Open Access Research Paper

ISSN: 2349-9818
May-June 2026, Vol. 13 (3), 27-43

Tropical Journal of Pharmaceutical and Life Sciences
(An International Peer Reviewed Journal)
Journal homepage: http://informativejournals.com/journal/index.php/tjpls

Assessment of Prescription Patterns in Stage 5 of Chronic Kidney Disease Patients Undergoing Heamodialysis

Sara Shreen*, Zama Muqeem, Shaik Nawaz, Hafsa Zaheer and Mohd Naseer Ullah

Department of Pharmacy Practice, Deccan School of Pharmacy, Hyderabad, India

ARTICLE INFO:

Received: 05th June 2026; **Received** in revised form: 17th June 2026; **Accepted:** 21st June 2026; **Available online:** 30th June 2026.

Abstract

Background: End-stage renal disease (ESRD) and chronic kidney disease (CKD) are growing more common. Whereas hemodialysis (HD) is the most common kidney replacement therapy for individuals with diabetes, dyslipidemia, anemia, and bone mineral abnormalities.

Objective: The objective of this study was to asses prescribing patterns in stage 5 of chronic kidney disease patients undergoing Hemodialysis.

Method: This study was an observational retrospective cohort study, it was conducted at Owaisi hospital, between march and April 2026. All adults on chronic HD were included. All information was were collected from governmental electronic health record, and patients were asked to answer some questions when data was not found in the system.

Result: Among the 50 patients studied, 62% were males and 38% were females. The majority of patients belonged to the 51–60 years age group (42%). Hypertension was the most common comorbidity (76%), followed by diabetes mellitus (36%), anemia (16%), hypothyroidism (4%), and coronary artery disease (2%). Polypharmacy was highly prevalent, with an average of 7.86 medications prescribed per patient. Most patients received 6–7 medications (42%), while 32% received eight or more medications. Erythropoietin Alfa (35 prescriptions), Iron Sucrose (28), Pantoprazole (25), Calcium Carbonate (20), Sodium Bicarbonate (19), and Amlodipine (18) were the most frequently prescribed drugs. Antihypertensive agents constituted the largest therapeutic class (23.3%), followed by hematopoietic agents (21.9%), phosphate binders and CKD mineral bone disorder drugs (16.0%), gastrointestinal drugs (13.7%), and diuretics (8.7%).

Conclusion: The study demonstrated a high prevalence of hypertension and diabetes mellitus among CKD Stage V patients undergoing hemodialysis. Extensive polypharmacy was observed due to the need to manage multiple comorbidities and CKD-related complications. Antihypertensive agents, hematopoietic agents, and phosphate binders were the most commonly utilized drug classes. Regular prescription review, rational drug utilization, and individualized pharmacotherapy are essential to optimize treatment outcomes and improve the quality of life of hemodialysis patients.

***Corresponding Author:**
Sara Shreen
DOI: https://doi.org/10.61280/tjpls.v13i3.273

© 2026 The Authors. Tropical Journal of Pharmaceutical and Life Sciences (**TJPLS Journal**)
Published by **Informative Journals** (Jadoun Science Publishing Group India)
This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution-Non Commercial 4.0 International License.

Keywords: Chronic Kidney Disease, CKD Stage V, Hemodialysis, Prescription pattern, Polypharmacy, Drug utilization, Hypertension, Diabetes mellitus.

Introduction

Chronic Kidney Disease (CKD) is defined by the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI) as abnormal kidney structure and function with a lowered Glomerular Filtration Rate (GFR) of less than 60 mL/min/1.73 m2 that persists for three months or longer (1). Based on the estimated GFR, CKD is divided into five stages: stage 1: GFR >90 ml/min/1.73m2, stage 2: GFR 60-89ml/min/1.73m2, stage 3: GFR 30-59 ml/min/1.73m2, stage 4: GFR 15-29ml/min/1.73m2, and stage 5: GFR <15 ml/min/1.73m2 (1). CKD was the 12th most common cause of death worldwide in 2017, with a reported frequency of 9.1% (2). Dialysis patients had a greater mortality rate than the overall population, with men dying at a higher rate than women (3-6). Diabetes mellitus is recognized as the primary cause of end-stage renal disease (ESRD) in many regions of the world, but it is also frequently brought on by a number of other well-known chronic illnesses, including hypertension, systemic lupus erythematosus, and HIV infection (6). In addition to the early mortality, ESRD causes a marked decline in quality of life (6). According to reports, CKD is a significant predictor of poor health outcomes for prevalent non-communicable diseases in Namibia, including diabetes mellitus and hypertension (7). Patients with end-stage renal disease (ESRD) have a heavy burden of co-occurring illnesses and complications from both the dialysis treatment and the renal disease (6,8). As a result, in order to treat these illnesses, these patients may take up to six different medications. Mineral and bone problems, diabetes, hypertension, renal anaemia, and viral diseases are among the documented common comorbid ailments that may all necessitate pharmaceutical treatment (9, 10).

These individuals are most vulnerable to drug-related issues since they take numerous medications (9). Absorption, distribution, metabolism and excretion are the four major processes that determine the destiny of a drug in the organism. These pharmacokinetic factors are important for determining whether the medicines and their active forms reach appropriate places for acting, when they produce beneficial or adverse effects. Also, these pharmacokinetic determinants could be affected by different comorbid conditions, including kidney disease. In cases of renal insufficiency, elimination is decreased for drugs that are primarily eliminated by the kidneys. Send email about serious kidney disease by reducing protein-binding levels, changes in the back and potentially more dangerous cytotoxins (10-11).

The number of patients with ESRD requiring renal replacement therapy has greatly increased over the years (1). In 2010, haemodialysis was reported to be the most common renal replacement therapy of choice worldwide (12). Distribution (Vd) and renal clearance. Therefore, haemodialysis may efficiently 2 remove some drugs and/or their active metabolites from the circulation, making dose adjustment in these patients necessary (11). It is well established that haemodialysis causes major alterations in the pharmacokinetics of many drugs. It affects the distribution, metabolism, and excretion of drugs (9). The influence of haemodialysis upon a drug is determined by the physicochemical properties of the drug, such as molecular size and degree of water solubility in addition to its pharmacokinetic parameters, including, plasma protein binding (PPB), volume of distribution (Vd) and renal clearance. Therefore, haemodialysis may efficiently 2 remove some drugs and/or their active metabolites from the circulation, making dose adjustment in these patients necessary (11).

Chronic Kidney Disease

Definition

Chronic kidney disease (CKD), which is characterized by either kidney damage or decreased kidney function for more than three months, is an increasing common condition in the world. It is associated to a poor prognosis, early cardiovascular disease development, and increased mortality (12).The attention that CKD receives worldwide is due to many factors; the rapid increase in its prevalence, the enormous cost of treatment, recent evidence indicating that overt disease is the tip of the iceberg of latent disease, its major role in increasing the risk of cardiovascular disease, and the discovery of effective measures to prevent its progression (13).

