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Research Article

A PROSPECTIVE COHORT STUDY ON THE EPIDEMIOLOGICAL, ETIOLOGICAL AND CLINICAL PROFILE OF HEMODIALYSIS PATIENTS: AN EXPLORATION OF MANAGEMENT STRATEGIES AND QUALITY OF LIFE IN A TERTIARY CARE TEACHING HOSPITAL

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Abstract

Hemodialysis is a life-saving procedure for patients with chronic kidney disease who have progressed to end-stage renal disease. This prospective cohort study aims to analyze the epidemiological, etiological, and clinical profiles of hemodialysis patients while assessing management strategies and their impact on quality of life. Data were collected from 120 patients undergoing hemodialysis, comprising 79 males (65.83%) and 41 females (34.17%). The highest incidence was observed in the 50–60 years age group (27.5%). Hypertension was the leading cause (55%), followed by diabetes mellitus. Diagnosis was primarily based on blood urea nitrogen (96.6%) and serum creatinine levels (93.3%). Weight loss was recorded in 85% of cases, while 15% experienced weight gain. Treatment included antihypertensive medications (98.3%) and vitamin D supplements (89.16%). The study highlights the need for comprehensive healthcare strategies to improve the management of hemodialysis patients. Clinical pharmacists and healthcare professionals should play a vital role in patient education regarding medication adherence, lifestyle modifications, and safety measures. Strengthening healthcare systems and implementing well-coordinated chronic kidney disease prevention programs are crucial for reducing the burden of kidney disease and enhancing patient outcomes.

Keywords: Hemodialysis, Chronic Kidney Disease, Hypertension, Epidemiology, Patient Management

1. Introduction

Chronic Kidney Disease (CKD) is a major global health issue, affecting around 10% of the population. It often progresses to End-Stage Renal Disease (ESRD), requiring renal replacement therapy such as Hemodialysis (HD)[1, 2]. Most leading causes are Primary Glomerular Diseases (Affecting Only the Kidneys) Acute Glomerulonephritis, Membranous Nephropathy, Secondary Glomerular Diseases (Caused by Other Conditions) Diabetic Nephropathy, Lupus Nephritis, Hypertensive Nephrosclerosis Amyloidosis, Post-Infectious GlomerulonephritisCommon risk factors include hypertension, diabetes, genetic predisposition, medication toxicity, and infections. CKD leads to complications like cardiovascular disease, anemia, and fluid-electrolyte imbalances, which significantly affect patients' quality of life[3,4].

Hemodialysis removes waste, toxins, and excess fluids from the blood when kidneys fail. However, it is associated with complications such as infections, cardiovascular risks, and psychological distress[5]. The high cost of treatment makes cost-effective management strategies crucial[6].

This study explores the epidemiological, etiological, and clinical characteristics of HD patients in a tertiary care hospital[7]. By assessing demographics, comorbidities, and treatment patterns, we aim to identify factors influencing patient outcomes and evaluate the effectiveness of current management strategies, including medications and lifestyle modifications[8,9]. These findings can guide better patient care, preventive healthcare initiatives, and structured CKD awareness programs[10].

2. Methodology

2.1 Study Design and Setting

This prospective cohort study was conducted in a tertiary care teaching hospital in Andhra Pradesh, India, with a dedicated nephrology and hemodialysis unit. The study spanned six months (October 2024 – March 2025) and was approved by the Institutional Ethics Committee.

2.2 Study Population

Inclusion Criteria

- CKD Stage 5 patients on maintenance hemodialysis
- Aged ≥18 years
- Undergoing HD at least twice a week for one month
- Provided informed consent

Exclusion Criteria

- Patients on peritoneal dialysis
- History of acute kidney injury (AKI) without ESRD progression
- Terminal illnesses (e.g., advanced cancer, severe heart failure)
- Cognitive impairment or language barriers
- Acute Conditions (Short-term, Sudden Onset)
- Infections (e.g., Pneumonia, Urinary Tract Infections, Sepsis)
- Acute Kidney Injury (AKI)
- Acute Glomerulonephritis
- Myocardial Infarction (Heart Attack)
- Stroke (Cerebrovascular Accident)
- Acute Respiratory Distress Syndrome (ARDS)
- Acute Pancreatitis
- Chronic Conditions (Long-term, Progressive)
- Chronic Kidney Disease (CKD)
- Chronic Glomerulonephritis
- Diabetes Mellitus
- Hypertension
- Chronic Obstructive Pulmonary Disease (COPD)
- Chronic Liver Disease (Cirrhosis, Hepatitis B/C)
- Autoimmune Diseases (Lupus Nephritis, Rheumatoid Arthritis)

2.3 Sample Size

The sample size was 120 patients, based on hospital admission data and CKD prevalence rates.

