolol
ACE Inhibitors	Enalapril
ARB	Telmisartan
Alpha blocker	Prazosin
Vasodilators	Hydralazine and Nitroglycerine
Central alpha 2 - agonist	Clonidine

**Table 8. Irrational drug therapy identified during study period**

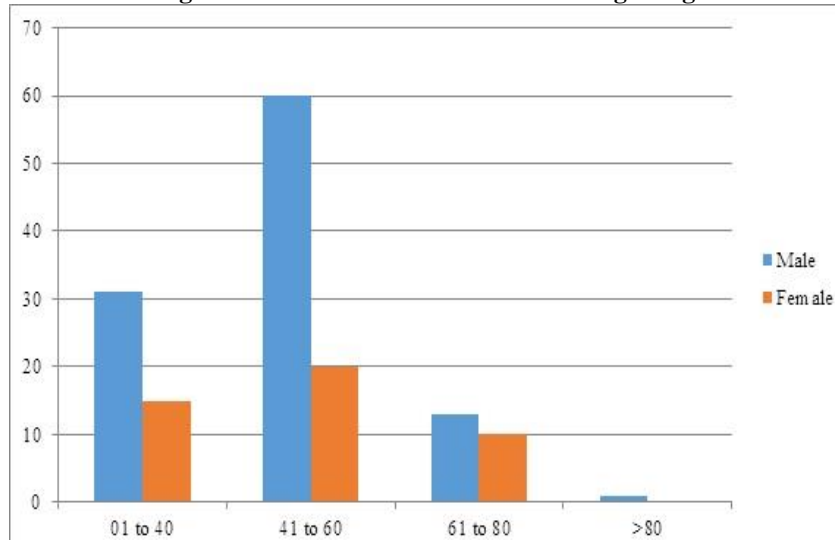
Intervention	Number of patient	Diagnosis	
		CKD	CKD with comorbidities
Contraindication	02	02	00
Inappropriate drug selection	02	01	01
Drug duplication	19	08	11

**Fig 1. Distribution of Patients According to Gender**



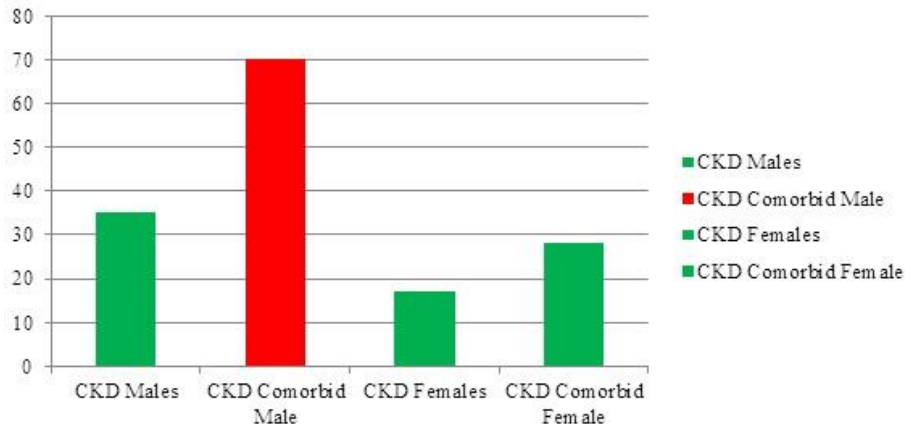
In this study among 150 subjects Prevalence of CKD was more in age group between 40-69 years (n =105)

**Fig 2. Distributions of Patients According to Age**



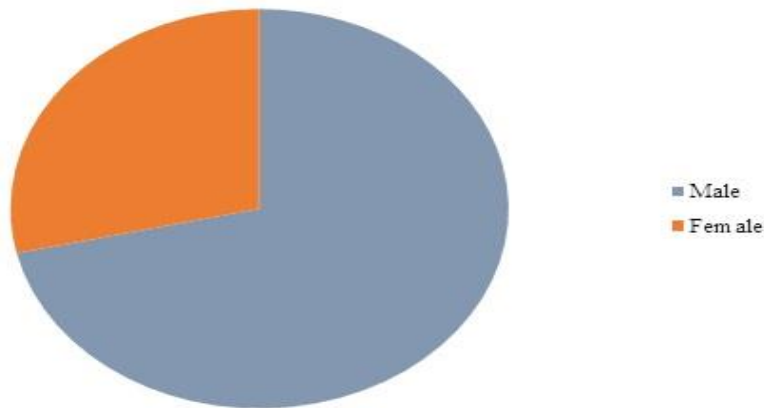
In this study total 150 patients, among them 70 male patients diagnosed as CKD with co-morbid and 30 male patient diagnosed as CKD. Followed by 28 female patients diagnosed as CKD with co-morbid and 17 female patients diagnosed as CKD.

