

Study of clinical profile of CKD on hemodialysis with focus on blood pressure management

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Abstract-

OBJECTIVE: The study of clinical profile of CKD on hemodialysis with focus on blood pressure management was done attempt to understand treatment pattern and outcomes of patients. This is a prospective observational study done for a period of 6 months august 2022 to February 2023 at dialysis unit, department of Nephrology, at Prathima Institute of Medical Sciences, Karimnagar, Telangana, India.

METHODS: In this study 100 patients of CKD-V undergoing dialysis patients were included. The clinical proforma was prepared and used to collect demographic detail, co-morbidity status, past medication history was noted. Pre and post dialysis (temperature weight, pulse & blood pressure), laboratory data and treatment was recorded. The data was analyzed in micro soft excel sheet & SPSS version 20 using statistical dependent T- Test.

RESULTS: out of 100 study population 79% subjects were males and 21% were females. The highest percentage of CKD on hemodialysis patients was found to be in age group of 50-60 (31%). The pre & post dialysis (pulse rate, weight, blood pressure) using SPSS software the confidence interval 95% p value (<0.005) is significant. The morbid along with CKD includes Hypertension-87%, Diabetes-20%, CAD-13%, CVA-3%, COPD-6% and malignancy-2% were reported. Severe anemia i.e(<6mg/dl) was seen in 11%, hypocalcemia in 46% of patients. Treatment includes beta-blockers-44%, calcium channel blockers-72%, Alpha-agonist -33%, Alpha adrenergic -40%, Angiotensin receptor blockers-8% to manage high blood pressure. Diuretics includes Loop diuretic- 54%, potassium sparing diuretics - 8%, calcium channel blockers-46% were prescribed.

CONCLUSION: It was concluded that out of 100 study subjects 17% of patients were died, 70% of patients not responded to medication, 13% of patient had been reported as hypertensive crises.

Index Terms- Chronic Kidney disease, blood pressure managemen, Haemodialysis, P value.

I. INTRODUCTION

Chronic renal disease represents worldwide major public health and social issue. The universal health teams share a goal of preventing the disease progression and managing the comorbidity conditions in CKD and End stage renal diseases.

Abnormalities in kidney structure or function that have been present for **more than three months** are referred to be **chronic renal disease**.

These may include

- (Albumin excretion ratio ≥ 30 mg/24h) Albuminuria
- (≥ 30 mg/g of urinary albumin to creatinine)
- Anatomical abnormalities induced by tubular disorders that were discovered via the history of kidney transplantation include aberrant urine sediment, electrolyte levels, and other abnormalities
- Glomerular filtration rate fell to 60ml/min/1.73m².

A serious public health issue that affects the entire world is chronic renal disease. End stage renal disease, the most advanced stage of chronic kidney disease, was defined as a glomerular filtration rate of less than 15 milliliters per minute per 1.73 m²

ESRD indicates inability to maintain haemostasis and requires patients to depend on haemodialysis or renal replacement therapy. The medical management of pre dialysis patient involves complex and high shifting pharmacotherapy as well as frequent monitoring and assessment to ensure accurate pharmacotherapy.

Elderly patients with CKD often have multiple co-morbidities and may suffered from reduced quality of sleep, pain, cognitive impairment, infirmity and weakness, anxiety and depression as well as medication related factors.

Management of blood pressure in patients with chronic renal disease, patient on haemodialysis provides significant challenge for health care professionals.

The current study's objectives are to assess the clinical profile of haemodialysis patients with chronic kidney disease in order to lower the risk of co-morbid illnesses and to assist elderly people with chronic Patients who have ESRD must rely on haemodialysis or renal replacement therapy to maintain haemostasis. In order to provide appropriate pharmacotherapy, medical treatment of patients undergoing predialysis includes regular monitoring and assessment as well as sophisticated and high shifting medication.

Reduced blood pressure is essential for long-term haemodialysis survival, making hypertension the most reliable indicator of developing heart disease. Blood vessel stiffness, endothelial dysfunction, and structural abnormalities in the heart are all caused by high blood pressure. Furthermore, there is a significant correlation between morbid occurrences and dialysis patients.

II. METHOD:

1. STUDY SITE

This study survey was conducted at Prathima Institute of Medical Sciences, Karimnagar, Telangana, India.