3. Results

This study analyzed 120 HD patients, focusing on their demographic characteristics, causes of CKD, clinical symptoms, lab findings, treatment strategies, and quality of life.

- Males (65.83%) were more affected; 50-60 years was the most affected age group.
- Hypertension (55%) was the leading cause, followed by diabetes (20%).
- Swelling in feet (72.5%) was the most common symptom.
- Lab tests: High BUN (96.6%) and creatinine (93.3%) confirmed kidney impairment.
- Treatment: Antihypertensives (98.3%) and calcium supplements (100%) were most prescribed.
- Quality of Life: 47.5% rated it moderate, while 3.3% had a very poor rating.

Table 1: Gender wise distrubution

S. No.	Gender	No. of Patients	Percentage
1.	MALE	79	65.83%
2.	FEMALE	41	34.17%
	Total	120	100%

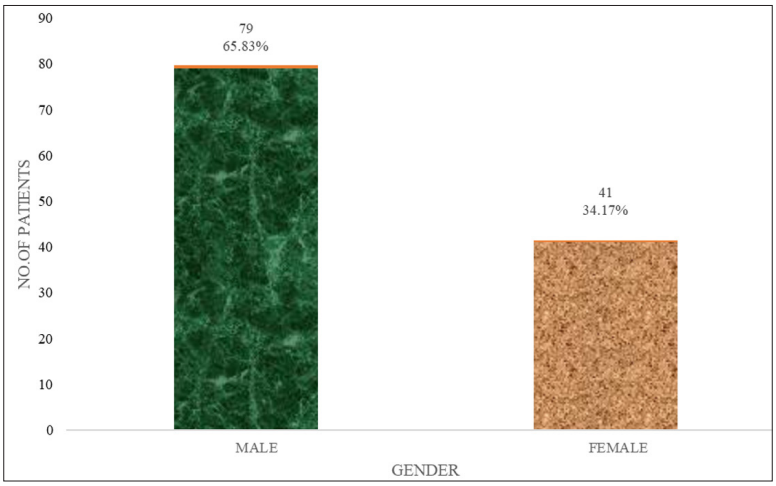

Figure 1: Graphical representation of distribution according to gender

Table 2: Age wise distribution

S. No.	Age	No of Patients	Percentage
1.	10-20	5	4.16%
2.	20-30	13	10.83%
3.	30-40	11	9.17%
4.	40-50	23	19.17%
5.	50-60	33	27.5%
6.	60-70	24	20%
7.	70-80	11	9.17%
	Total	120	100%