Classification

Based on GFR, the National Kidney Foundation's Kidney Dialysis Outcomes and Quality Initiative (K/DOQI) divided chronic kidney disease (CKD) into stages 1 through 5. A higher number denotes a more advanced stage of the disease, as shown by a dropping GFR. Additionally, structural evidence of kidney injury is taken into account by this classification: (14)

Table 1: Classification of CKD

Stage	GFR (ml/min/1.73m²)	Description
Stage 1	≥ 90	Kidney damage with normal or increased GFR
Stage 2	60-89	Kidney damage with mild decrease GFR
Stage 3	30-59	Moderately decrease GFR
Stage 4	15-29	Severely decrease GFR
Stage 5	<15	Kidney Failure

Risk Factors

Susceptibility factors

These factors-such as advanced age, a family history of chronic kidney disease (CKD), a decrease in kidney mass, low birth weight, membership in a racial or ethnic minority, low income, and education-increase the risk of kidney damage (15).

Initiation factors

Diabetes, high blood pressure, autoimmune disorders, systemic infections, urinary tract infections, urinary stones, lower urinary tract obstruction, drug toxicity, and hereditary diseases are among the conditions that directly result in kidney failure (16).

Progression factors

These factors cause worsening kidney damage and faster decline in kidney function after initiation of kidney damage, such as higher level of proteinuria, higher blood pressure level, poor glycemic control in diabetes, possibly dyslipidemia, and smoking (17).

Clinical Presentation

Clinical manifestations associated with chronic kidney diseases include a wide range of symptoms, some of which significantly interfere with everyday activities. Early stages of this condition can also be asymptomatic and are normally diagnosed through routine examinations. As the level of kidney dysfunction progresses, signs such as weakness, edema, nausea, loss of appetite, insomnia, feeling of itching, and high blood pressure become apparent. Some elderly patients might experience pain, anxiety, and psychological problems due to chronic nature of their medical condition. Apart from the above-mentioned symptoms, excessive blood loss, disturbance in electrolyte balance, abnormal metabolism, and cardiovascular complication may lead to even greater functional impairment and worsening symptoms in patients with advanced CKD (18).

Treatment

Management of CKD involves primarily measures to stage the chronic disease, slow its progression and complications with the aim of delaying their end-stage outcomes and improving patients quality of life. Management involves good blood pressure control, reduction of proteinuria and ensuring reasonable glycemic control in patients with diabetes, where applicable to prevent further decline in renal function. Renin–angiotensin–aldosterone system inhibitors are frequently used in pharmacologic therapy to maintain kidney function and reduce protein loss in urine. Moreover, CKD patients should also be treated for comorbid conditions caused by complications of income that include anemia, electrolyte imbalance, metabolic disorders and cardiovascular disorders (19).

An important part of the management of CKD is lifestyle modifications such as dietary salt restriction, healthy body weight maintenance, regular physical activity, smoking cessation and moderation in alcohol intake. Patients are also instructed to avoid nephrotoxic medications and remain well hydrated. More advances in CKD to end-stage renal disease relative to the need for renal replacement therapies such as hemodialysis, peritoneal dialysis, and kidney transplantation can be needed in order to long-lived patients to survive (20).

Table 2: Comorbidities-Symptoms and Drugs used for treatment

End-stage renal disease

Comorbidity	Symptoms	Drugs Used for treatment
Hypertension (HPT)	Pedal edema, decreased urine output, breathlessness, fatigue, nausea, vomiting, swelling	Amlodipine, Telmisartan, Losartan, Clonidine, Carvedilol, Metoprolol, Bisoprolol, Minoxidil, Prazosin XL, Cilnidipine,Nifedipine,Enalpril, Hydralazine,Alphamethyldopa,Furosemide, Torasemide
Diabetes Mellitus (DM)	Pedal edema, fatigue, decreased urine output, loss of appetite, nausea, vomiting	Insulin Regular, Insulin Glargine, Dapagliflozin, Linagliptin, Metformin
Anemia (ANM)	Weakness, fatigue, breathlessness, generalized edema	Erythropoietin Alfa, Darbepoetin, Iron Sucrose, Ferric Carboxymaltose, Folic Acid
Hypothyroidism	Mild breathlessness, edema, fatigue	Levothyroxine
Coronary Artery Disease (CAD)	History of CAD/CABG, cardiorenal syndrome	Aspirin, Clopidogrel, Rosuvastatin, Atorvastatin, Apixaban

Definition

End-stage renal disease is a health problem that can make people very sick and even cause death. The heart can get hurt in four ways when someone has end-stage renal disease. These problems are when the heart muscle gets too thick, the heart fails, the valves in the heart get hard, and fluid builds up around the heart.

All these heart problems happen because of things that are connected, like the body having too much stress, too much pressure and fluid and the balance of hormones getting messed up. When people have end-stage disease, their heart can get very weak, especially when it is relaxing, and the left side of the heart can get too big. For people with end-stage disease who are getting special treatment to clean their blood, the left side of the heart can change shape because of changes in blood pressure and fluid in the body, and it can switch between getting too thick all around and just getting too thick in one way. This can eventually cause the left side of the heart to not work properly when it is squeezing (21).

In high-prevalence nations like the US, Japan, and Taiwan, End-stage renal disease (ESRD) affects more than 1500 individuals per million. About 25% of individuals with end-stage renal disease (ESRD) get hemodialysis, 25% undergo kidney transplants, and 10% undergo peritoneal dialysis (22).

Treatment

End-stage renal disease (ESRD) is identified when the kidneys cannot function sufficiently for a patient to survive long-term without undergoing dialysis or receiving a transplant. Healthcare providers should direct individuals who are at risk for ESRD to nephrologists to enhance disease management strategies. Generally, kidney transplants provide the most favorable results for patients, yet the majority receive dialysis treatment.

The choice to start dialysis is ideally reached through a collaborative decision-making process. Since a large number of ESRD patients choose to have hemodialysis, maintaining the health of peripheral veins is crucial for individuals classified with stage III to V chronic kidney disease. For individuals with end-stage renal

disease, it is recommended to receive vaccinations for seasonal flu, tetanus, hepatitis B, human papillomavirus (up to 26 years old), and Streptococcus pneumoniae. Regular cancer screenings are not recommended for patients who are not candidates for kidney transplants. Managing blood pressure in dialysis patients can lead to better survival rates. Effective hypertension management in these individuals can be achieved through proper dialysis and limiting sodium intake. Insulin is the most suitable option for treating diabetes in patients with end-stage renal disease who need medication. Patients should have regular checks for indications of protein-energy malnutrition and wasting. Healthcare providers need to be mindful of the various medical issues that can arise due to end-stage renal disease (23).

Complications of End-Stage Renal Disease and Their Management

Fluid and electrolyte abnormalities

The kidneys play a crucial role in maintaining fluid balance, which can be disrupted in situations of impaired renal function by either excessive fluid loss that results in dehydration or less fluid filtration that causes fluid overload. Therefore, all patients with AKI or CKD must have their hydration status evaluated.

Clinical evaluation of hydration is accomplished by looking at mucosal membranes, skin turgor, jugular vein pulse, chest auscultation, heart rate, blood pressure, oedema status, and thirst perception.

Sodium

The kidneys control sodium levels. Both hyponatraemia and hypernatraemia are possible in patients with renal disease. In an inpatient context, hyponatraemia accounts for 5–30% of electrolyte abnormalities, whereas hypernatraemia is less common at 1%–4%. The degree of hyponatraemia is divided into three categories: mild (serum Na 130–134 mmol/litre), moderate (serum Na 125–129 mmol/litre), and severe (serum Na <125 mmol/litre). Acute severe hyponatraemia can cause respiratory depression and disorientation.

