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Original Research Article

Prescribing pattern of drugs in chronic kidney disease patients undergoing maintenance hemodialysis in a tertiary care hospital, Assam

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ABSTRACT

Background: Chronic kidney disease (CKD) is a progressive disorder associated with significant morbidity and mortality. Patients undergoing maintenance hemodialysis require multiple medications for comorbid conditions, prevention of complications, and improvement of quality of life. Assessing prescribing patterns helps in evaluating rationality of drug use and identifying areas for optimization. Purpose of the study was to evaluate the prescribing pattern of drugs in CKD patients undergoing maintenance hemodialysis in a tertiary care hospital in Assam.

Methods: The study was a cross-sectional observational study carried out in the department of pharmacology and medicine. The prescriptions of CKD patients under maintenance haemodialysis were gathered and examined in terms of demographic profile, comorbidities, classes of drugs prescribed, and mean number of drugs per prescription. Data were analysed and prescribing indicators were assessed according to WHO core indicators.

Results: The 120 prescriptions were examined. The average age of the patients was 55.6, and the majority of them were men. The most common comorbidities were hypertension and diabetes mellitus. Polypharmacy was observed with an average of 10.5 drugs per prescription. The most frequently prescribed classes of drugs were antihypertensives (calcium channel blockers, betablockers, diuretics), phosphate binders, erythropoiesis-stimulating agents, diuretics, and nutritional supplements. The rate of generic prescribing was 78.16 and rate of essential drug list adherence was 76.26.

Conclusions: Polypharmacy is common among CKD patients on maintenance hemodialysis. Rational drug use and adherence to WHO and evidence-based guidelines is essential to improve disease outcomes and reduce treatment burden.

Keywords: CKD, Hemodialysis, Prescribing pattern, Drug utilization

INTRODUCTION

Chronic kidney disease (CKD), characterized by gradual decline in glomerular filtration rate (GFR), is a significant global public health concern and is associated with considerable morbidity and mortality.¹ CKD is generally defined as a reduction in kidney function, an estimated GFR (eGFR) of less than 60 mL/min per 1.73 m², or presence of kidney damages identified by indicators such as albuminuria, haematuria, or abnormalities detected through laboratory testing or imaging and that are present for at least 3 months.² Patients with advanced CKD eventually progress to end-stage renal disease (ESRD)

which necessitates renal replacement therapies such as hemodialysis, peritoneal dialysis, or kidney transplantation to sustain life. Hemodialysis is the most commonly used treatment modality in India because of its accessibility and affordability relative to transplantation.³ Drug therapy in CKD is complex because reduced kidney function alters the pharmacokinetics of many drugs, increasing the risk of drug accumulation and toxic effects.⁴ Patients suffering from CKD present with several other comorbidities such as hypertension, diabetes mellitus, coronary artery disease and infection. These accompanying co-morbidities has a twofold effect on the CKD patients—firstly, it increases the treatment expenses

and secondly make managing CKD patients more difficult.⁵ Therefore evaluation of prescribing patterns and drug utilization offers meaningful insights into the quality of pharmacotherapy and care in dialysis patients. Such evaluation assists in determining adherence to evidence-based guidelines, identify irrational trends, and promote rational use of medicines as advocated by the world health organization (WHO).⁶

Although CKD is becoming a growing burden in our country, particularly in the populations with limited healthcare access, there is a paucity of published literature in North-East India that assesses prescribing patterns in patients undergoing maintenance hemodialysis. The majority of the past research is in other regions of the country or even overseas and regional differences in drug supply, prescribing habits and patient affordability can affect treatment strategies.

Therefore, the current research was conducted to assess the prescribing pattern and drug utilization profile of CKD patients under maintenance hemodialysis in a tertiary care hospital in Assam. It is hoped that the results of this research will offer useful information on the existing practice, identify the gaps in rational prescribing, and inform interventions to maximize drug therapy in this susceptible group of patients.

METHODS

The current research was a cross-sectional observational study in a hospital setting in the department of pharmacology and department of medicine, Tezpur medical college and hospital, Assam, during six months (April, 2023 to September, 2023). The study included CKD patients aged over 18 years who were on maintenance hemodialysis regardless of gender. Age less than 18 years, acute kidney injury, pregnant or lactating women, and patients who did not give consent were excluded. The institutional ethics committee provided ethical clearance, Data were gathered through a structured case record form, which contained demographic information, comorbidities, dialysis profile, and full prescription records. All the data were analysed and tabulated on Microsoft excel and expressed in numbers and percentage.

RESULTS

The study enrolled 120 prescriptions of patients with CKD undergoing maintenance haemodialysis. This study mentioned age wise distribution, comorbidities pattern, prescription pattern of drugs in CKD patients undergoing maintenance haemodialysis, WHO core indicators. In this research we discovered that the average age of the study population was 55.6 years. As Figure 1 indicates, 56 percent of the 120 study participants were males and 44 percent were females. Table 1 indicates that the most common comorbidities were hypertension (65.83%), diabetes mellitus (56.66%), and anaemia (54.16%), with

52.5% having other comorbidities, including hypothyroidism, ischaemic heart disease, and COPD. The study involved 1264 drugs that were prescribed.

WHO core prescribing indicators-The mean number of drugs prescribed per prescription was 10.5 medications. The 78.16% of medications were prescribed using their generic name, 5.30% of the encounters involved an antibiotic prescription, 10.78% of the encounters involved an injection prescription and 76.26% of the drugs were prescribed based on the WHO essential medicines list.