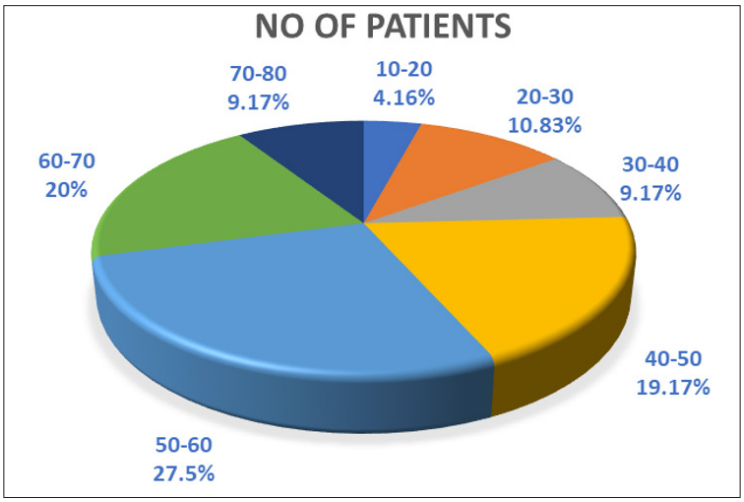

Figure 2: Pie chart representation of distribution according to age

Table 3: Weight wise distribution

S. No.	Weight	No. of patients	Percentage
1.	Weight gain	18	15%
2.	Weight loss	102	85%
	Total	**120**	**100%**

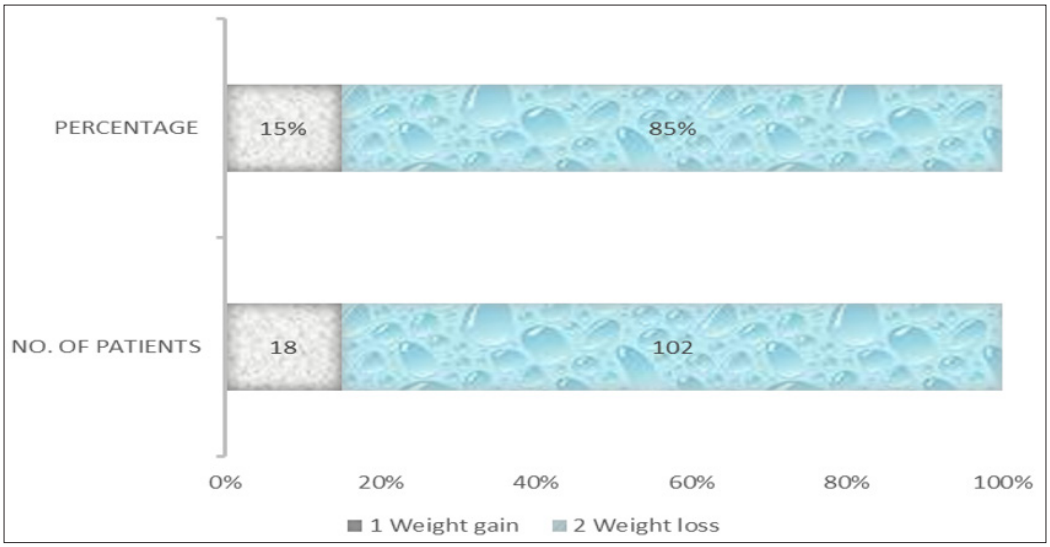

Figure 3: Graphical representation of distribution according to weight

Table 4: Etiology of chronic renal failure

S. No.	Cause	No. of Patients	Percentage
1.	Hypertension	66	55%
2.	Diabetes	24	20%
3.	Genetics	9	7.5%
4.	Medication	15	12.5%
5.	UTI	6	5%
	Total	**120**	**100%**

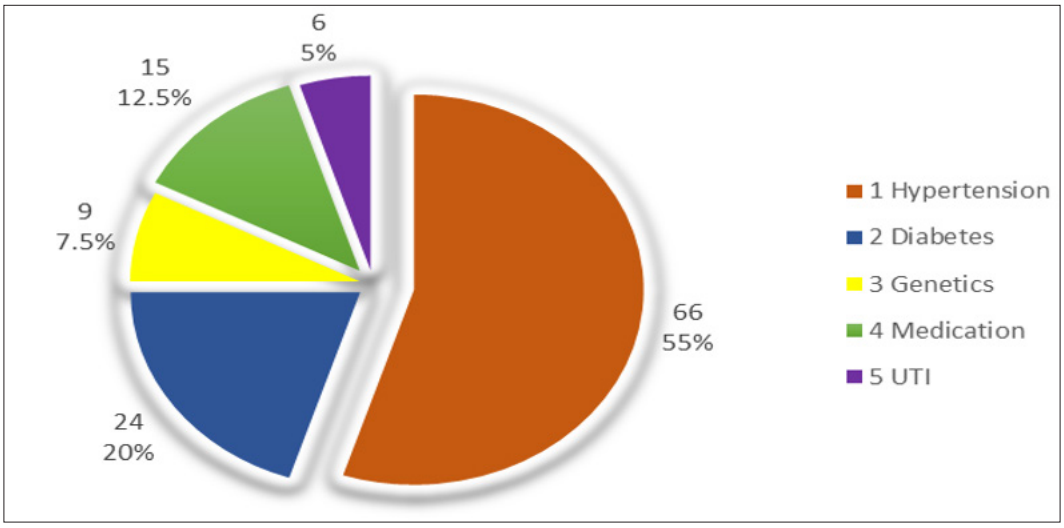

Figure 4: Pie chart representation of distribution according to etiology

Table 5: Clinical manifestations (swelling)