Potassium

By excreting over 98% of daily potassium intake under normal conditions, the kidneys play a crucial role in maintaining potassium homeostasis. Potassium levels, which are typically between 3.5 and 5.0 mmol/litre, may rise as a result of kidney disease.5 While potassium levels in CKD are typically maintained till stage, AKI is linked to hyperkalaemia.5 In addition to kidney illness, insulin insufficiency, tissue deterioration, and drugs like angiotensin-converting enzyme (ACE) can cause hyperkalaemia.

Magnesium

Since the kidneys aggressively eliminate magnesium, impaired renal function will raise magnesium levels. Serum levels of hypermagnesaemia greater than 2 mmol/litre may cause nausea, flushing, weakness, and hypotension. Atrioventricular block, cardiac arrest, and respiratory weakness may occur if the level rises above 8 mmol/litre. Treatment for hyperkalaemia has typically begun, and severe hypermagnesaemia is rarely isolated.

Phosphate and Calcium

The kidneys, stomach, bones, and parathyroid glands are responsible for maintaining calcium and phosphate homeostasis. Increased phosphate levels, which are ordinarily actively eliminated by the kidney but build up with decreased renal function and bind calcium, can produce hypocalcaemia in kidney impairment. Additionally, less calcium will be absorbed by the stomach due to a decrease in the manufacture of active vitamin D (calcitriol). (24)

Potassium Homeostasis

A blood sample that only represents a small portion of the entire K+ pool is frequently used to measure potassium (K+). The content of plasma K+ is carefully regulated between 3.5 and 4.5 mmol/L. Because platelets release K+ during the in vitro coagulation process, serum levels are about 0.5 mmol/L greater than plasma**.** By adjusting the extra-/intracellular distribution and systemic elimination of potassium to the dietary potassium intake, potassium homeostasis is protected. Furthermore, there are significant clinical ramifications to the interactions between K+, sodium (Na+), and acid-base homeostasis. Dyskalemias are caused by a number

of situations, including behavioral disorders, genetic abnormalities, pharmaceutical therapies, acid-base disturbances, and—most importantly—acute and chronic kidney diseases (CKD). Reduced potassium filtration due to a lower glomerular filtration rate (GFR), aberrant potassium reabsorption and secretion from dysregulated cells along the nephron, and various treatments that either increase or decrease renal K+ excretion are some of the ways that kidney diseases impact K+ homeostasis. The importance of CKD as a risk factor for hyperkalemia was highlighted in a comprehensive meta-analysis involving over 1.2 million participants, where 4.2% of CKD patients had serum-K+ > 5.5 mmol/L compared to only 0.5% of healthy and cardiovascular high-risk individuals without CKD.(25)

Anemia

Anaemia is the most common side effects of chronic kidney disease. It affects how patients feel and their daily lives. Anemia happens because of a mix of factors, including levels of erythropoietin, iron problems, chronic inflammation, bone marrow issues, and not getting enough nutrients.

Anaemia remains a health issue for people with kidney disease, even with new discoveries. Several guidelines have been created to help diagnose and treat anemia. Suggested from recent studies that new markers can help identify anaemia and related issues, such as iron deficiency, which is common in kidney disease patients. Kidney disease patients often have iron deficiency. New markers may help doctors assess anemia and iron deficiency in kidney disease patients.

However, the patients who develop CKD from diabetes tend to be more anaemic than patients without diabetes for the same GFR levels [3]. From a practical standpoint, if the GFR in a patient exceeds 60 mL/min, then the anemia is unlikely to be purely due to a lack of EPO production, and other factors need to be considered.(26)

ESA Therapy

In case other causes of CKD anaemia apart from iron deficiency have been ruled out, ESA administration is warranted. ESAs are very efficient in raising the levels of erythropoietin in circulation and in enhancing erythropoiesis in the bone marrow. The first-generation ESAs were made from recombinant human erythropoietin (epoetin), discovered in the latter years of the 1980s. The half-life of epoetin is relatively short, lasting only between 6 and 8 hours, requiring multiple dosing per week for optimum efficacy. Later, another molecule named NESP (novel erythropoiesis-stimulating protein) or darbepoetin alfa was developed. It is a glycoengineered analogue of epoetin, which has improved metabolic stability and a half-life that is more than triple the length of epoetin's, extending to over 25 hours.

Iron Management

Iron deficiency is another cause that leads to anaemia in CKD patients following erythropoietin insufficiency; it may be either absolute or functional. In absolute iron deficiency, there is an absence of body stores of iron, while functional iron deficiency refers to cases where body stores of iron are sufficient, but the release of iron is slow, thus not allowing proliferation of bone marrow. However, serum ferritin or TSAT, despite being the most used diagnostic tools for assessing iron deficiency in CKD, provide poor estimates. The percentage of hypochromic red blood cells and/or CHr has proved to be more discriminant than serum ferritin or TSAT, yet neither test has become widely used, with only the former requiring the use of a fresh blood sample for proper diagnosis [8]. For many years, arbitrary cut-offs of serum ferritin values have been established, and ferritin below 30 µg/L is indicative of absolute iron deficiency (27).

Secondary Hyperparathyroidism and Renal Osteodystrophy

The major complication of pre-end-stage renal disease and the pathophysiological mechanism redacting renal osteodystrophy is secondary hyperparathyroidism (SHPT). The cause is dysregulation of mineral metabolism (phosphate retention and hypocalcemia with reduced vitamin D activation in chronic renal failure). Results in increased parathyroid hormone levels are either due to continuous stimulation of the parathyroid glands or hyperplasia of the glands themselves. Chronic hyperparathyroidism causes bone resorption and disrupts the normal sequence of osteoclastic/bone remodeling process leading to renal osteodystrophy which manifests in

dialysis patients with bone pain, skeletal deformities or fractures as well as skeletal muscle weakness and fragility. SHPT is hence a key component of bone disease in ESRD and its intensity correlates with skeletal complications observed in patients on maintenance hemodialysis. Control of mineral and PTH imbalance is crucial to avoiding the deterioration of renal-bone disease, which may ultimately worsen clinical outcomes (28,29).

Diabetes Mellitus

Diabetes mellitus is one of the leading causes of end stage renal disease or ESRD worldwide and remains a major factor in patients on dialysis. Many different types of physiologic changes cause disruption of normal glucose-insulin homeostasis in ESRD. Insulin is metabolized through various tissues and organs, with a significant portion of insulin being metabolized by the kidneys. Therefore when a patient kidney function is decreased, then insulin clearance is decreased, and result in prolonged of insulin action, thus increasing the risk of hypoglycemia. At the same time, kidney failure leads to the development of chronic inflammation, accumulation of uremic toxins, oxidative stress, and hormonal abnormalities in individuals with ESRD; all of which can contribute to insulin resistance in ESRD individuals. These two opposite physiological mechanisms make very complicated the management of blood glucose in dialysis patients. Furthermore, it has been shown that dialysis can lead to fluctuations in blood glucose levels of patients due to glucose loss when dialysate is used or glucose addition when dialysate is used, thus further contributing to the variability of blood glucose control in dialysis patients. Additionally, dialysis has been known to fluctuation the blood glucose of a patient, as a result of loss of glucose when dialysate is being used or an addition of glucose when using dialysate. The fluctuations of blood glucose become more variable in dialysis patients. In ESRD, and with frequent anemia, traditional glycemic markers such as HbA1c may not accurately show the true glycemic status of this population. Consequently, diabetes management in ESRD patients who have started on dialysis must be very individualized and monitored closely to avoid hyperglycemic/hypoglycemic events and increase the total clinical outcome (30,31).

