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A RETROSPECTIVE STUDY ON PRESCRIPTION PATTERN IN PATIENTS UNDERGOING DIALYSIS AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To evaluate the prescription pattern in CKD patients undergoing dialysis, to study the impact of polypharmacy and to study co-morbidities associated with CKD patients. CKD has been recognized as a leading public health problem worldwide. Patients under dialysis are under higher risk of many comorbidities.

Methodology: A retrospective observational study was carried out in a tertiary care hospital for a period of 6 months in which data from January 2019 - December 2021 were collected from the Nephrology Department.

Result: Out of 225 CKD patients undergoing hemodialysis, 152 were males and 73 were females. The most prescribed drug in the study population was cardiovascular drugs (44%). This was followed by Hematopoietic agents (19%). The most common comorbid condition associated with these patients was hypertension (97.55%) followed by anemia (94.22%). An average of 11 drugs were prescribed per prescription which showed polypharmacy and drug interactions were found to be about 26.19%.

Conclusion: Dialysis among chronic kidney disease patients is increasing in the present scenario. Appropriate drug selection is important in order to avoid unwanted drug effects. This study was an attempt to study the prescribing pattern in patients undergoing hemodialysis

Keywords: Chronic kidney disease, hemodialysis, prescription pattern, comorbidities, polypharmacy

INTRODUCTION

Chronic kidney disease (CKD) is defined as a heterogeneous disorder that affects kidney structure and function in which the kidney is not able to filter waste and excess fluid from the body. It causes reduction in Glomerular filtration rate (GFR) of less than 60ml/min/1.73m2 for 3 or more months **[1]**. CKD has been recognised as a leading public health problem and a major cause of increased morbidity and mortality **[2, 3]**. CKD is a major medical problem because of increased incidence, prolonged hospital stays, increased treatment burden and poor outcome of treatment because of associated comorbidities and complications **[4]**. The global estimated prevalence of CKD is 13.4% and in India, the prevalence of CKD is about 17.2% **[5]**. Estimates of the global burden of the diseases reported that kidney diseases contribute 8,30,000 deaths annually making them the 12th highest cause of death and disability-adjusted life years (DALY) in 1,88,67,000 that is 17th cause of disability (1% of all DALY) **[6]**.

One of the major treatment options for CKD patients is dialysis and dialysis patients require special consideration regarding prescription of drugs because of altered pharmacokinetic and pharmacodynamic profiles and they have increased potential for adverse reactions **[7]**. The number of patients receiving renal replacement therapy in the form of dialysis has been increasing over the recent years **[8]**. Frequent administration of various medication during dialysis days, restricted life styles, unstable nature of disease conditions and prescription with huge number of drugs make these patients more prone or vulnerable to drug - drug interactions and adverse effects, decreased compliance or adherence to the treatment regimens **[9]**.

Patients suffering from CKD have a greater number of comorbid conditions either due to kidney dysfunction or complications of underlying diseases such as cardiovascular diseases like hypertension and CAD, diabetes, CKD - related bone disorders and anaemia **[10]**. These comorbid conditions may lead to administration of multiple drugs often causing Medication Related Problem (MRP) **[11, 12]**.

Polypharmacy is defined as the intake of five or more medications per day. As CKD

progresses, the drugs given for the dialysis patients increases thus the prevalence of MRP also increases. The purpose of this study was to obtain information about the prescription pattern in CKD patients undergoing dialysis and the comorbidities associated.

MATERIALS AND METHODS

Study design

A retrospective, observational study was conducted for a period of 6 months in the Medical Records Department, Nephrology department at a tertiary care hospital consisting of 900 beds and offering a complete range of health care services. Prescription related data were collected from the medical records.

Study population

The study population consisted of 225 hemodialysis patients who received dialysis from January 2019 to December 2021. All the patients who satisfied the inclusion and exclusion criteria were enrolled in the study.