S. No.	Symptoms	No. of patients	percentage
1.	Face	15	12.5%
2.	Hands	18	15%
3.	Feet/ ankles	87	72.5%
	Total	**120**	100

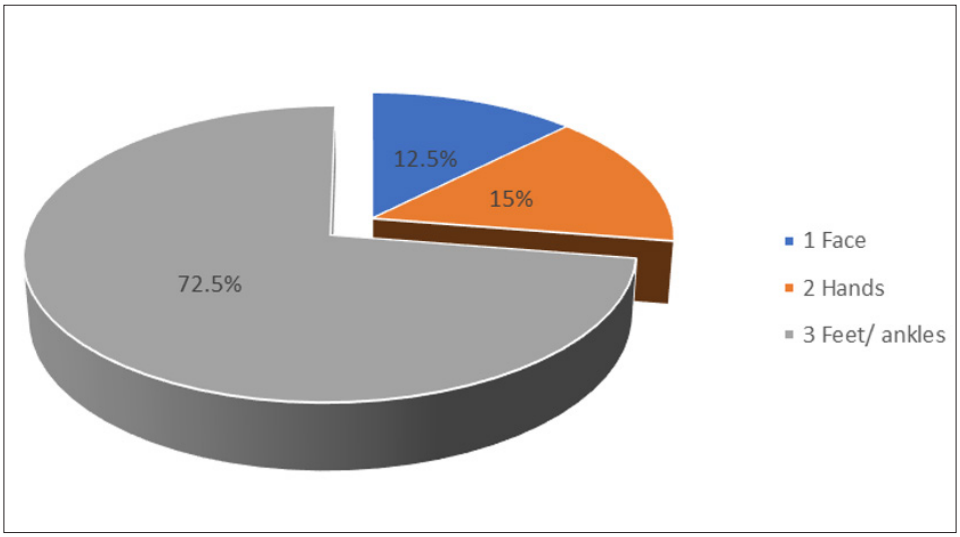

Figure 5: Pie chart representation of distribution according to symptom (swelling)

Table 6: Diagnosis for chronic renal failure

S. No.	Laboratory Investigations	No. of Patients	Percentage
1.	BUN	116	96.6%
2.	SGOT	103	85.8%
3.	SGPT	108	90%
4.	Sr. Creatinine	112	93.3%

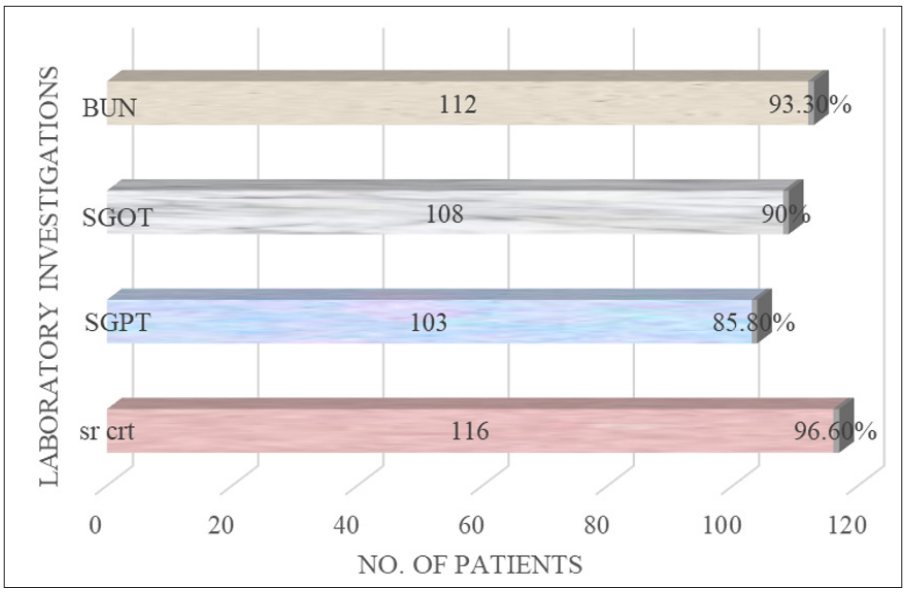

Figure 6: Graphical representation according to laboratory investigations

Table 7: Medication chart

S. No.	Medication	No. of Population	Percentage
1.	Antihypertensives	118	98.3%
2.	Statins	17	14.16%
3.	Antiplatelets	16	13.3%
4.	Vit calcium	120	100%
5.	Vit D_3	107	89.16%

