Original Article

# Assessment of Prescribing Patterns of Drugs in Chronic Kidney Disease Patients in a Tertiary Care Hospital

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## ABSTRACT

**Introduction:** A decrease in the Glomerular Reduction Rate, urinary abnormalities, or anatomical abnormalities of the renal tract are all signs of chronic kidney disease. **Objectives:** The main aim of our study is an assessment of prescribing patterns of drugs, patient comorbidities and risk factors associated with CKD. **Materials and Methods:** For six months, a retrospective observational study was carried out in a 700-bed multispecialty hospital. The statistical analysis was completed using Version 20 of the statistical package SPSS. [IBM SPASS statistics]. **Results:** Out of 99 patients included in the study, 76 were males and 23 were females. Majority of the patients were between the ages of 40 – 49, Only 7.1 percent of the patients were aged 20–29 years. Majority of the participants in the study were in the 40-49 year old age bracket. 89 patients were prescribed with anti-hypertensives,26 patients were prescribed with anti-diabetics, 57 patients were prescribed with anemic drugs,67 patients were prescribed with PPI's,49 patients were prescribed with Diuretics. The most commonly occurring risk factors were found out to be Diabetes and High Blood Pressure. **Conclusion:** The most common pattern of prescription observed are anti-hypertensive Agents followed by anemic drugs. The number of patients involved in the study are having CKD stage 5 and associated with other comorbidities like hypertension, anemia, diabetes etc. Diabetes and high blood pressure are the two most common causes of chronic kidney disease, as well as the most common risk factors among CKD patients.

**Keywords:** Chronic kidney disease, Glomerulus filtration rate, Creatinine, Fluid intake, Prescribing patterns, Comorbidities, Risk factors.

## INTRODUCTION

Chronic Kidney Disease (CKD) is characterised by a decrease in Glomerular Filtration Rate (GFR), as well as urine irregularities and structural changes in the renal tract. The kidney regulates sodium and water balance, as well as acid-base equilibrium. They also make hormones that are important for blood cell formation and calcium balance.[1] Chronic renal insufficiency or progressive kidney disease are other terms for chronic kidney disease.[2] Because medication is often difficult to manage, CKD is a risk factor for cardiovascular disease (CVD), hypertension, renal osteodystrophy, anaemia, malnutrition, and a high level of polypharmacy. The glomerular filtration rate (GFR) lowers as a result, changing the kidney's pharmacokinetics and pharmacodynamics. To avoid toxicity and the progression of CKD, drug dose regimens had to be adjusted in patients with impaired renal function. Maintaining kidney function requires optimal medication therapy. The majority of investigations on renal function prescribing trends have been conducted on older people. Since CKD patients are more likely to experience medication therapy issues, they require frequent monitoring and dosage modifications.[3]

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## MATERIALS AND METHODS

A retrospective observational study was done in the Department of Nephrology and General Medicine of Yenepoya Medical College and Hospital, Mangalore for a period of six months. Based on inclusion and exclusion criteria, about 99 patients were chosen for the study. Patient information was gathered utilizing a patient data collecting form that contained demographics, laboratory tests, diagnoses, and medications.

**Study Site:** The study was conducted at the concerned department, Yenepoya Medical College and Hospital, Mangalore. It is a 700 bedded Multi-Specialty Tertiary Care Teaching Hospital.

**Study Design:** This is a Retrospective Observational Study.

**Study Period:** Six months in Yenepoya Medical College and Hospital Mangalore.

### Study criteria

The study was carried out based on the criteria such as patients who are above 18 years of age. Patients from both inpatient and outpatient departments were included in our observational study.

**Study participants:** below 18years of age, intensive care unit, and pregnant or lactating women were excluded from our study.

**Ethical Approval:** The study was approved by Yenepoya Ethics Committee 2

**Approval date**: 16-04-2021 Protocol no: YEC2/755

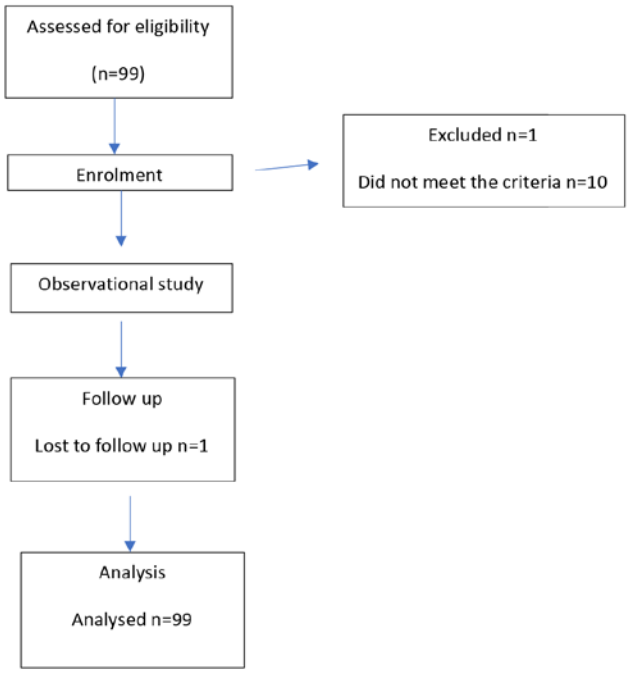
### Data collecting method

Data will be collected through a review of case sheets in the inpatients of the concerned department. The data collection includes patient details like age, sex, weight, height, history, diagnosis and treatment given to the patients.

