

ANALYSIS OF DRUG UTILIZATION PATTERN IN CHRONIC KIDNEY DISEASE PATIENTS IN A TERTIARY CARE HOSPITAL, SOUTH INDIA

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ABSTRACT

Objective: The objective of the study is to assess the drug utilization pattern of various drugs prescribed in chronic kidney disease (CKD) patients in a tertiary care hospital.

Methods: As a cross-sectional study 200 prescriptions were randomly selected from both the nephrology outpatient department and the inpatient ward. Patient demographics details, CKD staging, classes of drugs prescribed, and number of drugs prescribed were noted and data were analyzed with the World Health Organization core prescribing indicators.

Results: Incidence of CKD is more common in the age group of 40–50 years (45%) with male predominance (70%). Hypertension, diabetes, and anemia are the common comorbid conditions seen with CKD. Anti-hypertensives, anti-anemic drugs, calcium supplements, and anti-diabetic drugs are the commonly prescribed drugs in CKD. Number of prescription contains that generic names are near optimal and drugs from the National List of Essential Medicine are optimal. Majority of the prescriptions contain on average 5 drugs.

Conclusion: Diabetes and high blood pressure are the two most common causes of CKD with male dominance. Since polypharmacy is common in CKD patients, they should be monitored for drug – drug interaction and adverse drug reactions.

Keywords: Chronic kidney disease, Drug utilization pattern, Adverse drug reactions.

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INTRODUCTION

Drug utilization pattern studies will analyze the drugs used in chronic kidney disease (CKD) patients in reference to the class of drugs, indication, dose, dosage schedule, duration of therapy, combinations of the drugs used, side effects, and comorbid conditions. The global burden of disease study in 2017 suggested that the global prevalence of CKD is 9.1% and the 12th leading cause of death worldwide [1,2].

CKD patients are more susceptible to infections and antimicrobial agents are likely to be prescribed and they are prone to develop adverse drug reactions (ADR), particularly when elder adults with multiple comorbidities who are exposed to polypharmacy [3-6].

Renal failure and the aging process have an impact on the pharmacokinetic and pharmacodynamic profiles of drugs and can result in an increased incidence of ADRs and drug interactions [7]. Dose adjustments are therefore necessary for some drugs, especially which are exclusively excreted by the kidney in patients with CKD, to prevent potential ADRs.

The dosing of all drugs, including antibiotics should be optimized and monitored to prevent ADRs, avoid further renal injury, and facilitate treatment outcomes [8-10].

The marketing, distribution, prescription, and use of drugs in a society, with special emphasis on medical, social, and economic consequences are done in drug utilization research [2,11,12]. It is an important tool to study the clinical use of drugs in the population and its impact on the health-care system [3,13].

To observe the changes in prescription pattern, to form guidelines, or for timely updating of the guidelines and to check adherence to it, drug utilization studies are needed at regular intervals.

Objectives

The objectives of the study are as follows:

1. To assess the drug utilization pattern of various drugs prescribed in CKD patients in a tertiary care hospital.
2. To find the drug-related problems in chronic kidney disease patients.

METHODS

Study Center

Government Chengalpattu Medical College and Hospital, Tamil Nadu.

Period of study

May 2022.

Study design

Cross-sectional study.

Study population

Patients attending nephrology outpatient and nephrology ward.

Sample size

200.

After ethics committee approval, prescriptions of the patients attending the nephrology outpatient department, admitted to ward, and dialysis unit were randomly selected and analyzed. Convenience sampling was used. Demographic profile of the patient, diagnosis of the patient

with etiology, associated co-morbidities, drugs prescribed, indications, adverse drug reactions, drug interaction, compliance, and tolerability were noted [14-18].

RESULTS AND DISCUSSION

Table 1 shows the demographic profile of the patients. More number of patients belongs to 40–50 years of age group. Male patients are more compared to female patients. The most common three comorbidities associated with CKD are hypertension, diabetes, coronary artery diseases (CAD).