Inclusion criteria. IP patients who were undergoing hemodialysis, patients above 18 years

Exclusion criteria. Pregnant and lactating women, patients undergone renal transplant and patients with incomplete medical records.

Data collection

Data were collected through direct examination of the medical records. The study protocol was approved by the Institutional Ethics Committee before accessing the patient's records. Relevant data from the medical records were taken, which involves demographic details, diagnosis, comorbid conditions, dosage regimen, duration of treatment, frequency and duration of dialysis etc.

Data analysis

The data collected was analysed statistically using descriptive statistics. Wherever necessary, the results are depicted in the form of percentages and graphs.

RESULTS AND DISCUSSION

Patient characteristics

The study involved 225 CKD patients undergoing dialysis. Among these 152 were males and 73 were females. Most of them who have undergone dialysis were male patients above 65 years followed by patients in the age group of 55 -64 years **(Table 1)**.

Prescription analysis

The highest prescribed drugs among these patients were cardiovascular drugs (44.4%) followed by hematopoietic drugs (19.6%). Among cardiovascular drugs calcium channel blockers (CCB) were commonly prescribed (34%). Among hematopoietic drugs erythropoietin was most commonly prescribed (52.3%) followed by iron supplement **(Figure 1)**.

Comorbid conditions

The most common comorbidity associated with these patients were found to be hypertension (97.55%) followed by anemia (94.22%), cardiovascular disease (71.55%) **(Figure 2)**. A total of 225 prescriptions were analysed with a total of 2025 drugs, an average of 11 drugs per prescription prescribed in the study showing polypharmacy **(Table 2)**. The number of prescriptions with polypharmacy was 222 which accounts for 98.81%. 26.19% of drug interactions were found, among which the interaction between clonidine and beta blocker (9.33%) was found with highest frequency **(Table 3)**.

Table 1: Distribution of patients based on gender and age

Age	Female	Male	Total
18-30	**1**	**3**	**4**
31-44	**9**	**19**	**28**
45-54	**21**	**18**	**39**
55-64	**13**	**52**	**65**
65 and above	**29**	**60**	**89**
TOTAL	**73**	**152**	**225**