### Statistical Analysis

SPSS (Statistical Package for Social Science) version 20. [IBM SPASS statistics (IBM corp. Armonk, NY, USA released 2011)] was used to perform the statistical analysis. Data was entered in the excel spreadsheet. Descriptive statistics of the explanatory and outcome variables were calculated by mean, standard deviation, frequency, and charts

## RESULTS




**Consort flow chart**

### Gender wise distribution

Out of 99 patients included in the study, 76(76.8%) were males and 23(23.2%) were females.

### Age-Gender Distribution

Majority of the patients (27.3%) were in the age group of 40-49 years. Only7.1%belonged to the age group of 20-29 years. Majority of the Males (21.2%) and Females

**Table 1: Gender wise distribution.**

| Gender | No of patients | Percentage (%) |
|---|---|---|
| Male | 76 | 76.8 |
| Female | 23 | 23.2 |

**Table 2: Age-Gender Distribution.**

| Age groups (in years) | No. of Males | Percentage | No. of Females | Percentage | Total no. of Patients | Percentage |
|---|---|---|---|---|---|---|
| <=19 | 1 | 1.0% | 1 | 1.0% | 2 | 2.0% |
| 20-29 | 6 | 6.1% | 1 | 1.0% | 7 | 7.1% |
| 30-39 | 14 | 14.1% | 7 | 7.1% | 21 | 21.2% |
| 40-49 | 21 | 21.2% | 6 | 6.1% | 27 | 27.3% |
| 50-59 | 18 | 18.2% | 6 | 6.1% | 24 | 24.2% |
| 60-69 | 15 | 15.2% | 1 | 1.0% | 16 | 16.2% |
| >=70 | 1 | 1.0% | 1 | 1.0% | 2 | 2.0% |

Majority of the study participants were in the age group of 40-49 years.

**Table 3: CKD Staging.**

| CKD Staging | No of Participants | Percentage |
|---|---|---|
| Stage 3 | 12 | 12.12 |
| Stage 4 | 19 | 19.19 |
| Stage 5 | 68 | 68.68 |

**Table 4: Representation of patients prescribed with anti-hypertensives.**

| Classification of Anti-Hypertensives | No. of Patients |
|---|---|
| Diuretics | 10 |
| Alpha agonist | 20 |
| Calcium Channel Blockers | 30 |
| Vasodilators | 5 |
| ARB | 8 |
| Alpha adrenergic agonist | 9 |
| Beta Blockers | 7 |

**Table 5: Distribution of anti- diabetic among CKD patients.**

| Anti-Diabetic | No. of Patients |
|---|---|
| Insulin | 12 |
| Sensitizers | 2 |
| Secretagogues (Sulfonylureas, Nonsulfonylureas) | 9 |
| Alpha- glucosidase inhibitors | 2 |
| Peptide Analogs | 1 |

(27.3%) belonged to the age group of 40-49 years. The mean age of study participants is 47.2 years with the stand deviation of 12.9 years.

## CKD-Staging

68.68% (68) of the patients in stage 5 CKD,19.19% (19) were in stage 4 and 12.12% (12) were in stage 3. CKD stage 5 was found to be the most common (68%).

## Prescription of anti- hypertensives in CKD patients

Total 99 patients with CKD were enrolled in the study. Out of them, 89 patients were prescribed with anti-hypertensives. Hence the total percentage of anti- hypertensives prescribed was found to be 89.9%. Commonly prescribed anti-hypertensives were amlodipine, captopril, losartan, telmisartan.

## Distribution of anti- diabetic among CKD patients

Total 99 patients with CKD were enrolled in the study. Out of them, 26 patients were prescribed with anti-diabetics. Hence the total percentage of anti-diabetic prescribed was found to be 26.3%.

