



STUDY ON TO EVALUATE THE EFFECTIVENESS OF THE TREATMENT AND LIFESTYLE MODIFICATION IN PATIENTS WITH CHRONIC KIDNEY DISEASE ON MAINTANANCE HAEMODIALYSIS

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ABSTRACT

Background: As Chronic kidney disease is a commonly developing Health issue due to Underlying causes such as hypertension, diabetes, AKI and Also CKD increases the risk of heart attack and stroke, and in some cases can progress to end stage renal disease (ESRD) can be reduced by the early detection and management of risk factors and complications associated with it. The present study aims to study the complications, treatment pattern, knowledge about life style modification and associated outcome in hospitalized CKD patients. **Objectives:** The main objectives is to evaluate the effectiveness of treatment of Chronic Kidney Disease, lifestyle modification in CKD patients and to educate the patients about the lifestyle modification to improve quality of life. **Methods:** A prospective observational study was conducted in a tertiary care hospital during six month period in which 110 samples were included Collection of patient details from the patient profile Evaluating the effectiveness of the treatment Counseling the patients regarding the lifestyle modification. **Result:** In the total sample 85 are males and 25 are females, the study showed male predominance. The most common comorbidity associated were Hypertension in 45% of population followed by Diabetes Mellitus of 17%, 34% of population had complaint of breathlessness and lower limb swelling (20%). Monotherapy or combination therapy of diuretics (9%), antidiabetics (3%) and antihypertensives (8%) were used in the management of comorbidities. Serum Creatinine, Serum urea had improved significantly ($p < 0.001$). 77 patients had moderate treatment outcome and 33 patients had mild treatment outcome among the subjects. The subjects with adequate knowledge of lifestyle (58.18%) had moderate symptomatic improvement and the subjects with inadequate knowledge of lifestyle (41.82%) had mild symptomatic improvement in the treatment. **Conclusion:** Present study highlights the comorbidities, symptoms, treatment pattern and knowledge about life style in Chronic Kidney Disease patient in South India. Treatment was evaluated, this study population with moderate treatment outcome had adequate knowledge of lifestyle and this study population with mild treatment outcome had inadequate knowledge of lifestyle hindering the treatment outcome. Thus, patient counselling on appropriate lifestyle modification in chronic kidney disease patient will result in significant improvement in treatment outcome and improve quality of life. This study helps to reduce the prevalence and mortality associated with CKD in future.

INTRODUCTION

Chronic kidney disease (CKD) is a clinical syndrome secondary to the definitive change in function and/or structure of the kidney and is characterized by its irreversibility and slow and progressive evolution. The global estimated prevalence of CKD is 13.4% (11.7-15.1%), and patients with end stage kidney disease (ESKD) needing renal replacement therapy is estimated between 4.902 and 7.083 million. An adult patient is identified with CKD when they present, for a period \geq three months, glomerular filtration rate (GFR) lower than 60 ml/min/1.73 m², or GFR greater than 60 ml/min/1.73 m², but with evidence of injury of the renal structure. Some indicators of renal injury are albuminuria, changes

in renal imaging, hematuria/ leukocyturia, persistent hydro electrolytic disorders, histological changes in kidney biopsy, and previous kidney transplantation.^[1]

The main causes of CKD include diabetes, hypertension, chronic glomerulonephritis, chronic pyelonephritis, chronic use of anti-inflammatory medication, autoimmune diseases, polycystic kidney disease, Alport disease, congenital malformations, and prolonged acute renal disease.^[1] Dialysis is derived from the Greek words dia, meaning "through", and lysis meaning "loosening or splitting". It is a form of renal replacement therapy, where the kidney's role of filtration of the blood is supplemented by artificial equipment, which removes excess water, solutes, and toxins. Dialysis ensures

maintenance of homeostasis in people experiencing a rapid loss of kidney function i.e., acute kidney injury (AKI), or a prolonged, gradual loss that is CKD. There are three broad types of dialysis: Hemodialysis (HD), Peritoneal dialysis (PD), Continuous renal replacement therapy (CRRT).^[2]