Table 2 shows various dosage forms used in prescriptions in CKD patients. Tablets are the most common dosage form used. Syrups are minimally prescribed.

Table 3 explains the World Health Organization (WHO) drug prescribing indicators; the average drug per counter is 5. Prescriptions are according to generic names and national lists of essential medicines. Only a few prescriptions contain antibiotics.

The common groups of drugs prescribed are anti-hypertensives, calcium supplements, sodium bicarbonate, and antidiabetics.

Table 1: Demographic profile of the patients

Characteristics	Percentage
Age of the patients	
>60	5
60–50	15
50–40	45
40–30	20
30–20	15
Sex	
Female	30
Male	70
Comorbids	
Hypertension	90
Diabetes	60
CAD	30
Obstructive uropathy	7
Thyroid	5
Tuberculosis	5
Anemia	70
Autoimmune disease	2

CAD: Coronary artery diseases

Table 2: Dosage forms used in prescriptions

Dosage forms used in prescriptions	Percentage of prescriptions
Tablets	95
Capsule	30
Injection	30
Syrup	2

Table 3: WHO drug prescribing indicators analyzed

The WHO drug prescribing indicators	Percentage
Average drugs per encounter	5
Percentage of drugs prescribed by generic name	98
Percentage of prescriptions with antibiotics	7.5
Percentage of prescriptions with injections	15
Percentage of drugs from the national list of essential medicine	100

WHO: World Health Organization

Out of 200 prescriptions audited the incidence of CKD is higher with the age group of 40–50 years (45%) which is similar to the findings seen with the study by Shamkuwar *et al.* [19]. More common in male patients (70%) than in female patients (Table 1) which is seen study by Thomas *et al.* [20].

The comorbidities associated with CKD are hypertension (90%), diabetes (60%), and CAD (30%) which is similar to the study Atray *a*. The prevalence of anemia is (70%) in CKD.

Most of the patients fall with stage 4, 5 CKD (60%) (Table 4). The common dosage form used is tablets. Commonly prescribed injections are insulin, erythropoietin, and antibiotics which is less than the study with Rakshana and Selva [21].

According to the WHO prescribing indicators analyzed (Table 3), the percentage of drugs prescribed by generic name is 98% which is near to optimal and from the NLEM list is 100% which is the optimal level. Percentage of antibiotics prescribed is 7.5% which is optimum (<30% optimal level). Moreover, the percentage of prescriptions with injections is more than the optimal level of 15%, (<10% is the optimal level).

Among the various classes of drugs prescribed (Table 5), major classes of drugs prescribed are anti-hypertensives (90%), iron supplements (80%), calcium supplements (70%), antidiabetics (60%), statins (40%), sodium bicarbonate (62%), hematopoietic agents (32%) which is similar to findings seen with the study Roja Rani *et al.* [22].

Average number of drugs prescribed per prescription (Fig. 1) is 5 which is above the optimal level. It is because of the severity of the disease and comorbid conditions associated with the disease.

Table 4: Distribution of patients in reference to stages of CKD

Stages of CKD	Percentage of patients
1	5
2	5
3 ^a	10
3 ^b	20
4	30
5	30

CKD: Chronic kidney diseases

Table 5: Classes of drugs prescribed

Drug class	Percentage
Antihypertensives	90
Iron supplements	80
Calcium supplements	70
Immunosuppressants	10
Anti-platelets	30
Anti-diabetics	60
Steroids	8
Antibiotics	7.5
Benign prostatic hyperplasia drugs	5
Statins	40
Analgesics	2
Thyroid drugs	5
Antiviral	2
Disease-modifying antirheumatic drugs	0.5
Anti-tubercular	5
Anti-gastric agents	10
Phosphate binders	32
Sodium bicarbonate	62
Hematopoietic agents	32
Others	5