2. STUDY PERIOD

This study was organized for 6 months.

3. STUDY DESIGN

This was a prospective observational study.

4. SAMPLE SIZE

100 -A total number of dialysis outpatients were included in the study.

5. STUDY APPROVAL

The study protocol and written informed consent form which is approved by the Head of the Department.

6. STUDY CRITERIA

INCLUSION CRITERIA

- Patients with CKD stage 5 on hemodialysis
- Patients above 20 years of age
- Out patients department

EXCLUSION CRITERIA

- CKD stage 1,2,3,4 are excluded
- Pediatric patients
- Pregnant women

7. DATA SOURCE

- Patients
- Data collected from the dialysis unit
- Patient case notes
- Patients prescriptions
- Diagnosis and laboratory reports
- Qualitative interviews via patients
- The above data will be documented in the data collection form. The data will be co-related and comparison will be done.
- A micro soft excel sheet used to record all information of 100 patients. SPSS version 20 used to estimate the significance difference.

STUDY PROCEDURE: This is a prospective observational study. A Protocol was prepared and submitted. This study was conducted by Prathima Institute of Medical Sciences, Nagnoor, Karimnagar, Telangana. In this study, 100 patients were included. In this study, the clinical proforma was prepared and used to collect demographic details of patients, comorbidity status, history, and physical parameters- pre&post dialysis (Temperature, weight, pulse, blood pressure). Laboratory data includes HB count, serum iron, Blood urea, serum creatinine, Electrolytes, ALP, Ca⁺, and phosphate levels. understanding the treatment patterns and providing medication adherence among patients.

III. RESULTS:

Data were collected from a total of 100 patients and the results were as follows

Figure -1– Distribution of subjects based on the gender

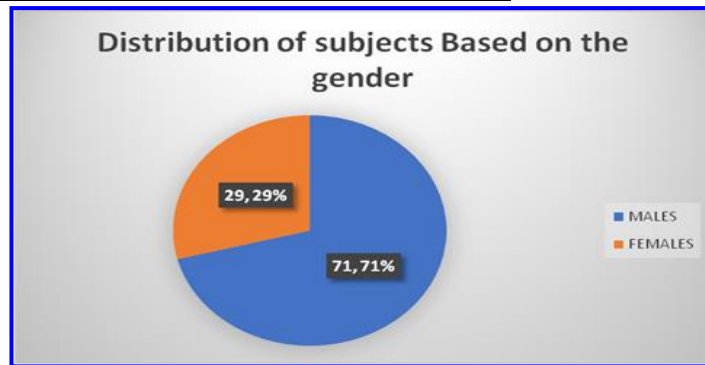


Table: 1 DISTRIBUTION OF SUBJECTS BASED ON AGE

Age Interval (Years)	Frequency	Percentage
21-30	8	8%
31-40	14	14%
41-50	28	28%
51-60	31	31%
61-70	15	15%
>71	4	4%

- Software used: SPSS version 20
- The confidence interval is 95%, hence P value <0.05 is considered significant
- Test Performed: Dependent t-test

Table -2 Pulse Rate

Dialysis	Pulse rate			P value
	Minimum	Maximum	Mean± SD	
Pre	62	160	80.74±13.55	0.0020
Post	60	100	76.42±5.94	

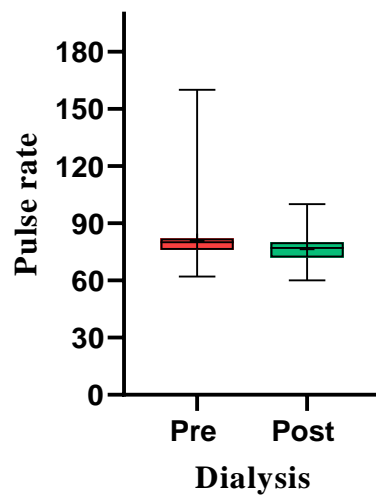


Figure -2– Pre and Post Pulse rates during dialysis

Table -3Weight

Dialysis	Weight			P value
	Minimum	Maximum	Mean± SD	
Pre	27	90	57.46±11.16	0.0011
Post	26	89	56.51±11.56	