Dialysis is performed in CKD patients to remove accumulated toxins from the body which is responsible for oxidative stress, due to an imbalance between the overproduction of reactive oxygen species or toxins and a reduced defense mechanism of the body.^[3] Hypertension increases the pressure of blood flow, which may damage blood vessels. In case renal blood vessels are involved, it leads to the accumulation of toxins and fluids, which further increases the BP. It is a known fact that hypertension alone is a risk factor for kidney diseases, and if it is associated with other complications, it leads to CKD.^[4]

The prevalence of hypertension is high in those with ESRD receiving dialysis, and it is a prominent risk factor for cardiovascular disease morbidity and mortality and contributes to heart failure and arrhythmias. Accurate, appropriate BP measurement is vital. As in the general population, treatment of hypertension may have a significant impact on the survival of patients receiving dialysis. Patients with CKD have increased BPV. Patients undergoing HD regularly have fluids removed for short periods of time and are prone to greater BPV, which may contribute to their burden of cardiovascular disease. Studies have found an association between the mean BP and outcomes in patients on HD.^[4]

The severity of anemia of CKD is directly related to the degree of loss of kidney function, as the kidneys are responsible for approximately 90% of erythropoietin production by the interstitial fibroblasts. In individuals with ESRD, the etiology of anemia tends to be multifactorial and include the following: Decreased RBC production due to lack of erythropoietin and iron deficiency, Increased RBC destruction due to hemolysis (intravascular or extravascular) Increased blood loss due to multiple venipunctures for an array of indications. Hemoglobin concentration tests should be requested when clinically indicated or every three months for patients in stages III to V of CKD. For patients under treatment for anemia with iron replacement and/or using erythropoiesis-stimulating agents, the hemoglobin and iron control must be done at every patient consultation or at least every three months.^[5]

Metabolic acidosis occurs in most CKD patients when the glomerular filtration rate is less than 30 ml/min/20. It is usually mild to moderate, with bicarbonate ranging between 12 and 22 mEq/L. The kidneys play a pivotal role in the regulation of electrolyte and acid–base balance. With progressive loss of kidney function, derangements in electrolytes and acid–base inevitably occur and contribute to poor patient outcomes.^[1]

High protein intake may lead to increased intraglomerular pressure and glomerular hyper filtration. This can cause damage to glomerular structure leading to or aggravating CKD. Hence, a low protein diet (LPD) of 0.6–0.8 g/kg/day is often recommended for the management of CKD. We reviewed the effect of protein intake on incidence and progression of CKD and the role of LPD the CKD management.^[6]

The kidneys play a pivotal role in the regulation of electrolyte and acid–base balance. With progressive loss of kidney function, derangements in electrolytes and acid–base inevitably occur and contribute to poor patient outcomes. The main electrolyte disorder in CKD patients under conservative treatment is hyperkalemia. The measurement of potassium levels should be done at every patient consultation, and, when hyperkalemia is detected, it is important to assess errors in diet, medications that can lead to hyperkalemia, the presence of metabolic acidosis, and question the use or dose increase of potassium-sparing diuretics.^[7]

The care of CKD patients includes: slowing the progression of CKD; treat complications related to the pathology, such as anemia, mineral and bone disorder, hydro electrolytic disorders, metabolic acidosis, and cardiovascular disease; prepare the patient for renal replacement therapy (RRT); establish a immunization routine, especially for hepatitis B. In general, the strategies used to reduce the progression of CKD are: use of angiotensin-converting enzyme inhibitors or angiotensin receptor blockers for patients with proteinuria above 500 mg/24 hours; reach target blood pressure below 130x80 mmHg; reach levels of glycated hemoglobin lower than 7% for diabetic patients; protein restriction indicated and managed by a nutritionist; correction of metabolic acidosis; smoking cessation. In addition, it is essential to assess the presence of factors of exacerbation of CKD, such as volume depletion, use of nephrotoxic substances, such as iodinated contrast, antibiotics, non-steroidal anti-inflammatory drugs, and obstruction of the urinary tract. Present study highlights the comorbidities, symptoms, treatment pattern and knowledge about lifestyle in Chronic Kidney Disease patient. Improvement in symptoms are evaluated by comparing the symptoms associated at the time of admission vs time of discharge.^[1]

MATERIALS AND METHODS

Study site

The study was conducted in Department of General medicine and Dialysis unit at Vijayanagar Institute of Medical Sciences, Ballari, Karnataka.