**Fig 3. Distribution of Patients According to Diagnosis**



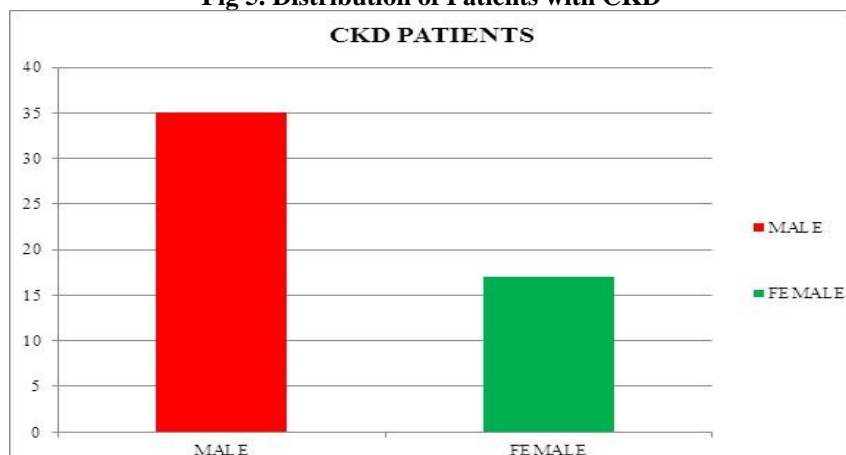
In our study total 150 patients, 98 patients were diagnosed as CKD with co-morbidities. Among them 70 were Male (71.4%) and 28 were Female (28.6%).