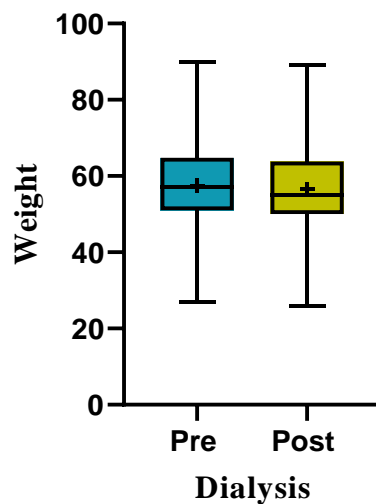


Figure -3 – Significant difference between pre & post weight

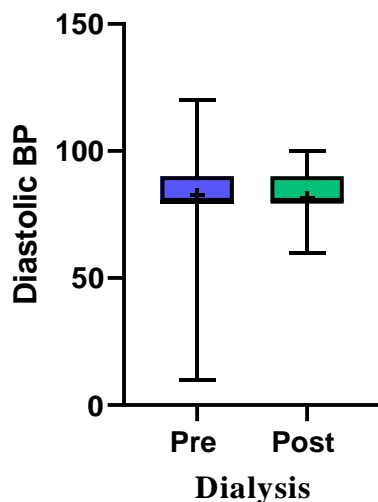
A statistically significant difference was found in the pre and post-weight.

Dialysis	Systolic Blood Pressure			P value
	Minimum	Maximum	Mean± SD	
Pre	100	220	150.2±23.44	<0.0001
Post	100	180	134.3±17.70	

Table 4-Systolic Blood Pressure

A statistically significant difference was found in the pre and post-systolic blood pressure.

Figure -4 – Significant difference in systolic blood pressure



Dialysis	Diastolic Blood Pressure			P value
	Minimum	Maximum	Mean± SD	
Pre	10	120	82.68±13.14	0.3870
Post	60	100	81.40±6.86	

Table -5: Diastolic Blood Pressure

A statistically significant difference was found in the pre and post-diastolic blood pressure

Figure -5– Significant difference in diastolic blood pressure

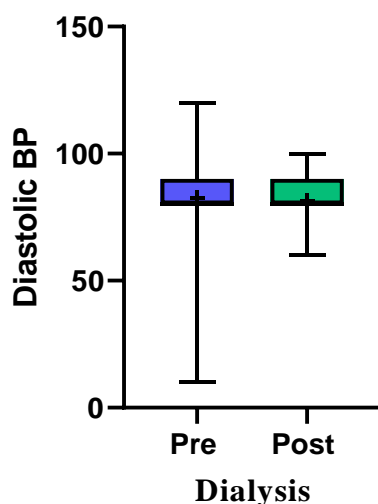


Table -6 BLOOD PRESSURE RANGE - DISTRIBUTION OF SUBJECTS BASED ON PRE AND POST-DIALYTIC/ SYSTOLIC BLOOD PRESSURE

SYSTOLIC BLOOD PRESSURE	NO.OF PATIENTS(PRE DIALYSIS)	NO.OF PATIENTS (POST-DIALYSIS)
<120	8	24
129-139	20	50
140-159	41	17
>160	44	18

CO-MORBIDITY CONDITION- Table -7: DISTRIBUTION OF SUBJECTS BASED ON THE CO-MORBIDITIES

CO MORBIDITIES	TOTAL NO. OF PATIENTS	PERCENTAGE
HYPERTENSION	87	87%
DIABETES	20	20%
CAD	13	13%
CVA	3	3%
COPD	6	6%
HYPOTHYROIDISM	10	10%
MALIGNANCY	2	2%
OTHERS	10	10%

Table -8 DISTRIBUTION OF SUBJECTS BASED ON HAEMOGLOBIN CONTENT

HEMOGLOBIN (mg/dl)	FREQUENCY	PERCENT
<6	11	11%
6.5-10.0	65	65%
>11.0	24	24%

Table -9DISTRIBUTION OF SUBJECTS BASED ON CALCIUM LEVELS.