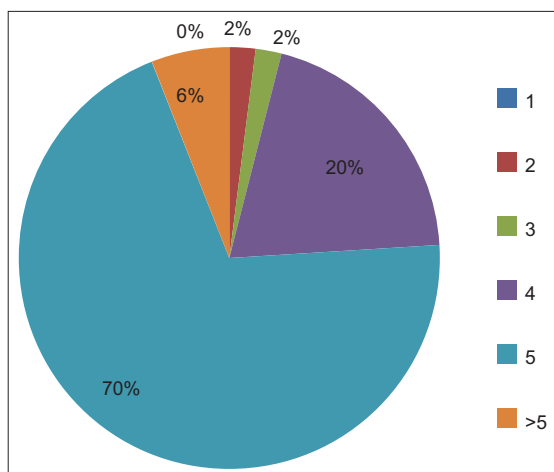


Fig 1: Number of drugs per prescription

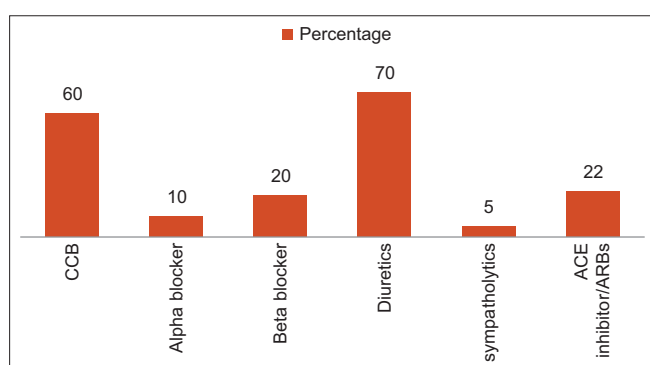


Fig 2: Different classes of anti-hypertensives used in chronic kidney disease

Table 6: Different classes of antidiabetics used in chronic kidney diseases

Classes of antidiabetic drugs	Percentage
Insulin	35
Sulfonyl urea	40
Metformin	10
DPP4 inhibitors	0
Non-taking any antidiabetics	30

Table 7: Drug-related problems in chronic kidney diseases

Problem	Number of prescriptions
ADR	5
Dose adjustment needed	5
Drug interactions	10
Irrational prescriptions	2

ADR: Adverse drug reactions

Different classes of antihypertensives (Fig. 2) used were noted. In that calcium channel blockers, diuretics, angiotensin-converting enzyme inhibitors/angiotensin receptor blockers are commonly prescribed, Table 6 shows that sulfonylureas and insulin are the commonly prescribed antidiabetics in CKD patients.

Table 7 shows the common drug-related problem noted in CKD. Since polypharmacy is common in CKD, there may be a higher incidence of ADR and drug interactions among CKD patients, patients should be continuously monitored with laboratory and clinical parameters for dose adjustments in CKD.

Study limitations can be an increase in sample size that will give a broader perspective of prescription patterns. Since the study is done in a single center, it may not be extrapolated to the general population with CKD.

CONCLUSION

This study will serve as basis for comparison with other drug utilization studies in CKD in the future. The number of prescriptions from the National List of Essential Medicine is optimal level in this study and prescriptions were written in the generic name which is near optimum. Polypharmacy seen in CKD may increase the possibility of drug interactions and adverse events. Further studies with special consideration of drug-related problems to include drug-drug interactions, adverse events, and adherence can be conducted. The analysis of prescription patterns in CKD at regular intervals is essential to understand and improve the drug utilization pattern in CKD.

AUTHORS CONTRIBUTION

Study conception and design: Dr. Siyamala Devi T, Dr. Hemalatha K; Data Collection, Analysis, and interpretation of results: Dr. Siyamala Devi T, Dr. Hemalatha K; Draft manuscript preparation: Dr. Siyamala Devi T, Dr. Renuka A.

CONFLICT OF INTEREST

Nil.

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