Study desing

This was a prospective observational study was performed on 110 patients on A study to evaluate the effectiveness of treatment of Chronic Kidney Disease, and lifestyle modification in chronic kidney disease patients undergoing maintenance haemodialysis.

Sample size

A total of 110 patients from the Department of General medicine and Dialysis unit at Vijayanagar Institute of Medical Sciences, who satisfied the study criteria and consented to participate were included in the study.

Study period

The study was conducted for the period of 6 months starting from March 2022 to August 2022.

Ethical approval

Ethical committee was obtained from the institutional ethical committee.

Study criteria

The study was carried out by considering the following inclusion and exclusion criteria.

Inclusion criteria

- Age > 18 years
- Both Male and Female patients
- Inpatient are to be considered
- Patient undergoing hemodialysis for CKD

Exclusion criteria

- Age < 18 years
- Patient undergoing hemodialysis other than CKD
- Patient who are not willing to participate in the study
- Outpatient

Source of data

Patients demographic details, clinical findings, laboratory and therapeutic data was collected from the inpatients the source of data were

- 1) Patients case report,
- 2) Treatment chart,
- 3) Laboratory report,
- 4) Patients Discharge Card

Study Procedure**1. Patient Enrollment**

A hospital based prospective observational study was conducted in Department of General medicine and Dialysis unit at Vijayanagar Institute of Medical Sciences. The study was conducted on 110 patients who met the inclusion and exclusion criteria were enrolled in the study.

2. Method of data collection

It is a prospective observational study which was conducted in the Department of General medicine and Dialysis unit at Vijayanagar Institute of Medical Sciences by obtaining ethical clearance. All the patients admitted with chronic kidney disease on maintenance hemodialysis who meet the inclusion and exclusion criteria were enrolled in the study. After the diagnosis is confirmed, the baseline information such as age & gender, date of admission, date of discharge, of the patient was collected. Therapeutic data such as name of the drug, dosage, route of administration, duration,

frequency & other laboratory data was collected and documented in a previously designed data collection form. The follow up was carried till the day of discharge for the enrolled patient and was documented. Lab parameters such as serum creatinine, serum urea, hemoglobin, and other lab parameters were documented. An overview of effectiveness of treatment outcome of chronic kidney disease based on assessment of significance P value 0.001.

Statistical analysis

Data was analyzed using SPSS version. Demographic and clinical characteristics of the patient were analyzed using descriptive statistical analyses using paired t test. P values 0.001 were used to assess statistical significance in case of laboratory values like serum creatinine, serum urea, serum sodium, hemoglobin compared on the day of admission and day of discharge.

RESULTS

A prospective observational study was conducted, a total number of 110 patients were included and assessed for evaluating the effectiveness of the treatment and lifestyle modification in patients undergoing maintenance hemodialysis. Among the 110 patients evaluated, it was observed that 85 (76.57%) were males and 25 (22.52%) were females. Majority of patients were in the age group of 51 – 60 years with a mean age.

Table no. 01: Distribution of Patient According to Their Age Groups: Females.

AGE RANGE	FEMALE	PERCENTAGE
21-30	3	12%
31-40	4	16%
41-50	4	16%
51-60	8	32%
61-70	2	8%
71-80	3	12%
81-90	1	4%
Total	25	100%

Table no. 02: Distribution of Patient According to Their Age Groups: Males.

AGE RANGE	MALE	PERCENTAGE
21-30	9	10.58%
31-40	13	15.29%
41-50	36	42.35%
51-60	14	16.47%
61-70	10	11.76%
71-80	2	2.35%
81-90	1	1.176%
Total	85	100%

The majority of female patients were present within the age group of 51-60 years (32%) and the majority of male patients were present within the age group of 41- 50 years (42.35%).