Hypertension

Hypertension is one of the most common cardiovascular issues most often seen in patients with end stage renal disease (ESRD) receiving dialysis and is a major cause of death and severe illness among dialysis patients. Dialysis individuals have a great deal of reasons why they will develop high blood pressure, including sodium and fluid retention; activation of the renin-angiotensin-aldosterone system; excess sympathetic nervous system stimulation; endothelial dysfunction; and stiffness of the arteries. Both predialysis and post dialysis blood pressure values may not provide the correct amount of blood pressure patients have, being that it requires very accurate blood pressure measurement. Home blood pressure monitoring, as well as the assessment of individuals' blood pressures over 24 hour periods, is likely the best modalities of obtaining an accurate representation of the blood pressure of individuals and therefore should be used in determining therapeutic interventions for these patients. The ongoing goal in keeping blood pressure under control for these individuals is to keep blood volume in balance with dialysis treatments, limit sodium consumption, and use medications as needed. Frequently-used drugs are beta-blockers and drugs that inhibit the renin-angiotensin system, and drugs that inhibit the calcium channel system as well. Effective blood pressure management is crucial in reducing cardiovascular complications and improving the life expectancy in dialysis patients with ESRD (32,33).

Infection

The most leading cause of illness, hospitalization, and deaths among the patients of ESRD undergoing dialysis therapy is infection. Hemodialysis patients have the highest tendency of acquiring infections owing to their low immune response to uremic conditions, frequent exposure to medical environments, repeated vascular access operations and other conditions like malnutrition and diabetes. Infections that involve the bloodstream and are secondary to the placement of a central venous catheter are major problems in hemodialysis patients On the other hand, peritonitis is one of the complications in patients with peritoneal dialysis. Peritonitis is a

common problem in peritoneal dialysis patients. Moreover, apart from peritonitis, the other infections that are common in such patients include pneumonia, UTI, skin infection, and vascular access infection. These infections may have considerable effects on the patient's prognosis and reinforce the significance of their early identification and prevention. It will improve their survival and quality of life among ESRD patients receiving long-term dialysis treatment (34,35).

Statement of the Problem

Individuals with end-stage renal disease undergoing haemodialysis often present with various pre-existing health issues alongside complications stemming from their kidney condition, which in most scenarios necessitate medicinal treatment (9) .The presence of multiple health conditions in these patients requires several medications, and the state of renal failure further restricts the options available for medication and influences how these drugs should be administered, making the treatment of ESRD patients more challenging. Research conducted in different nations has consistently pointed out the difficulties that healthcare providers encounter in choosing medications and adjusting dosages for patients with chronic kidney disease (2,13–19) . This may lead to either insufficient prescribing and dosing or excessive prescribing and dosing .Patients with chronic kidney disease who are on haemodialysis have an elevated likelihood of experiencing negative drug reactions, drug interactions, and other medication-related complications owing to the altered pharmacokinetic properties of many of their medications, along with the necessity for polypharmacy (9,20,21). Choosing the right medication and modifying dosages appropriately is essential to prevent negative health effects, including death and illness, among patients with chronic kidney disease. The significant effect of chronic kidney disease on public health and the difficulties associated with sensible prescribing for these individuals are recognised as a worldwide issue. At present, there is a lack of information regarding the patterns of medication prescriptions and dosage modifications for patients receiving haemodialysis in Namibia. . Therefore, a study to assess the appropriateness of drug therapy and investigate for predictors of medication choice and renal dosage adjustment errors in patients undergoing haemodialysis in this setting is necessary.

Significance of the Study

As far as we know, there are very few data concerning HD patients in our country. Hence, this research project will provide baseline data regarding prescribing practice and adherence to therapy guidelines among HD patients. These types of information are greatly needed in our country in order to enhance the service offered. This research is going to assist in enhancing the quality of life for HD patients through controlling their condition using the recommended treatment guide. The results will be useful in creating educational programs for increasing adherence to the international treatment guidelines among HD patients.

Aims And Objective

Aim

To assess the prescription pattern in Stage 5 chronic kidney disease patients undergoing hemodialysis in a tertiary care hospital.

Objectives

To assess the different types of drugs prescribed to stage 5 CKD patients under hemodialysis.

Need for the Study

To understand drug prescribing patterns in stage 5 CKD patients undergoing hemodialysis.

Novelty

1. This research is noble because it examines prescription trends with particular emphasis on patients with CKD stage 5 who are under hemodialysis treatment.

2. It determines whether the dosage of the drugs is adequately adjusted depending on the kidney function.

Methodology

Study Design- A prospective interventional study.

Sample Size- 50 Patients.

Study Duration- 3 Months.

Study Site- The study was carried out in the Department of Nephrology/Dialysis Unit of Owaisi Hospital.

Statistical Analysis

The data was analyzed using Microsoft Excel. Description analysis of the study variables was conducted, followed by hypothesis testing in the order they were formulated.

Study Population

Any Patients are appropriate for the study based on the defined inclusion and exclusion criteria.

Inclusion Criteria

- Patients diagnosed with Stage 5 CKD (GFR < 15 mL/min/1.73 m^2)
- Patients undergoing hemodialysis
- Patients of either gender
- Patients aged ≥18 years
- Patients who are willing to participate

Exclusive Criteria

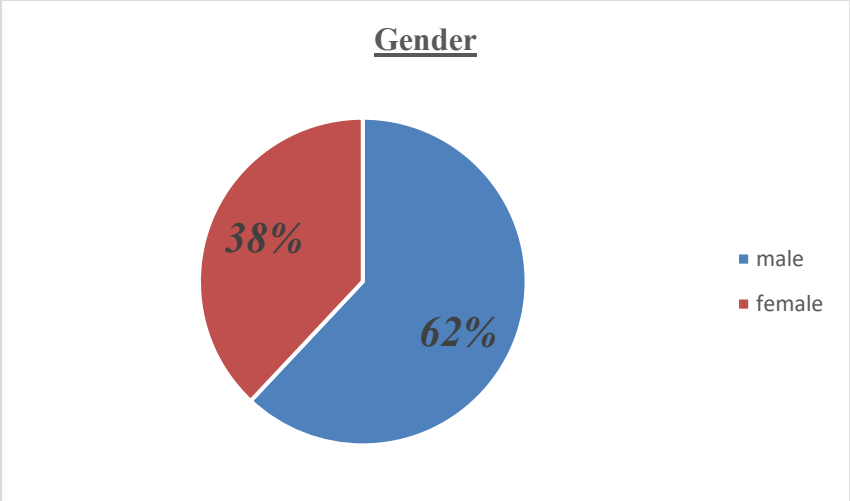
- Patients with incomplete medical records
- Patients not undergoing hemodialysis
- Patients with acute kidney injury (AKI)
- Pregnant or lactating women
- Critically ill patients and Non-compliant patients.