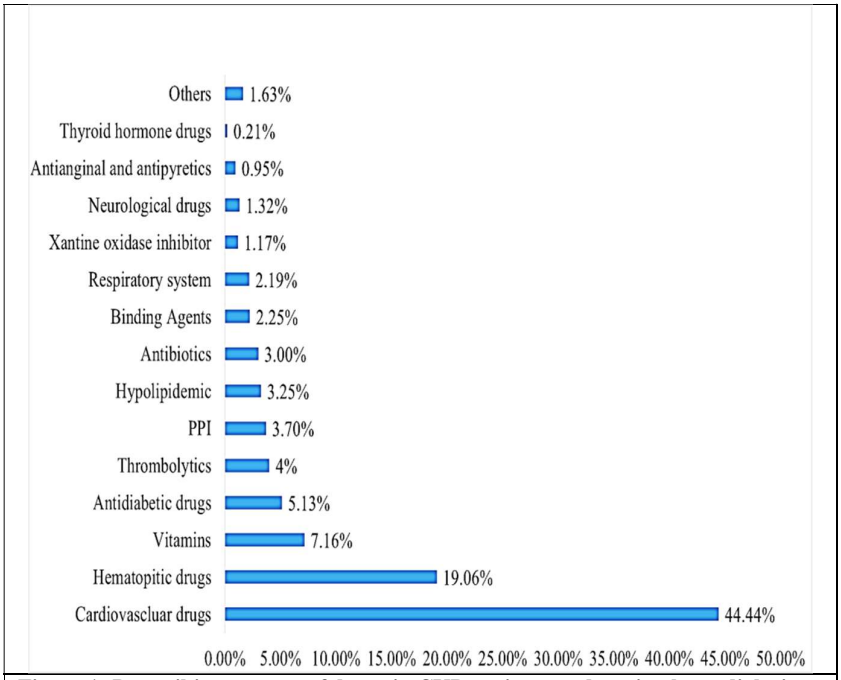

Figure 1: Prescribing pattern of drugs in CKD patients undergoing hemodialysis

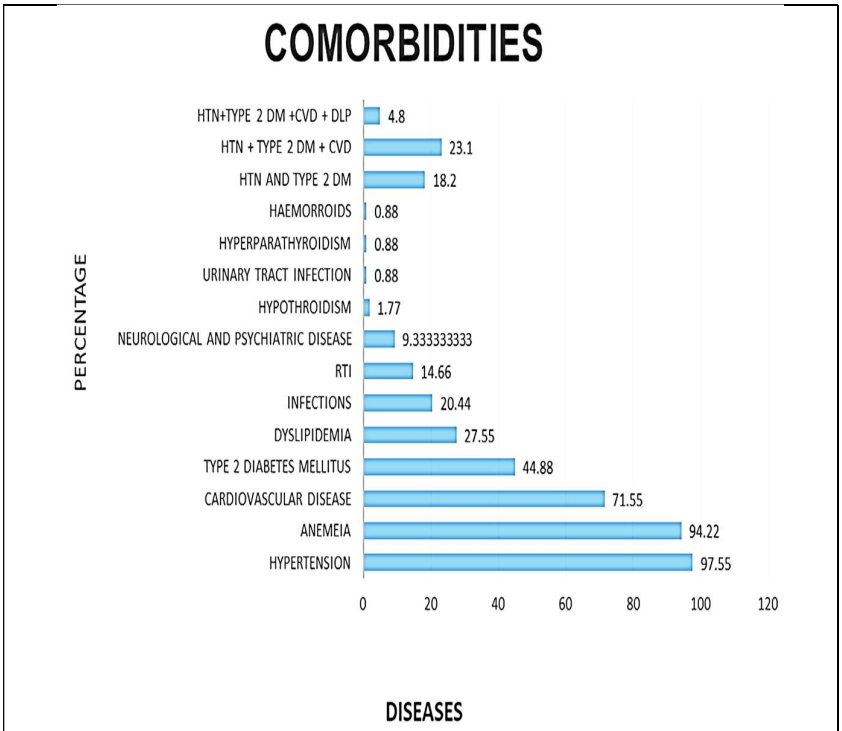

Figure 2: Comorbidities associated with dialysis patients

Table 2: Prescription analysis	
Total number of prescriptions analysed	225
Number of different classes of drugs prescribed	19
Total number of drugs prescribed	2025
Average number of drugs per prescription	11
Number of prescription with polypharmacy	222

Table 3: Drug interactions		
Drugs	*f*	%
Aspirin + Clopidogrel	17	7.55
Furosemide + Metolazone	9	4
Clonidine + Beta Blockers	21	9.33
Aspirin + Heparin	4	1.77
Clonidine + Benzodiazepine	3	1.33
Atorvastatin + Ranolazine	1	0.44
Spironolactone + Losartan	1	0.44

***Note. f* = Frequency, *%*= Percentage**

CKD is recognized as a major medical problem worldwide. Patients undergoing hemodialysis have many complications like fluid retention, low haemoglobin levels and increased phosphate levels. Many comorbid conditions are also associated with these patients which leads to increased chances of polypharmacy and drug related problems.

Among 225 patients included in this study, in this study it is seen that elderly patients account for an increased fraction of patients on dialysis worldwide due to ageing and underlying comorbidities thus justifying the

higher number of our study subject belonging to the age group of 65 years and above. In addition, 68% of the study population were males whereas 32% were constituted by females. It was found that men are at increased risk of reaching CKD sooner than women because of differences in hormone levels. Higher testosterone levels in men may cause a loss in kidney function. On the other hand, men's kidneys may not be protected by estrogen, which is higher in women until menopause. These findings are supported by studies conducted by Mukhtat Ansari *et al* **[13]**.