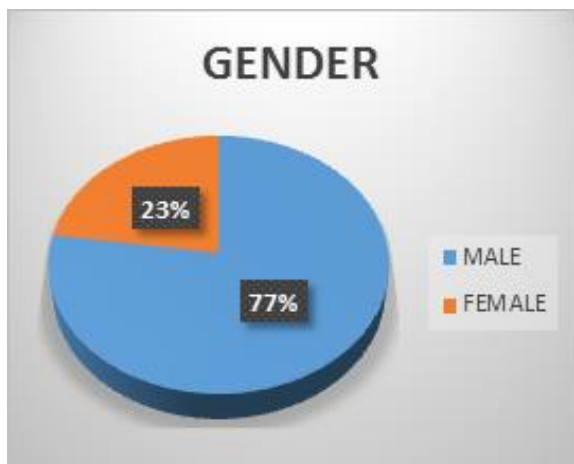


Fig no. 03: Distribution of gender.

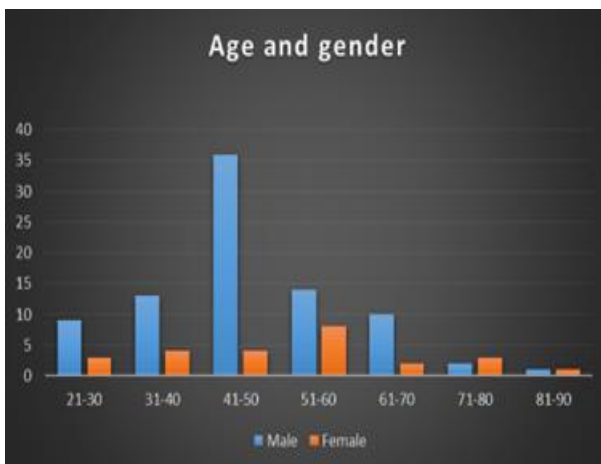


Fig no. 02: Distribution of patient according to their age.

The most common co-morbidity condition were HYPERTENSION (45%) followed by DM (17%), HTN & DM (15%), CLD & IHD (19%), HTN & DM (1%) and Nil co-morbidity (19%)

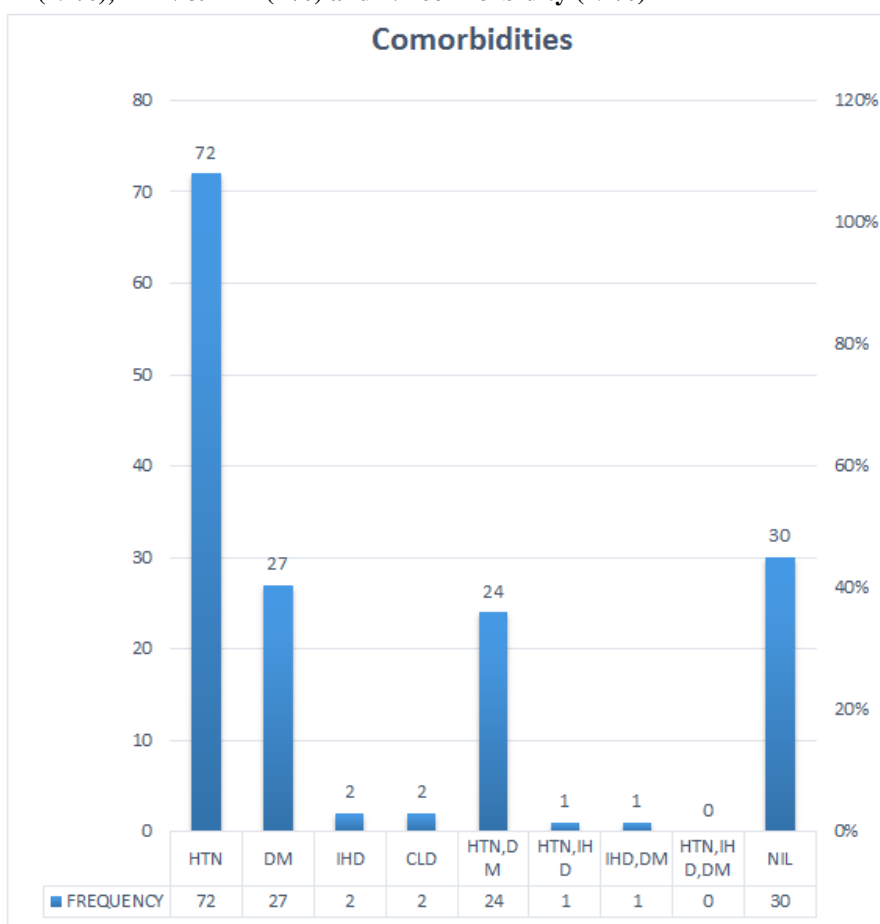


Fig no. 04: Incidence of co- morbidities among the patients.