Results

The present study was conducted among 50 CKD Stage V patients undergoing maintenance hemodialysis in the Department of Nephrology at Owaisi Hospital and Research Centre (OHRC), Hyderabad. Descriptive analysis was performed using demographic characteristics, comorbidities, and prescription data. Among the study population, males constituted 62% and females 38%. The majority of patients belonged to the age group of 51–60 years (42%). Hypertension (76%) was the most common comorbidity, followed by diabetes mellitus (36%), anemia (16%), hypothyroidism (4%), and coronary artery disease (2%). A total of 393 drug prescriptions were recorded among the 50 patients. The number of drugs prescribed per patient ranged from 2 to 14, with a mean of 7.86 drugs per patient, indicating a high prevalence of polypharmacy. Erythropoietin Alfa, Iron Sucrose, Pantoprazole, Calcium Carbonate, Sodium Bicarbonate, and Amlodipine were among the most frequently prescribed medications. The results obtained are presented in the following tables and figures.

Table 3: Related to gender

Gender	
Male	62%
Female	38%

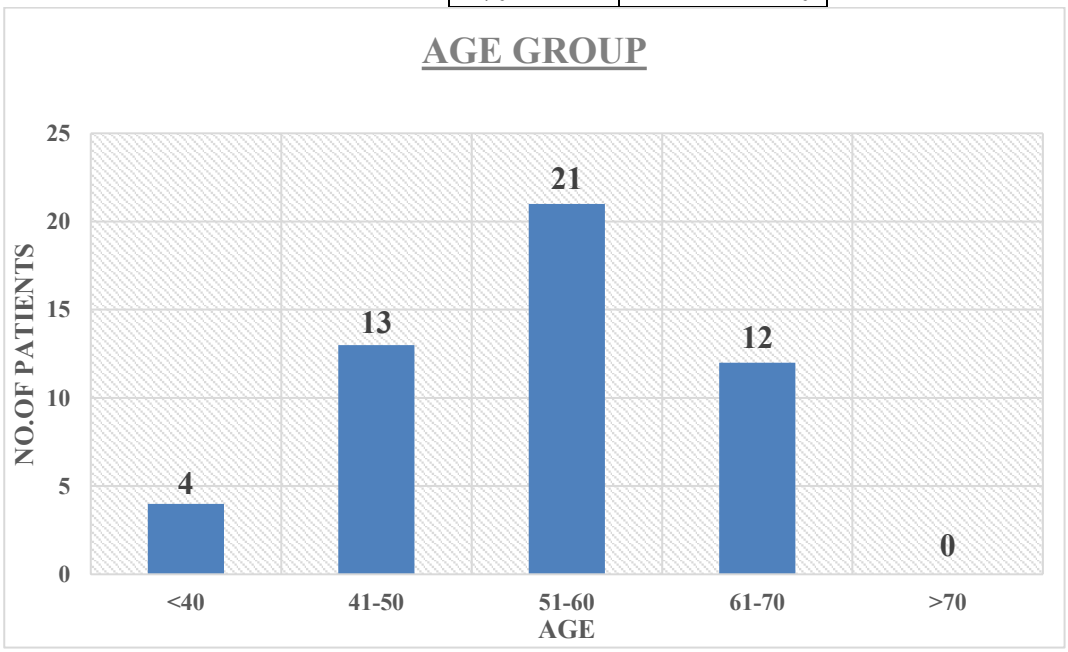


Interpretation

Males made up 62% of the study population, while females accounted for 38%. This indicates a male dominance in CKD Stage V. It supports other studies that report higher CKD progression rates in males due to factors such as a greater prevalence of hypertension, diabetes, and later healthcare seeking.

Table 4: Age group

AGE Group	
Age	No. Patient
<40	4
41-50	13
51-60	21
61-70	12
>70	0

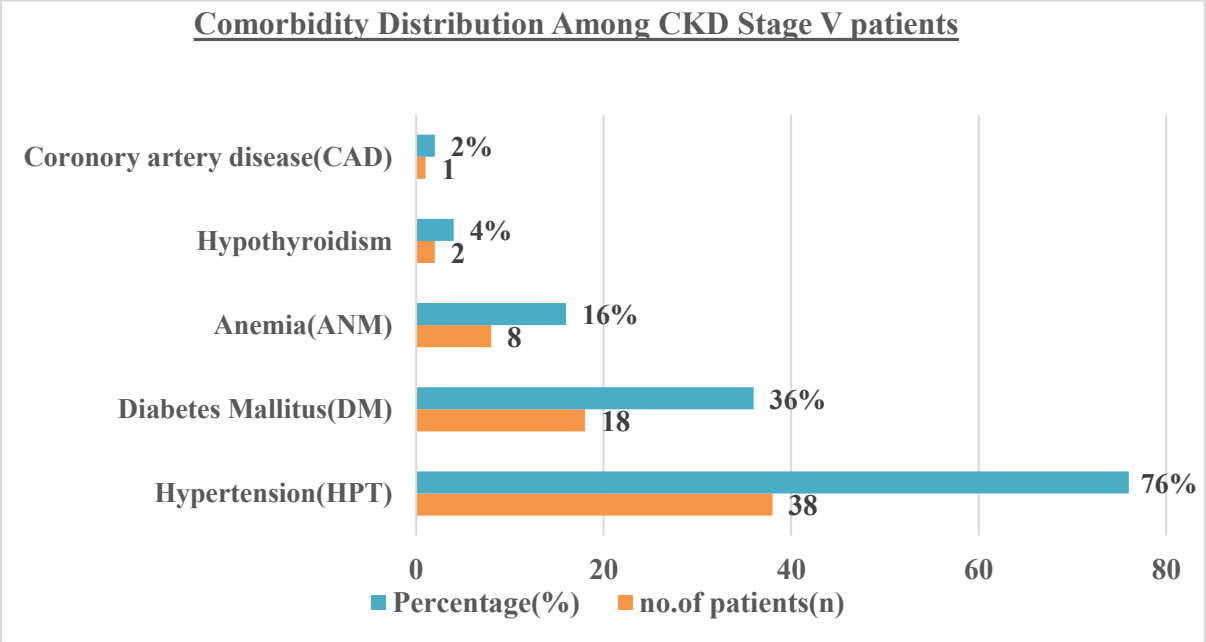


Interpretation

The age group of 50-60 was made up to 42%. Then 41-50 years with 26%, followed by 61-70 years at 24% and Just 8% were under 40, and there were no patients over 70 years old.

Table 5: Comorbidity Distribution Among CKD Stage V patients

Comorbidity	No. of patients(n)	Percentage (%)
Hypertension (HPT)	38	76
Diabetes Mellitus (DM)	18	36
Anemia (ANM)	8	16
Hypothyroidism	2	4
Coronary artery disease (CAD)	1	2