The commonly prescribed drug was found to be cardiovascular drugs (44.4%) followed by hematopoietic drugs which was found to be 19.06%, Vitamin and mineral supplements (7.16%), antidiabetic drugs (5.13%).

The main comorbidities were found to be hypertension 97.55%, anaemia 71.55%, cardiovascular diseases 44.88%, diabetes mellitus 27.55%, and dyslipidemia 20.44%. The most commonly used medications in this study were based on these comorbidities. HTN is the most commonly associated comorbidity associated with these patients. It was found that CCBs were found to bechiefly used drugs in this category followed by diuretics. This was consistent with the study found by NarayanaMurthi *et al*. **[14]**.

Anaemia was found to be the second complication seen among these patients due to reduced erythropoietin secretion. In our study, anaemia was found in 94% patients and were treated with hematinics and vitamin supplements. Among hematinics, erythropoietin (52.3%) and iron supplements (43%) were prescribed. This was consistent with the study byNasar Ashraf and SajidHussain **[15]**. 7% of vitamins and mineral supplements were prescribed, of which multivitamins (77%) and electrolytes (12%) were prescribed.

In this study, cardiovascular diseases like angina, CAD were the next comorbidity associated in 71% of patients. Drugs like antianginals and antithrombotics were prescribed for them.

Type II DM forming one of the leading causes of CKD among the patients, hypoglycemics were prescribed to treat them. Among the hypoglycemic agents, Insulin (68%), sulfonylurea (17%) and DPP-4 (13%) were prescribed. Whereas amidst the hypolipidemic agent atorvastatin were largely prescribed (71.21%) followed by rosuvastatin (16.67%).

Due to decreased immunity these patients are more susceptible to infection. The most frequently prescribed antibiotics (3%) were cephalosporins forming 40.9% followed by penicillins (26.2%), fluoroquinolones (21.6%). Hyperphosphatemia has been seen

as frequent complication in patients with End Stage Renal Disease, Phosphate binders are prescribed to CKD patients to bind these phosphate. It was found that, calcium acetate was primarily prescribed as a phosphate binder (2.25%). This is consistent with the study by Sourvav Chakrabothy *et al* **[16]** which showed calcium acetate were primarily prescribed.

We found that drug interactions were found to be 26.19% in this study. This was significantly lower than the study by Gayathri *et al*. **[17]** where the drug interactions were found to be 76%. The average number of medications/patients administered in the study population was 11 indicating polypharmacy which is a major risk factor for drug-drug interaction (DDI). The medicines commonly involved in DDI were those of daily use

CONCLUSION

Appropriate drug selection among patients undergoing hemodialysis is very important due to the complications and comorbidities associated with disease conditions. This study was an attempt to study the prescribing pattern in patients undergoing hemodialysis. The current study was conducted in a tertiary care hospital. 225 CKD patients undergoing dialysis were selected for study and their demographic details and information relevant to the study were obtained from the medical records. The obtained information was analysed and the results concluded that the male patients were more prone to undergo dialysis and patients above 66 years had the highest percentage. Most prescribed drug in the study population was cardiovascular drugs (44.44%) and the most common comorbidity was hypertension. 98% of the cases had polypharmacy indicating the increased risk of decreased medication adherence and increase in drug-drug interaction. The present study helps to determine the trend of prescription patterns in dialysis patients and also to give an insight about polypharmacy and drug-drug interactions. It can be used to lower the frequency of potential interactions by careful selection of therapeutic alternatives.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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ETHICAL CONSIDERATION

Institutional Ethics / Human Ethics Committee approval was obtained with IEC no: PCP/IEC-01B/15/PD-2021, PCP/IEC-01B/16/PD-2021, PCP/IEC-01B/18/PD-2021

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