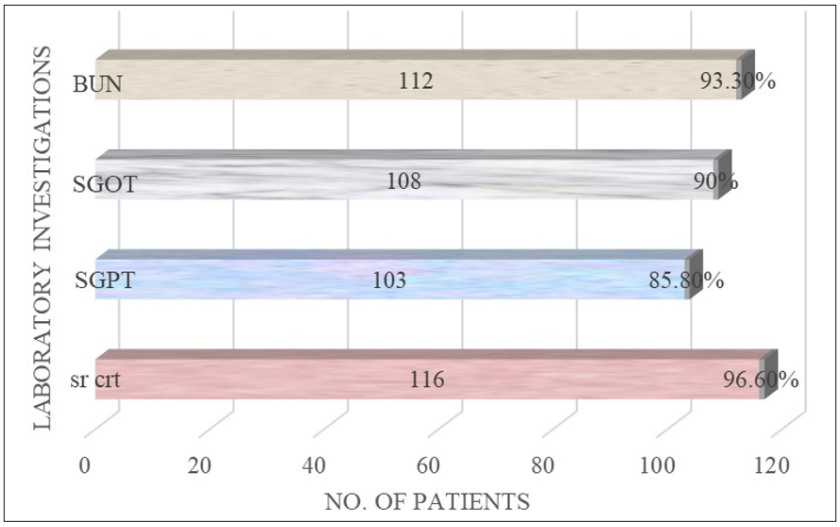

Figure 7: Graphical representation of management

Table 8: Quality of life

S. No.	Quality Of Life	No. of Population	Percenage
1.	1/5	4	3.3%
2.	2/5	7	5.8%
3.	3/5	57	47.5%
4.	4/5	42	35%
5.	5/5	10	8.4%
	Total	**120**	**100%**

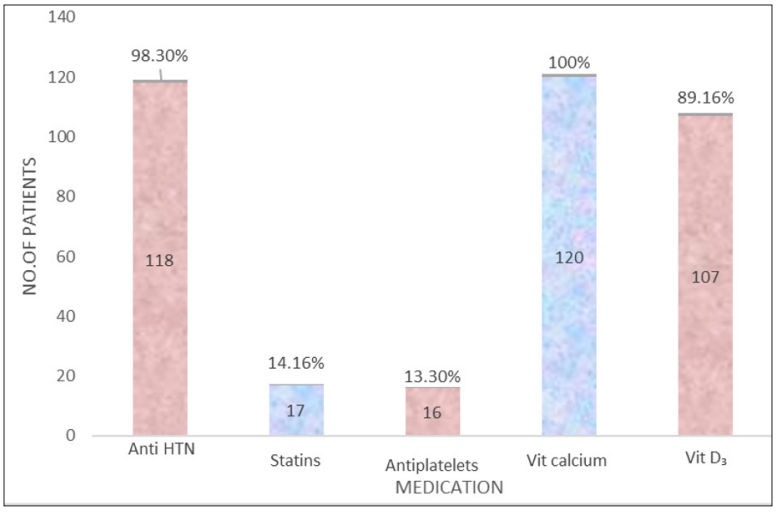

Figure 8: Pie chart representation of distribution according to quality of life

4. Discussion

4.1 Comparison with Previous Studies

The predominance of hypertension (55%) and diabetes (20%) as primary causes of CKD in this study aligns with findings from previous research, where these two conditions account for the majority of ESRD cases worldwide (Jha et al., 2013). Similar studies in Ethiopia and Somalia also reported hypertension (33–39%) and diabetes (27–36%) as leading risk factors (Seifu et al., 2023; Rage et al., 2023).

4.2 Clinical and Laboratory Correlations

The high prevalence of elevated BUN (96.6%) and serum creatinine (93.3%) reinforces the established diagnostic criteria for CKD. These laboratory markers are critical in assessing disease progression and dialysis adequacy (Levey et al., 2011). Furthermore, the presence of liver enzyme abnormalities (SGOT and SGPT elevations) in over 85% of patients may suggest a need for routine hepatic function monitoring, given the potential for drug-induced liver injury in HD patients.

4.3 Significance and Clinical Implications

The findings emphasize the importance of early detection and management of hypertension and diabetes to reduce CKD progression rates. Given that weight loss was observed in 85% of patients, nutritional support should be integrated into hemodialysis care to prevent malnutrition and muscle wasting. The widespread use of antihypertensives (98.3%) and calcium/vitamin D supplementation aligns with standard CKD treatment guidelines, highlighting effective pharmacological management strategies.

4.4 Future Research Directions

- To build upon these findings, future studies should:
- Conduct multicenter studies to improve the generalizability of results.
- Explore genetic and molecular markers for CKD progression in hemodialysis patients.
- Assess long-term survival rates and dialysis-related complications.

5. Conclusion

This study highlights that hypertension followed by diabetes mellitus are the leading causes of chronic renal failure (CRF) among maintenance hemodialysis patients. Our findings indicate that the majority of dialysis patients are older males, often unemployed, with arteriovenous fistula as the most preferred mode of vascular access. Beyond the physical burden of disease, patients also experience weight loss, persistent hypertension, and vascular access-related complications such as swelling, itching, and infections. From a clinical perspective, serum creatinine, blood urea nitrogen (BUN), serum glutamic oxaloacetic transaminase (SGOT), and serum glutamic pyruvic transaminase (SGPT) were the primary laboratory markers used for diagnosis and monitoring. Pharmacotherapy in CKD patients on hemodialysis commonly included antihypertensives, statins, calcium + vitamin D_3, and antiplatelets, indicating a multifaceted approach to disease management.

6. Acknowledgements

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7. Conflict of Interest: None

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