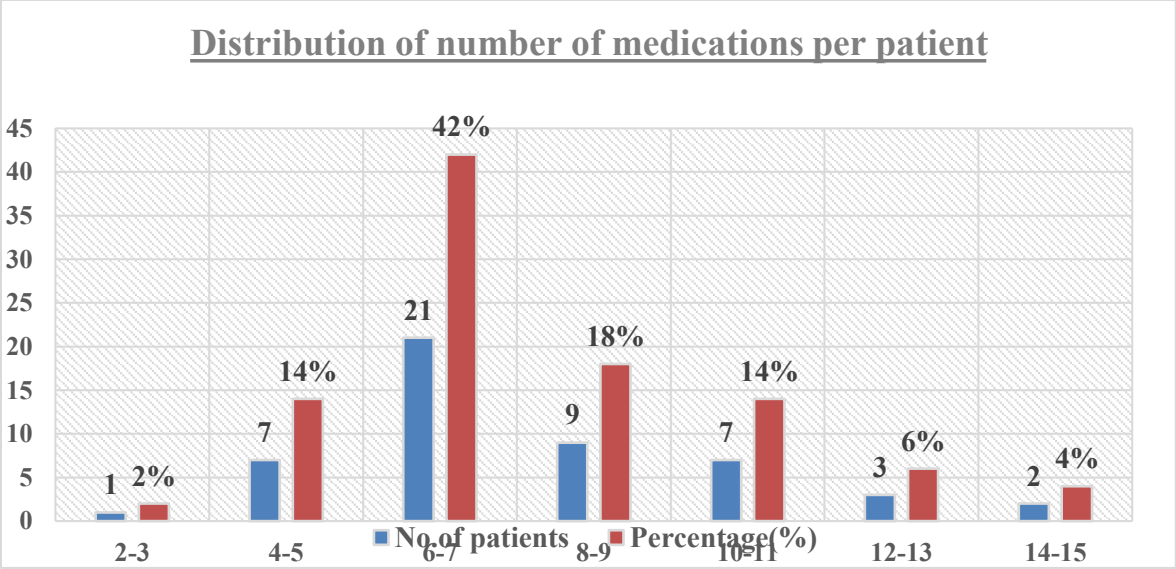


Interpretation

Hypertension had the highest prevalence at 76% followed by Diabetes Mellitus (36%). Anemia was present in 16%, hypothyroidism in 4% and CAD only in 2%. In other words, hypertension and diabetes are certainly pushing chronic kidney disease to Stage V in this population. The expected blood problems due to end-stage renal disease (ESRD) including a high anemia rate are reflected in these results, explained by the fact that the kidneys make less erythropoietin.

Table 6: Distribution of number of medications per patient

Distribution of number of medications per patient		
No. of Drugs	**No. of patients**	**Percentage (%)**
2-3	1	2
4-5	7	14
6-7	21	42
8-9	9	18
10-11	7	14
12-13	3	6
14-15	2	4

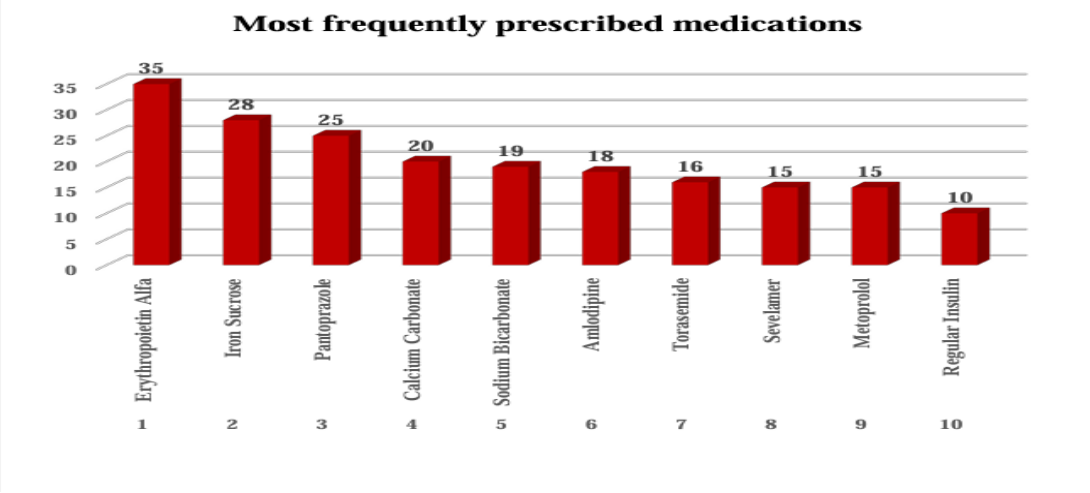


Interpretation

Polypharmacy was highly prevalent. Patients on 6–7 drugs, 8–9 drugs, and 10–11 drugs comprised of 42%, 18% and each of 14% were on maximum prescribed drugs while patients receiving from four to five medicines accounted for the remaining percentage. So only 2% were on ≤3 drugs and 10% on ≥12 drugs. There were 2-15 drugs per patient.

Table 7: Most frequently prescribed medications among study participants

Most frequently prescribed medications among study participants		
Rank	**Drug**	**Frequency**
1	Erythropoietin Alfa	35
2	Iron Sucrose	28
3	Pantoprazole	25
4	Calcium Carbonate	20
5	Sodium Bicarbonate	19
6	Amlodipine	18
7	Torasemide	16
8	Sevelamer	15
9	Metoprolol	15
10	Regular Insulin	10

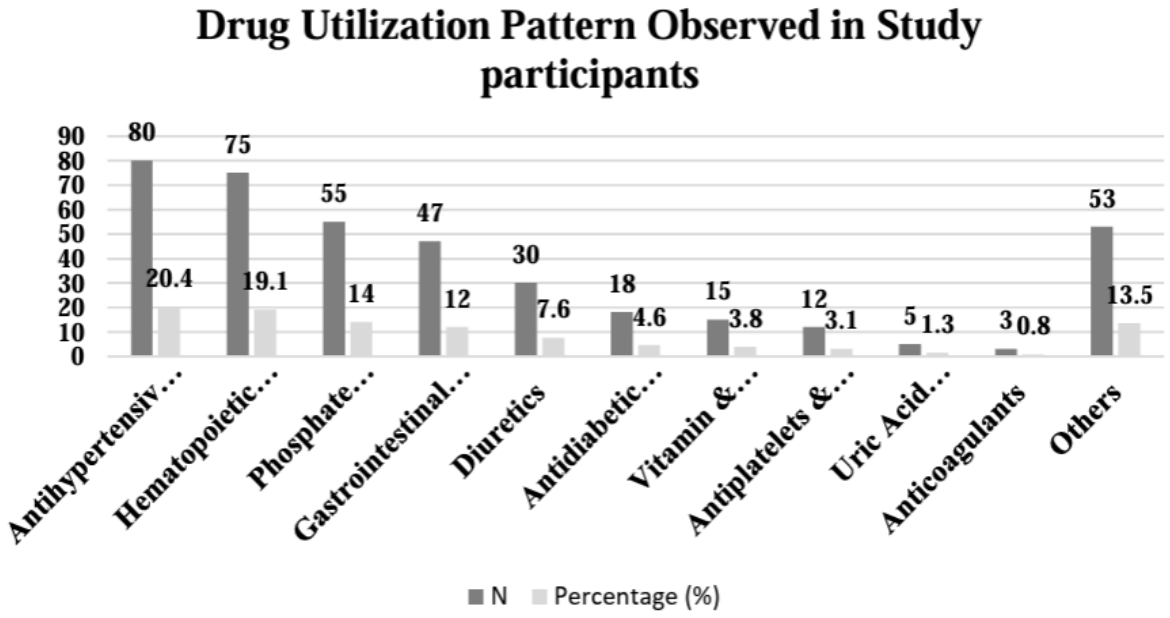


Interpretation

Among the medications prescribed to the study participants, Erythropoietin Alfa was the most frequently prescribed drug (35 prescriptions), followed by Iron Sucrose (28 prescriptions), Pantoprazole (25 prescriptions), Calcium Carbonate (20 prescriptions), and Sodium Bicarbonate (19 prescriptions). Antihypertensive agents such as Amlodipine (18 prescriptions) and Metoprolol (15 prescriptions) were also commonly utilized. The high utilization of erythropoiesis-stimulating agents and iron preparations indicates the significant burden of anemia among CKD Stage V patients. Similarly, the frequent use of phosphate binders and alkalinizing agents reflects the management of CKD-associated mineral bone disorders and metabolic acidosis.