CALCIUM LEVELS(mg/dl)	FREQUENCY	PERCENT
<7.0	46	46%
8.0-10.2	38	38%
>10.2	10	10%

Table -10 DISTRIBUTION OF PATIENTS BASED ON ANTIHYPERTENSIVES

ANTIHYPERTENSIVE	NO. OF PATIENTS
METOPROLOL	44
CILNIDIPINE	60
NIFEDIPINE	15
CLONIDINE	30
AMLODIPINE	2
PRAZOSIN	40
TELMISARTAN	8

Table -11- NUMBER OF ANTIHYPERTENSIVE AMONG STUDY SUBJECTS

ANTIHYPERTENSIVE	FREQUENCY	PERCENT
NIL	4	4%
ONE	21	21%
TWO	32	32%
THREE	22	22%
FOUR	14	14%
FIVE AND ABOVE	7	7%

Table -12- DISTRIBUTION OF DIURETICS AMONG STUDY SUBJECTS

DIURETICS	TOTAL NO. OF PATIENTS PERCENTAGE
FUROSEMIDE	50%
TORSEMIDE	4%
TORSEMIDE+SPIRANOLACTONE	4%
SPIRANOLACTONE	4%
METALOZONE	9%

Figure -6- DISTRIBUTION OF PATIENTS BASED ON CLASS OF DRUGS

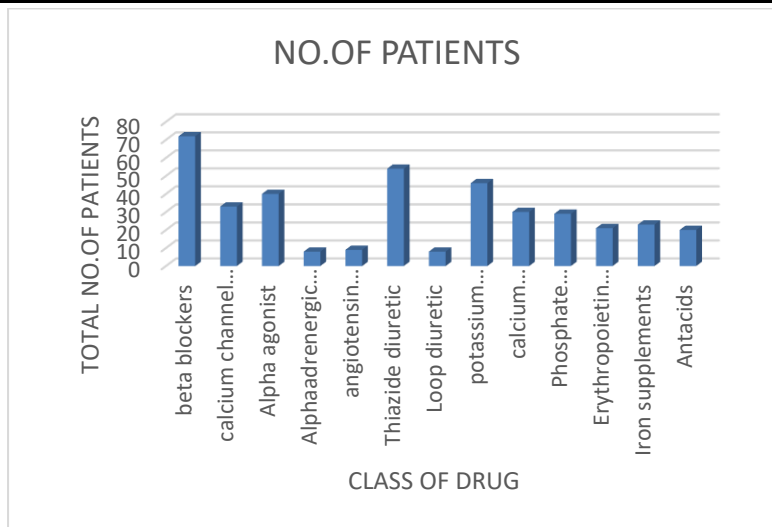


Table -13- DISTRIBUTION OF STUDY BASED ON OUTCOMES

OUTCOMES	NO.OF PATIENTS	PERCENTAGE
DEATH	17	17%
MEDICATION NON-ADHERENCE	70	70%
HYPERTENSIVE CRISIS	13	13%

DISCUSSION

Chronic kidney disease (CKD) is a global health issue with significant number of CKD patients progressing to end stage renal disease (ESRD) requiring dialysis as life sustaining therapy. Patients on dialysis have high morbidity and mortality. Hence this study was conducted in 100 patients of ESRD on haemodialysis to understand their clinical profile and blood pressure control which is the major factor influencing the outcome of these patients .This study was conducted in Department of Nephrology ,Prathima institute of medical sciences. Clinical and pharmacological profile of 100 haemodialysis patients was studied over a period of 6 months.

GENDER: The study shows that males (79%) were more commonly affected than females (21%). This was in accordance with the study done by Durg Dhungana *et.al.*in 2020 at Dandaki medical college Nepal. This shows that male are frequently seeking treatment facilities for their problems and females may be neglected for treatment purpose.

AGE: Majority of the study subjects were of age group 51 to 60 years accounting 31%. Most of patients were male and belonging to 4th and 5th decade of life leading to severe economic crises in the family. This is an alarming social problem.

PULSE RATE: The pre and post pulse rate was analysed statistically SPSS version 20.0. Statistically significant difference was found in the pre and post pulse rate. P value of <0.05 were considered significant test performed dependent test. In this study it was noticed that tachyarrhythmias like atrial fibrillation, supra ventricular tachycardia and ventricular

tachycardia. beta blockers are essential to prevent sudden cardiac arrest in these high risk group patients.