Table no. 05: Disease specific Symptoms commonly associated among the patients.

Symptoms	Frequency	Percentage
B/L Lower limb swelling	42	20.48%
Breathlessness	71	34.63%
Fever	26	12.68%
Decreased urine output	34	16.58%
Headache	3	1.46%

cough	12	5.85%
Decreased appetite	3	1.46%
Loose stool	8	3.90%
Vomiting	18	8.78%
Burning micturition	3	1.46%
Abdominal distension	12	5.85%
Abdominal pain	11	5.36%
Easy fatigue ability	3	1.46%
Generalized body ache	1	0.48%
TOTAL	n=205	100%

In the study, the Breathlessness (35.68%) were the common complaint, Lower limb swelling (20.48%)

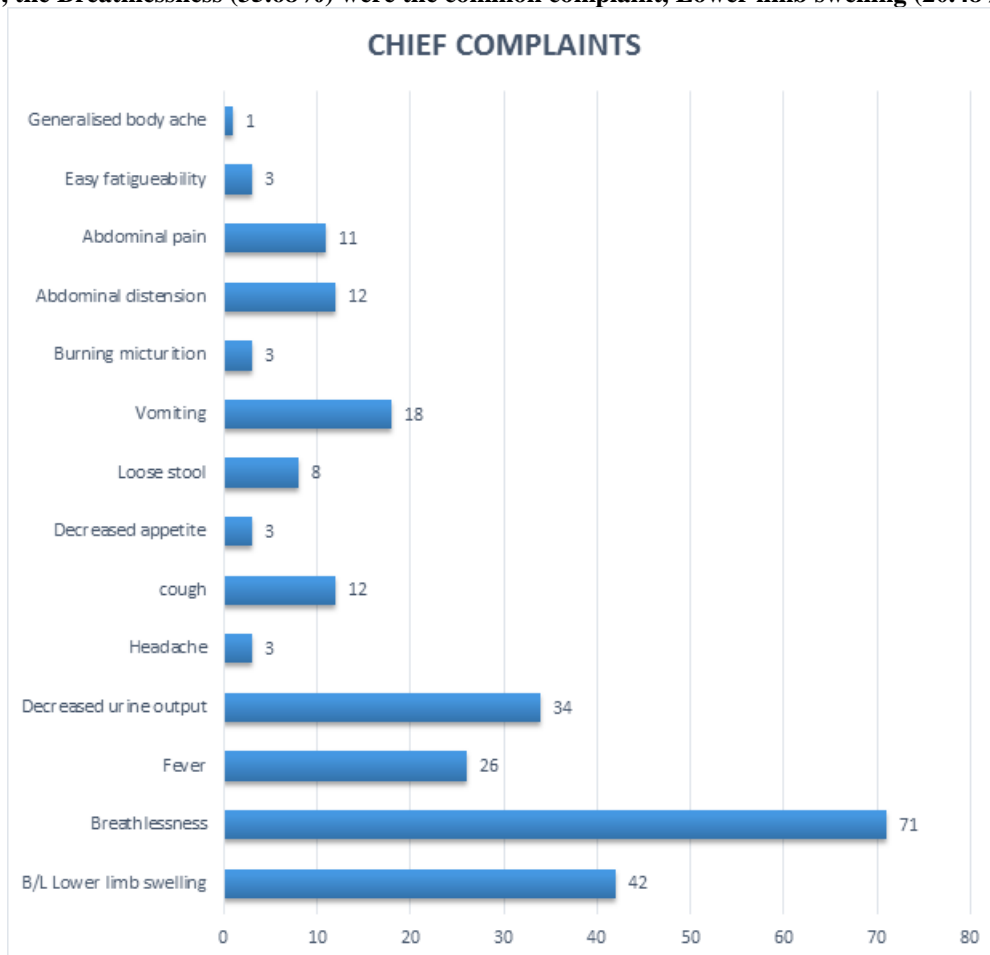


Fig no. 05: Symptoms commonly associated among the patients.