Table 8: Drug Utilization Pattern Observed in Study participant

Drug Utilization Pattern Observed in Study participants			
S. No.	**Drug Class**	**N**	**Percentage (%)**
1	Antihypertensive Agents	80	20.4
2	Hematopoietic Agents	75	19.1
3	Phosphate Binders & CKD-MBD Drugs	55	14
4	Gastrointestinal Drugs	47	12
5	Diuretics	30	7.6
6	Antidiabetic Agents	18	4.6
7	Vitamin & Mineral Supplements	15	3.8
8	Antiplatelets & Lipid-Lowering Agents	12	3.1
9	Uric Acid Lowering Agents	5	1.3
10	Anticoagulants	3	0.8
11	Others	53	13.5



Interpretation

A total of 393 drug prescriptions were recorded among the 50 study participants. Antihypertensive agents represented the most frequently utilized therapeutic class (80 prescriptions, 20.4%), followed by hematopoietic agents (75 prescriptions, 19.1%), phosphate binders and CKD-MBD drugs (55 prescriptions, 14.0%), and gastrointestinal drugs (47 prescriptions, 12.0%). Diuretics accounted for 7.6% of prescriptions, while antidiabetic agents contributed 4.6%. Vitamin and mineral supplements constituted 3.8%, whereas antiplatelets and lipid-lowering agents represented 3.1% of the total prescriptions. The prescribing pattern reflects the

complex management requirements of CKD Stage V patients undergoing maintenance hemodialysis, particularly for the treatment of hypertension, anemia, metabolic acidosis, mineral bone disorders, and diabetes mellitus.

Discussion

The present study assessed prescription patterns among 50 Stage V CKD patients undergoing hemodialysis. Males constituted 62% of the study population, while females accounted for 38%, indicating a higher prevalence of advanced CKD among males. The majority of patients belonged to the 51–60 years age group (42%), suggesting that CKD Stage V is more common in middle-aged and elderly individuals. Hypertension was the most common comorbidity (76%), followed by diabetes mellitus (36%), anemia (16%), hypothyroidism (4%), and coronary artery disease (2%). These findings support previous studies that identify hypertension and diabetes as major contributors to CKD progression and end-stage renal disease. A high degree of polypharmacy was observed, with an average of 7.86 drugs prescribed per patient. Most patients received 6–7 medications (42%), while 32% received eight or more drugs. This reflects the complexity of managing CKD and its associated complications. Among the prescribed medications, Erythropoietin Alfa, Iron Sucrose, Pantoprazole, Calcium Carbonate, Sodium Bicarbonate, and Amlodipine were most frequently utilized. Antihypertensive agents represented the largest therapeutic class (23.3%), followed by hematopoietic agents (21.9%) and phosphate binders (16.0%). The frequent use of these medications highlights the need for effective management of hypertension, anemia, metabolic acidosis, and mineral bone disorders in CKD patients undergoing hemodialysis. Overall, the prescribing pattern observed in this study reflects current therapeutic practices for managing CKD Stage V and its associated comorbidities. Regular prescription review and individualized treatment remain essential to optimize patient outcomes and minimize medication-related complications.

Conclusion

The present study evaluated prescription patterns among 50 CKD Stage V patients undergoing hemodialysis. The majority of patients were males aged 51–60 years. Hypertension and diabetes mellitus were the most prevalent comorbidities, highlighting their important role in the progression of CKD to ESRD. Polypharmacy was common, with patients receiving an average of 7.86 medications per prescription. Antihypertensive agents, hematopoietic agents, and phosphate binders were the most frequently prescribed drug classes, while Erythropoietin Alfa, Iron Sucrose, Amlodipine, Calcium Carbonate, and Sodium Bicarbonate were among the most commonly prescribed medications. The study demonstrates that management of CKD Stage V requires a multidisciplinary and individualized approach due to the high burden of comorbidities and medication use. Continuous monitoring of prescribing practices can help improve treatment outcomes, promote rational drug use, and enhance the quality of life of patients undergoing hemodialysis.

Acknowledgement

I want to sincerely thank all of the faculty members and my guide for their valuable advice and assistance during the writing of the research article. I am particularly grateful to Sara Shireen mam for her unwavering inspiration, encouragement, and support throughout this work. I also want to express my sincere gratitude to my family and friends for their unwavering encouragement and support.

References

1. Rovin BH, Adler SG, Barratt J, Bridoux F, Burdge KA, Chan TM, et al. KDIGO 2021 Clinical Practice Guideline for the Management of Glomerular Diseases. Kidney International. 2021 Oct;100(4):S1–276.
2. Bikbov B, Purcell CA, Levey AS, Smith M, Abdoli A, Abebe M, et al. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet. 2020 Feb;395(10225):709–33

3. Neovius M, Jacobson SH, Eriksson JK, Elinder CG, Hylander B. Mortality in chronic kidney disease and renal replacement therapy: a population-based cohort study. BMJ Open. 2014 Feb;4(2):e004251.
4. Aune D, Sun X, Nie J, Huang W, Liao B, Wang Y. Self-reported chronic kidney disease and the risk of all-cause and cause-specific mortality: outcome-wide association study of 54 causes of death in the National Health Interview Survey. BMC Nephrol. 2022 Dec;23(1):165.
5. Pan American Health Organisation. The burden of kidney diseases in the Region of the Americas, 2000-2019 [Internet]. PAHO. 2021 [cited 2023 Jul 30]. Available from: https://www.paho.org/en/enlace/burden-kidney diseases#:~:text=The%20age%2Dstandardized%20death%20rate,15.6%20deaths%20per %20100%2C000%20population.
6. Hashmi MF, Benjamin O, Lappin SL. End-Stage Renal Disease. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Aug 1]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK499861/
7. National Multisectoral Strategic Plan for Prevention and Control of Non Communicable Diseases (NCDs) in Namibia 2017/18 – 2021/22 [Internet]. Directorate: Primary Health Care Services Division: Family Health; 2017 [cited 2021 Nov 14]. Available from: National Multisectoral Strategic Plan for Prevention and Control of Non-Communicable Diseases (NCDs) in Namibia 2017/18 – 2021/22 | WHO | Regional Office for Africa
8. Chiu YW, Teitelbaum I, Misra M, de Leon EM, Adzize T, Mehrotra R. Pill Burden, Adherence, Hyperphosphatemia, and Quality of Life in Maintenance Dialysis Patients. Pill Burden, Adherence, Hyperphosphatemia, and Quality of Li... : Clinical Journal of the American Society of Nephrology
9. Velenosi TJ, Urquhart BL. Pharmacokinetic considerations in chronic kidney disease and patients requiring dialysis. Expert Opinion on Drug Metabolism & Toxicology. Diversity in the erg27 Gene of Botrytis cinerea Field Isolates from Strawberry Defines Different Levels of Resistance to the Hydroxyanilide Fenhexamid
10. Fan J, de Lannoy IAM. Pharmacokinetics. Biochemical Pharmacology. https://www.sciencedirect.com/science/article/pii/S0006295213005790
11. Verbeeck RK, Musuamba FT. Pharmacokinetics and dosage adjustment in patients with renal dysfunction. Eur J Clin Pharmacol. (PDF) Pharmacokinetics and dosage adjustment in patients with renal dysfunction (ckd def) Chen TK, Knicely DH, Grams ME. Chronic Kidney Disease Diagnosis and Management: A Review. JAMA. 2019;322(13):1294–1304. https://doi.org/10.1001/jama.2019.14745
12. Barsoum RS. Chronic kidney disease in the developing world. N Engl J Med. 2006;354(10):997-999. doi:10.1056/NEJMp058318.
13. Pharmacotherapy Handbook Wells BG, DiPiro JT, Schwinghammer TL, DiPiro CV. Chronic kidney disease. In: Pharmacotherapy Handbook. 8th ed. New York: McGraw-Hill Medical; 2012.
14. Levey AS, Eckardt KU, Tsukamoto Y, et al. Definition and classification of chronic kidney disease: a position statement from Kidney Disease: Improving Global Outcomes (KDIGO). Kidney International. 2005 Jun;67(6):2089-2100. doi:10.1111/j.1523-1755.2005.00365.x.
15. Webster AC, Nagler EV, Morton RL, Masson P. Chronic kidney disease. Lancet. 2017;389(10075):1238-1252. doi:10.1016/S0140-6736(16)32064-5.
16. Jha V, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B, et al. Chronic kidney disease: global dimension and perspectives. Lancet. 2013;382(9888):260-272. doi:10.1016/S0140-6736(13)60687-X.
17. Bonner A, Wellard S, Caltabiano M. Development of a preliminary conceptual model of the patient experience of chronic kidney disease: a targeted literature review and analysis. BMC Nephrology. 2021;22(1):233. http://doi.org/10.1186/s12882-021-02440-9