BLOOD PRESSURE: This study shows that 44% of patients having high pre dialytic systolic blood pressure (>160mm of Hg). Post dialytic decrease in BP was noticed in 18% of patients. This shows that majority of the patient there should be increase in the number and dosage of antihypertensives and also there should be stricter control of salt and water intake. Majority of the patients are in hypertensive crises which can be managed on haemodialysis by doing increasing ultrafiltration and achieving dry weight and regular medication intake. The statistically significant difference was found in pre and post systolic and diastolic blood pressure. P value (<0.001).

CO-MORBIDITY: The majority of (87%)patients had uncontrolled blood pressure .In non - dialysis CKD patients there is increase in hypertension severity with increasing blood pressure. In our study glomerulonephritis was the most common cause of CKD followed by diabetic nephropathy. Many patients presented in late stage as ESRD. The cause of CKD was not known. These findings show that prevention, early diagnosis and regular medications of hypertension and diabetic nephropathy can prevent the development of ESRD.

Unlike urban population this trend is mostly seen in rural areas because of undiagnosed congenital kidney disease, secondary hypertension due to kidney and endocrine causes and inadequately treated pyelonephritis Lack of education and poverty, and Non-compliance to medication increases the risk of morbidity conditions.10% of people was seen as hypothyroidism. Hypothyroidism can weaken the heart muscle and heart rate, reduce pumping capacity and increases the stiffening od blood vessels. This combination of these changes can leads to hypertension. Other Co- morbidities like DM-20%, CAD 13%, COPD 6%, CVA 3% and malignancy 2% are seen as morbid condition in study subjects.

HAEMOGLOBIN: Anaemia is one of the complications frequently observed in ESRD patient. 76% of patients were anaemic. Anaemia is due to increases red cell lysis, erythropoietin deficiency . Nutritional factors play an important role in rural areas. severe anaemia was seen in 11% of people its correction can help to cause decrease in morbidity and mortality. Iron injection was prescribed patient to treat anaemia, and erythropoietin alpha that was given in majority of study population

CALCIUMLEVELS: The calcium levels are seen to be reduced in the majority of the subjects with 46% showing hypocalcemia of < 7 mg/dl. Bone and mineral disorders are also common complication seen in ESRD. Dietary patter and medical therapy (Calcium carbonate is mostly prescribed as calcium supplements in 46% of study subject to recorrect the calcium deficiency. vitamin D analogues i.e calcitriol is most widely prescribed to correct hypocalcemia.)

POTASSIUM LEVELS: Hyperkalemia is due to dietary non- compliance, dependence on blood transfusion. Diuretics and dialysis reduce the high potassium levels

MEDICATION REGIMEN: In our study 87% subjects are hypertensive. Mostly prescribed drug was calcium channel blocker among 72% of study subjects. betablockers was prescribed for 44%, Alpha agonist for 33%, Alpha adrenergic 40% and Angiotensin receptor blocker 8% of patients. Only 4% of patients had not been prescribed any antihypertensives. Mostly these patients had slat losing nephropathy. ,68% of patients had prescribed by two to four and 7% of patients prescribed five and above medications. Mostly prescribed diuretic is loop diuretic was in 54% of patients, Potassium sparing diuretic 8% of patients, thiazide diuretic 9% and 30% patients were anuric not requiring diuretics.

OUT COMES: During 6 months study of clinical profile of CKD on haemodialysis with focus on blood pressure management. It has been reported that the following out comes was 17% of death rates, 70% of patients are not adhered to medications, 13% of subjects had been reported as hypertensive crises. It reports that management of blood pressure reduce significantly mortality and morbidity. Hence the health care team should be aggressive in control of blood pressure by pharmacological and Non- pharmacological management.

CONCLUSION:

From our 6 months study of clinical profile of CKD on haemodialysis with focus on blood pressure management. It has been reported that the following out comes was

- 17% of subjects were died,
- 70% of patients are not responded to medications,
- 13% of subjects had been reported as hypertensive crises.

It reports that management of blood pressure reduce significantly mortality and morbidity. Hence the health care teams and professionals maintain aggressive in order to succeed in maintenance of blood pressure by pharmacological and Non- pharmacological management.

Acknowledgments:

We would like to thank the multidisciplinary health care team of dialysis unit & department of Nephrology and staff of pharmacy department for continuous support and guidance.

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