Table 2 indicates that out of 120 prescriptions, anti-hypertensives (33.47%), anaemia (8.14%), gastrointestinal protecting agents (6.96%), anti-diabetic drugs (6.25%), phosphate binders (6.48%), and diuretics (5.53) were the most common prescriptions. Antibiotics (5.30%) and anti-platelets (3.56) were also widely prescribed. In general, the use of drugs was aimed primarily at the treatment of hypertension, Anaemia, and metabolic disorders.

Calcium channel blockers were the most commonly used cardiovascular drugs among patients with CKD undergoing maintenance haemodialysis followed by betablockers and diuretics as indicated in Table 3.

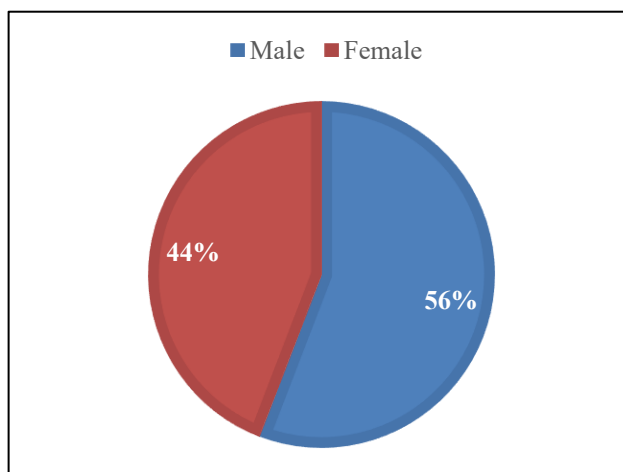


Figure 1: Gender distribution of study participants.

Table 1: Co-morbidities observed in the study population.

Comorbidities	N	Percentage
Hypertension	79	65.83%
Diabetes	68	56.66%
Anaemia	65	54.16%
Others (hypothyroidism, Hyperuricemia, secondary hyperparathyroidism, ischaemic heart disease, polycystic kidney disease, cervical spondylosis, BPH, tubercular ascites, alcoholic, chronic smoking, coronary artery disease, COPD)	63	52.5%

Table 2: Drug utilization pattern observed in study participants.

Class	N	Percentage
Anti-hypertensive	423	33.47%
Anti diabetic agents (Insulin-30 no, oral hypoglycaemic-49)	79	6.25%
Hematopoietic agents (erythropoietin-78 no, oral iron-11 nos, iron preparations-14 nos)	103	8.14%
Diuretics (torsemide-70 nos)	70	5.53%
Phosphate binders (Sevelamer-82 nos)	82	6.48%
Gastrointestinal drugs (PPI-39 no, H2 blockers-32, anti emetics-17 nos)	88	6.96%
Anti platelets	45	3.56%
Antibiotics (Ceftriaxone-27, FDC of amoxicillin and clavulanic-22 nos, linezolid-14 nos, rifaximin-4 nos)	67	5.30%
Acid-base disorder (sodium- bicarbonate-87 nos)	87	6.88%
CNS drugs (anti-depressant-22, antipsychotic-11, anti-epileptic-8 nos, other-4)	45	3.56%
Vitamins and minerals (vitamin C-45, calcium and vitamin D3-85, calcium-26 nos)	156	12.34%
Others	19	1.5%

Table 3: Classes of cardiovascular drugs prescribed.

Class	Frequency
Calcium channel blockers	213
Beta blockers	108
Diuretics	72
ACE inhibitors	11
Alpha blockers	13
Others	6

DISCUSSION

The current research assessed the prescribing trend of medications in CKD patients receiving maintenance haemodialysis (MHD). The study of drug use among this patient subgroup is essential because CKD is linked to various comorbidities and polypharmacy, which predisposes patients to adverse drug reactions, drug-drug interactions, and low adherence. We examined 120 prescriptions in our study during a 6-month period. There were 56% males and 44% females. This is in line with the

fact that CKD is more prevalent in men than in women, both globally and in India.⁷ The average age of the study population was 55.6 years. Hypertension was the most prevalent comorbidity in our study of CKD patients undergoing maintenance hemodialysis and then diabetes and anaemia. Other studies by Balaji et al and Santra et al also revealed that hypertension was the most prevalent comorbidity followed by type 2 diabetes mellitus.^{8,9} Anaemia was the most prevalent haematological manifestation in our study population and it affected 65 patients (54.16%). Abramson et al conducted another study where the prevalence of anaemia was 12.2%.¹⁰ The mean number of drugs prescribed to each patient in our study was 10.5, which is a high level of polypharmacy. Polypharmacy, or the simultaneous use of several drugs, is common among older adults due to the presence of several, comorbid serious health conditions, and has been a topic of intense interest. Polypharmacy has been defined as the concurrent use of 5 and above medications, but hyper-polypharmacy has been defined as the use of 10 and above medications concurrently.¹¹ CKD patients are more likely to experience altered medication exposure and adverse effects than individuals with normal kidney function.¹² The use of generic drugs (78.16%) and adherence to the WHO essential medicine list (76.26) which is in line with the WHO guidelines on rational prescribing.¹³

Treating physicians prescribed various classes of drugs in our study. Prescriptions were made of drug classes such as cardiovascular system, haematinics, diuretics, acid base balance regulating drugs, antibiotics, anti-diabetics etc. Most of the drugs used to treat cardiovascular system calcium channel blockers were prescribed as co-morbid condition followed by betablockers, this observation is comparable to the research conducted by Devi et al and Bailie et al.^{14,15}

CONCLUSION

Thus, comprehensive assessment of drug utilization in CKD patients undergoing maintenance hemodialysis patients is essential for identifying prescribing trends, improving drug prescribing practices and ensuring rational use of medicines. Multidisciplinary collaboration among nephrologists, pharmacologists, and physicians is crucial to optimise treatment approaches, minimise adverse drug reactions, drug-drug interactions and reduce economic burden of therapy.

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