18. Provenzano M, Coppolino G, De Nicola L, et al. Treatments for chronic kidney disease: a systematic literature review of randomized controlled trials. Advances in Therapy. 2021;38(12):5606-5628. https://doi.org/10.1007/s12325-021-02006-z
19. Webster AC, Nagler EV, Morton RL, Masson P. Management of chronic kidney disease. The Lancet. 2017;389(10075):1238-1252. https://doi.org/10.1016/S0140-6736(16)32064-5
20. Heart Fail Rev. 2024 Mar;29(2):465-478. doi: 10.1007/s10741-023-10376-5. Epub 2023 Dec 10.Echocardiographic manifestations in end-stage renal disease - PubMed
21. Abbasi MA, Chertow GM, Hall YN. 2010 Jul 19:2010:2002.End-stage renal disease - PubMed.
22. Am Fam Physician. 2021 Nov 1;104(5):493-499.End-Stage Renal Disease: Medical Management - PubMed
23. Daebes A, Essa A. Fluid and electrolyte imbalance in renal imbalance: Volume 25, Issue 5, May 2024, Pages 31319.https://doi.org/10.1016/j.mpaic.2024.03.006
24. Kettritz. R, loffing J, Potassium homeostasis – Physiology and pharmacology in a clinical context, Volume 249, September 2023, 108489, **https://doi.org/10.1016/j.pharmthera.2023.108489**
25. Badura k, Janc J, Wasik J, Gnitecki S, Skwira S, Mlynarska E, Rysz J and Franczyk B, Anemia of Chronic Kidney Disease—A Narrative Review of Its Pathophysiology, Diagnosis, and Management, **2024**, *12*(6),1191; **https://doi.org/10.3390/biomedicines12061191**
26. Iain C. Macdougall, Anaemia in CKD—treatment standard, 2024, 39 , 770–777,https://doi.org/10.1093/ndt/gfad250
27. Van der Plas WY, Noltes ME, van Ginhoven TM, Kruijff S. Secondary and tertiary hyperparathyroidism: a narrative review. Scand J Surg. 2020;109(4):271-278. http://doi.org/10.1177/1457496919866015
28. Jat JA, Mal P, Kumar D. Renal osteodystrophy in end stage renal failure patients on maintenance haemodialysis. J Clin Exp Nephrol. 2016;1(4):25. http://doi.org/10.21767/2472-5056.100025
29. Ben-David E, Hull R, Banerjee D. Diabetes mellitus in dialysis and renal transplantation. Ther Adv Endocrinol Metab. 2021;12:20420188211048663. http://doi.org/10.1177/20420188211048663
30. Kovesdy CP, Park JC, Kalantar-Zadeh K. Glycemic control and burnt-out diabetes in ESRD. Semin Dial. 2010;23(2):148-156. http://doi.org/10.1111/j.1525-139X.2010.00701.x
31. Kim IS, Kim S, Yoo TH, Kim JK. Diagnosis and treatment of hypertension in dialysis patients: a systematic review. Clin Hypertens. 2023;29:24. doi: http://doi.org/10.1186/s40885-023-00240-x
32. Van Buren PN. Evaluation and Treatment of Hypertension in End-Stage Renal Disease Patients on Hemodialysis. Curr Cardiol Rep. 2016;18(12):125. doi: http://doi.org/10.1007/s11886-016-0805-y
33. Nguyen DB, Shugart A, Lines C, et al. Hemodialysis-associated infections. Semin Dial. 2017;30(5):454-460. doi: http://doi.org/10.1111/sdi.12613
34. Li PKT, Chow KM. Infectious complications in dialysis—epidemiology and outcomes. Nat Rev Nephrol. 2012;8(2):77-88. doi: http://doi.org/10.1038/nrneph.2011.194
35. Rahul S, Simon S, Doddayya H, Mudgal SM. Study on prescription pattern of chronic kidney disease patients in a tertiary care teaching hospital: a retrospective study. Int J Pharm Pharm Res. 2024;30(1):389-399.
36. Parameshwari K, et al. Assessment of prescription pattern in chronic kidney disease patients undergoing hemodialysis. Journal of Population Therapeutics and Clinical Pharmacology. 2025;32(8). DOI: 10.53555/qdrepc83
37. Palikhey A, Paudel S, Agrawal K, Shrestha L and Shrestha J.Prescription Pattern of Drugs in Hemodialysis Patients at a Tertiary Care Hospital. DOI:10.3126/jucms.v13i01.78035
38. Alam D R, Hasan R and Jahan F. Prescription pattern and common complications in maintenance hemodialysis patients. DOI: https://doi.org/10.33545/26646692.2024.v6.i1a.11.

39. Khangia M and Chakravarty P. Prescribing pattern of drugs in chronic kidney disease patients undergoing maintenance hemodialysis in a tertiary care hospital, Assam. DOI:10.18203/2319-2003.ijbcp20253730.

How to cite this article: Sara Shireen, Zama Muqeem, Shaik Nawaz, Hafsa Zaheer, and Mohd Naseer Ullah. "Assessment of Prescription Patterns in Stage 5 of Chronic Kidney Disease Patients Undergoing Heamodialysis". *Tropical Journal of Pharmaceutical and Life Sciences*, vol. 13, no. 3, June 2026, pp. 27-43, doi:10.61280/tjpls.v13i3.273.

Published by:
Informative Journals
Jadoun Science Publishing Group India