**Fig 4. Distribution of Patients CKD with Co-morbidities**

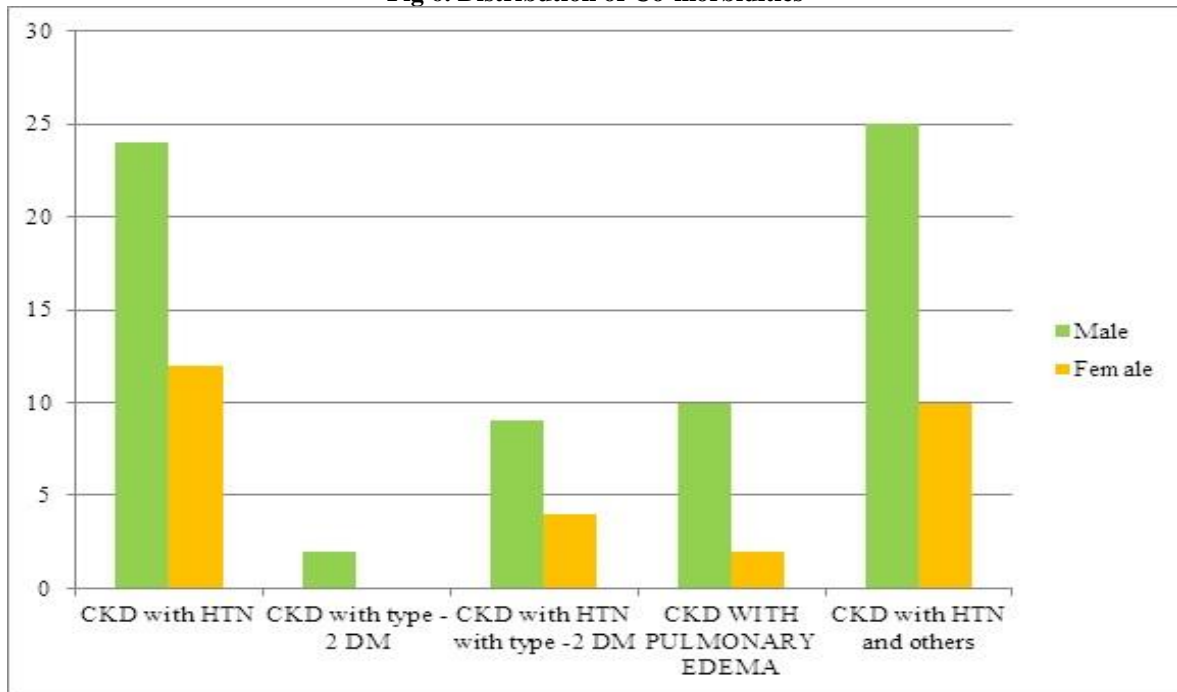


In 150 patients, 52 patients were diagnosed as CKD. Among them 35(67.30%) were Male and 17(32.70%) were Female.