Table no. 06: Symptoms improvement (Mild, Moderate, Total).

SYMPTOMS	MILD	MODERATE	TOTAL
FEVER	24	41	65
BREATHLESSNESS	31	64	95
REDUCED APPETITE	28	66	94
EDEMA/LOWER LIMB SWELLING	26	66	92
ABDOMINAL PAIN	20	27	47
DECREASED URINE OUTPUT	6	14	20
VOMITING	5	13	18
COUGH	2	10	12
CHEST PAIN	0	3	3
ORTHOPNEA	0	1	1
LOOSE STOOL	0	2	2

YELLOWISH DISCOLOURATION	0	1	1
INABILITY TO PASS STOOL	0	1	1
DIFFICULT IN SWALLOWING	0	1	1
BURNING MICTURITION	1	2	3
HEMATURIA	0	1	1
GIDDINESS	1	1	2
EASY FATIGUABILITY	1	0	1
FACIAL SWELLING	0	1	1

In the study, breathlessness is the most common symptom (95) in which 31 number of patients were mildly relieved and 64 patients were moderately relieved followed by reduced appetite (94) in which 28 number of patients were mildly relieved and 66 patients were moderately relieved and lower limb swelling (92) in which 26 number of patients were mildly relieved and 66 patients were moderately relieved.

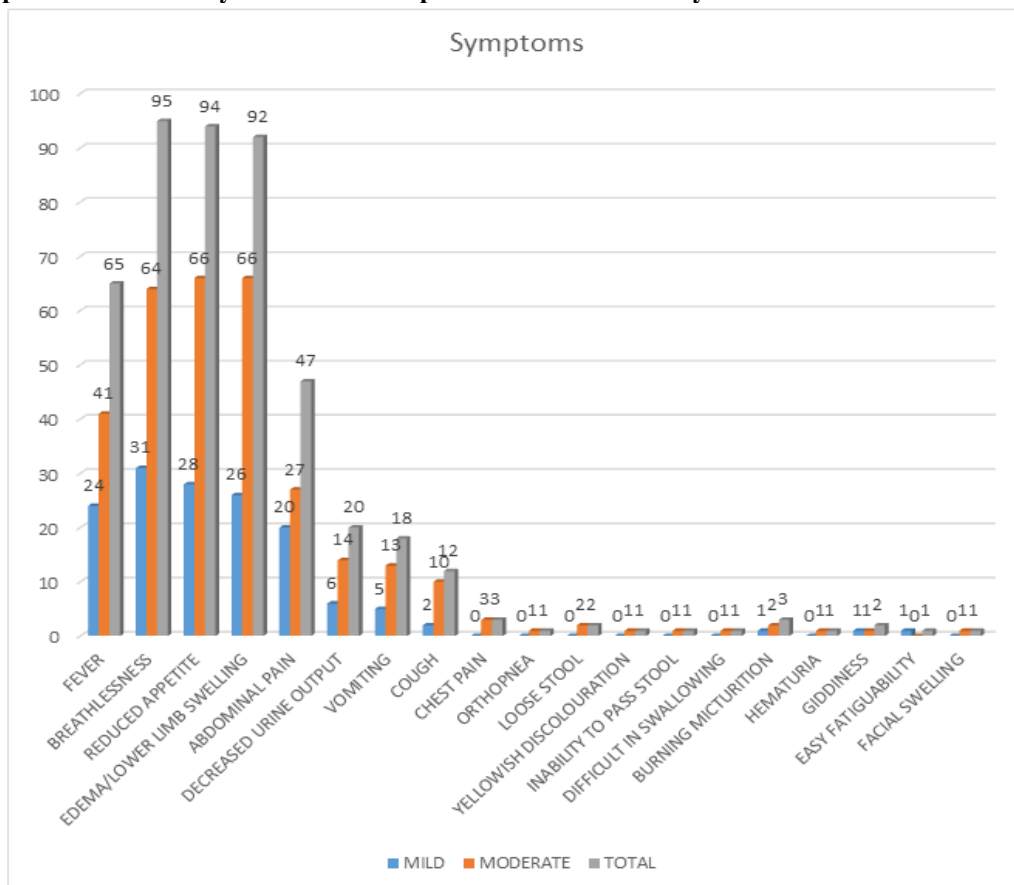


Fig no. 06: Symptoms (Mild, Moderate, Total).