**Table 6: Representation of distribution of anemic drugs.**

| Drugs | No. of Patients | Percentage |
|---|---|---|
| Prescribed | 57 | 57.6% |
| Not prescribed | 42 | 42.4% |

**Table 7: Representation of Distribution of Proton Pump Inhibitors.**

| Proton Pump Inhibitors | No. of Patients |
|---|---|
| Pantoprazole | 20 |
| Omeprazole | 13 |
| Rabeprazole | 15 |
| Lansoprazole | 10 |
| Esomeprazole | 9 |

**Table 8: Representing distribution of diuretics.**

| Diuretics | No. of Patients |
|---|---|
| Loop Diuretics | 21 |
| Thiazides | 13 |
| Carbonic anhydrase inhibitors | 1 |
| Potassium Sparing Diuretics | 8 |
| Osmotic Diuretics | 6 |

**Table 9: Representing Distribution of various other drugs.**

| Antibiotics, Anti-Emetics etc. | No. of Patients |
|---|---|
| Antibiotics | 46 |
| Anti- emetics | 29 |
| Analgesic Antipyretic | 9 |

## Distribution of anemic drugs among CKD patients.

Total 99 patients with CKD were enrolled in the study. Out of them, 57 patients were prescribed with anemic medication. Hence the total percentage of anemic drugs prescribed was found to be 57.6%. Commonly prescribed drugs were ferrous ascorbate, erythropoietin and zinc sulphate.

## Distribution of Proton Pump Inhibitors in CKD patients

Total 99 patients with CKD were enrolled in the study. Out of them, 67 patients were prescribed with PPI's. Hence the total percentage of PPI's prescribed was found to be 67.7%. Commonly prescribed PPI's were

Pantoprazole, Omeprazole and Rabeprazole.

### Distribution of Diuretics in CKD patients.

Total 99 patients with CKD were enrolled in the study. Out ofthem,49 patients were prescribed with Diuretics. Hence the total percentage of diuretics drugs prescribed and was found to be 49.5%. Commonly prescribed Diuretics were Furosemide and Chlorothiazide.

### Distribution of various other drugs among CKD patients

Total 99 patients with CKD were enrolled in the study. Out of them, 84patients were prescribed with various other drugs which includes antibiotics, anti-emetics, anti-pyretic etc. Hence the total percentage was found out to be 84.8%.

## DISCUSSION

CKD is described as decreased kidney function or excessive albumin excretion that last longer than three months as measured or it is estimated by the glomerular filtration rate (GFR). The most prevalent complication of progressing renal disease is end-stage renal disease. The study was carried out with the aim to assess the prescribing pattern of drugs in chronic liver disease and to evaluate the comorbidities in a tertiary care hospital. The discussion is based on the data obtained from 99 patients which is included in the study.

In this study the males were in the majority compared to female subjects which coincides with the study conducted by Tadvi N A *et al.*[4] Majority of the subjects which is included in the study were from the age group of 40-49 years $\pm$ 12.9 which is related to the mean age of 43.9 $\pm$ 17.8 in a study conducted by Amoako A Y *et al.*[5] The most commonly prescribed class of drug in our study w-as found to be Anti- Hypertensives(89.9%). Other frequently prescribed class of drugs include multi-vitamins (84.8%), PPI's (67.7%), erythropoietin stimulating agents (57.6%), Diuretics (49.5%), Diabetic drugs (26.3%) which is comparable to the study done by Anil A *et al.*[6] Hypertension was the most common comorbidity found in our study population (78.8%) followed by anemia (50.5%) and diabetes mellitus (30.3%) which is similar to reports of patients who had hypertension (16%) as the leading medical condition and diabetes mellitus (9.5%) found in the study done by Raja V, *et al.*[7] The most commonly prescribed antihypertensive in the study participants were amlodipine, captopril, losartan, telmisartan. Shamkuwar A C *et al.* reported that diuretics followed by calcium channel blockers (CCB) were most frequently prescribed drug.[8] The most commonly prescribed antidiabetic drug was Metformin, Repaglinide, Sitagliptin, Glimepiride and human insulin. AlRamahi R. reported that insulin followed by gliclazide. Was the most commonly prescribed drug.[9] The most commonly prescribed anti-anemic drugs were folic acid, ferrous ascorbate, zinc sulphate which is compared to the study of Amenous *et al.* found that hematinic followed by vitamin supplements are the most commonly prescribed drug.[10]

## CONCLUSION

The most common pattern of prescription is observed was anti-hypertensive. Agents in which the commonly prescribed drugs were amlodipine, captopril, losartan and telmisartan followed by the anemic drugs which include ferrous ascorbate, erythropoietin and zinc sulphate. Maximum number of patients involved in the study are having CKD stage 5 and associated with other comorbidities like hypertension, anemia, diabetes etc. Hypertension followed by anemia and diabetes is the most common comorbidities in the CKD patients. The management of these factors at an earlier stage can prevent the morbidity and which is associated with the CKD. Diabetes and high blood pressure are the two leading causes of chronic kidney disease and also the most common risk factor associated with CKD patients. Thus, regular studies are needed to determine medication prescribing patterns in order to enhance management strategies and patient quality of life.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ABBREVIATIONS

**CKD:** Chronic kidney disease; **CKD-EPI:** Chronic Kidney Disease, Epidemiology Collaboration; **CRP:** c-Reactive Protein; **DKD:** Diabetic Kidney Disease; **GFR:** Glomerulus Filtration Rate; **PD:** Peritoneal Dialysis.

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