**Fig 5. Distribution of Patients with CKD**

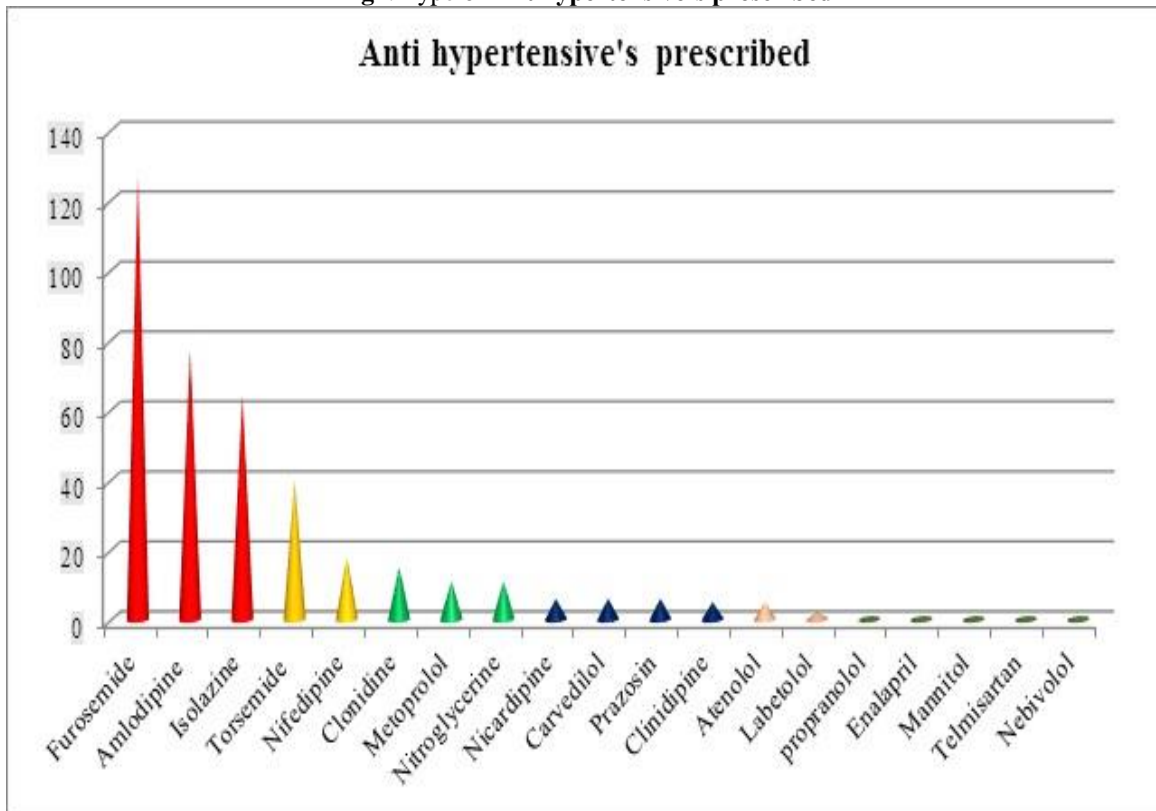


**Fig 6. Distribution of Co-morbidities**

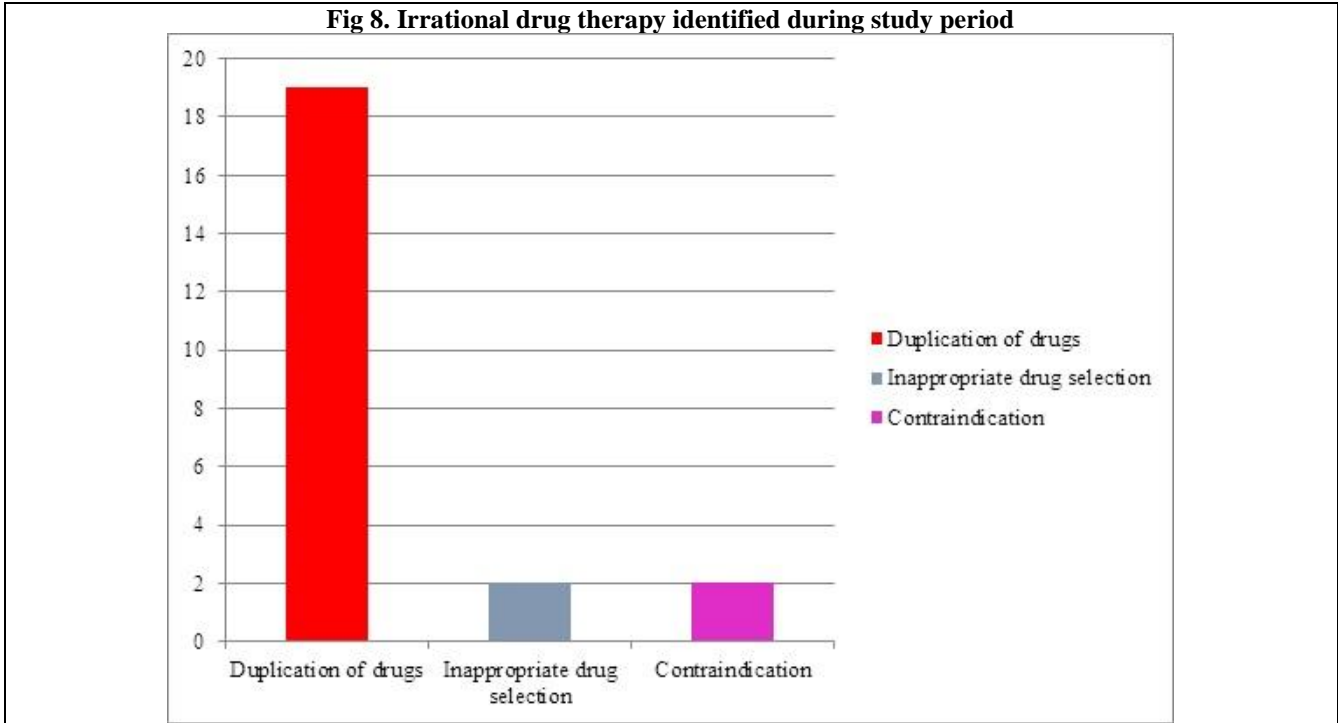


The most commonly prescribed Anti hypertensive's among 150 number of CKD patients were Furosemide , Torsemide ,Amlodipine , Isolazine (Isosorbide di nitrate and Hydralazine) Nifedipine ,Clonidine , Metoprolol, Nitroglycerine . Followed by other antihypertensive prescribed were Nicardipine, Carvedilol, Clinidipine, Atenolol, Propranolol, Enalapril, Mannitol, Telmisartan, Prazosin, Labetolol.

**Fig7. Type of Ant hypertensive's prescribed**



**Fig 8. Irrational drug therapy identified during study period**



**COMBINATION THERAPY**

In this study most commonly prescribed combination therapy of Antihypertensive's were

- CCBs + Loop diuretics
- Loop diuretics + CCBs+ Vasodilators
- Loop diuretics + Vasodilators
- Loop diuretics + CCBs + Beta blockers + vasodilators
- Loop diuretics + Beta blockers + vasodilators
- Loop diuretics + ACE inhibitors + vasodilators
- CCBs + Beta blockers
- Loop diuretics+ Beta blockers
- Loop diuretics + CCBs + Beta blockers
- CCBs + Beta blockers +Central alpha 2 –agonist
- Alpha 1 – blockers + Vasodilators + Central alpha 2 agonist

**MONOTHERAPY**

In this study among 150 CKD patients, Monotherapy have been observed.

- Loop diuretics. (Furosemide).
- CCBs (Amlodipine).

**Irrational drug therapy identified during study period: (23 cases)**

In our study total 150 CKD patients enrolled, among them 23 cases of prescriptions identified some irrational drug therapy such as Contraindications and Inappropriate drug selection and Duplication of the drugs.

**Inappropriate drug selection**

Amlodipine was only the antihypertensive prescribed and administered in the condition of peripheral edema.

**Contra-indications:** Diuretics prescribed in the condition of Hyponatremia.

**Duplication of the drugs**

Selection of same classes of loop diuretics prescribed at the same intervals during the treatment, which resulted in electrolyte disturbances/imbances in some cases.

**DISCUSSION AND CONCLUSION**

The common most problem with chronic kidney disease is hypertension which should be controlled on the basis of patient’s condition. Hence, PPM is one of the important tools which provide standard treatment guidelines to assess and manage hypertension. Hypertension is one of the major cause and complication in chronic kidney disease. Appropriate choices of Antihypertensive drugs should be selected in CKD with hypertension which may helps to decrease the chances of cardiovascular complications, mortality rate and delays progression of CKD.

In this study we observed 150 CKD Patients, among them 105 Male (70%) and 45 Female (30%). Prevalence of CKD being more in men than women, and 35 Males with CKD and 70 Males CKD with Co-morbidities. Whereas, 17 Female with CKD and 28 Females CKD with Co morbidities. A similar study was

conducted by Neethu Joseph *et al.*, on A Study On Prescription Pattern Of Anti Hypertensive Agents in Chronic Renal Failure Patients and Assessment Of Medication Adherence, Which reveals that among 120 CKD Patients 87 Males and 33 Females .Another study conducted by Kiran A Kantanavaret *et al.*, on A study of Prescription Pattern in the drug Therapy of Chronic Kidney Disease , Which reveals that among 188 patients 101 Males and 87 Females. Another Study conducted by BhanuPriya B *et al.*, Pattern of anti hypertensive drug utilization among chronic disease patients in a dialysis unit of tertiary care hospital ,which reveals that among 95 patients 75 Males and 20 females.

In our study, most commonly prescribed Antihypertensive were Furosemide, Torsemide, Amlodipine, Isolazine( Isosorbide di nitrate and Hydralazine ), Nifedipine, Clonidine, Metoprolol, Nitroglycerine and followed by other ant hypertensive's prescribed were Nicardipine, Carvedilol, Clinidipine, Atenolol, Propranolol, Enalapril, Mannitol, Telmisartan, Prazosin, Labetolol.

In our study 150 CKD patients enrolled, among them 23 cases of prescriptions were identified with irrationalities such as Contraindications, Inappropriate drug selection and Duplication of the drugs.

#### Inappropriate drug selection

Amlodipine was only the antihypertensive prescribed and administered in the condition of peripheral edema.

#### Contra-indications

Diuretics prescribed in the condition of Hyponatremia.

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#### Duplication of the drugs

Selection of same classes of loop diuretics prescribed at the same intervals during the treatment, which resulted in electrolyte disturbances/imbances in some cases.

#### STRENGTHS

- Prescription pattern monitoring helps to provide rational use of medications in chronic diseases.
- Improves patient health related quality of life and delays progression of disease.
- It helps to find out the irrationality in the prescriptions and reduces the economical burden on the society.
- It helps to select the appropriate choice of drugs based on the standard treatment guidelines.
- Ultimately, PPM studies assist the health care professionals to provide standard treatment for the betterment of the patient life.

#### LIMITATIONS

- PPM studies may not applicable to all sort of disease management
- PPM study has limited among the patients who have multiple diseases and also difficult to assess in the co-morbid conditions.

#### ACKNOWLEDGEMENT

The authors express sincere gratefulness to Principal Dr. Manjunath V. Jali, and Dr. H.N. Girish, HOD, Department of pharmacy practice, TVM college of pharmacy, Ballari, for giving opportunity to do project.

#### CONFLICT OF INTEREST

Nil

#### Cite this article:

Andrew G.J. K.Srikanth, P.Navya, V.Geethika Reddy, P.Krishnaveni, D.Subhash Reddy Srividya. Study On Prescription Pattern Of Antihypertensives In Chronic Renal Failure Patients..*International Journal of Pharmacy & Therapeutics*, 11(1), 2020,19-26.DOI: <http://dx.doi.org/10.21276/ijpt.2020.11.1.5>



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