TREATMENT PATTERN

CLASS	DRUGS	FREQUENCY	PERCENTAGE
DIURETICS	FUROSEMIDE	43	5%
	TORSEMIDE	18	2%
	DYTOR	31	4%
CCB	AMLODIPINE	64	8%
	NIFEDIPINE	7	1%
	NICARDIPINE	4	0%
ALPHA BLOCKER	PRAZOSIN	6	1%
	TAMSULOSIN	4	0%
ALPHA AGONIST	CLONIDINE	1	0%
BETA BLOCKER	CARVEDILOL	6	1%
	METOPROLOL	4	0%
	BISOPROLOL	3	0%

GIT	PANTOPRAZOLE	64	8%
	RANITIDINE	4	0%
	SUCRALFATE	2	0%
ANTIBIOTICS	CEFTRIAZONE	55	6%
	PIPZO	14	2%
	AZITHROMYCIN	6	1%
	MEROPENEM	6	1%
	VANCOMYCIN	7	1%
	METRONIDAZOLE	14	2%
	CEFTAZIDIME	3	0%
	CEFPODOXIME	1	0%
	DOXYCYCLINE	1	0%
	FEROPENEM	1	0%
	AMOXICILLIN	4	0%
ANTI DIABETICS	CIPROFLOXACIN	4	0%
	INSULIN	23	3%
ANTI PLATELETS	OHA	4	0%
	ASPIRIN	5	1%
HEMATOPOIETIC AGENTS	CLOPIDOGREL	3	0%
	EPO	1	0%
	LIVOGEN	45	5%

Assessment of Therapy Outcome by Lab Value

	LIVOGEN	45	5%
	IFA	44	5%
	FF	7	1%
	FOLIC ACID	14	2%
	FOLVITE	55	6%
CALCIUM SUPPLEMENT	SHELCAL	80	9%
NITRATES	ISDN	8	1%
	ISOLAZINE	17	2%
SYSTEMIC ALKALYZER	SODIUM BICARBINATE	90	11%
STATINS	ATORVASTATIN	5	1%
	ROSUVASTATIN	1	0%
BRONCHODILATOR	ASTHALIN	10	1%
	BUDECORT	8	1%
	DUOLIN	3	0%
ANALGESIC/ANTIPYRETICS	PCT	23	3%
	TRAMADOL	7	1%
ANTI DIARRHEA	SPOROLAC	6	1%
	RACECADOTRIL	3	0%
VITAMINS	MVI	5	1%
	B-COMPLEX	3	0%
	VITAMIN-D	1	0%
	TOTAL	848	100%

We have observed that Furosemide is the mostly used drug for fluid accumulation. Pantoprazole is used for gastric irritation. Amlodipine is the mostly used drug for HTN. Insulin is the mostly used anti-diabetic for balancing blood sugar level. Shelcal and Folvite are the mostly used drugs for calcium and hematopoietic agent respectively

KNOWLEDGE ABOUT LIFESTYLE MODIFICATION

Biochemical tests	On admission (Mean±SD)	On discharged (Mean±SD)	Mean difference	95% C.I	p-value
S.Creatinine (mg/dl)	7.919±3.529	3.641±1.471	4.278	0.667, 0.278	<0.0001
S.Urea (mg/dl)	122.018±61.311	72.844±53.517	49.175	11.586, 10.113	<0.0001
Haemoglobin (g/dL)	8.659±6.146	9.369±1.524	-0.710	1.161, 0.288	0.226

In the study, reduction in serum creatinine (7.919 ± 3.529) at the time of admission vs (3.641 ± 1.471) at the time of discharged was statistically significant ($p < 0.0001$) and serum urea (122.018 ± 61.311) at the time of admission vs (72.844 ± 53.517) at the time of discharged was statistically significant ($p < 0.001$). Haemoglobin was also reduced but not significant ($p = 0.226$)

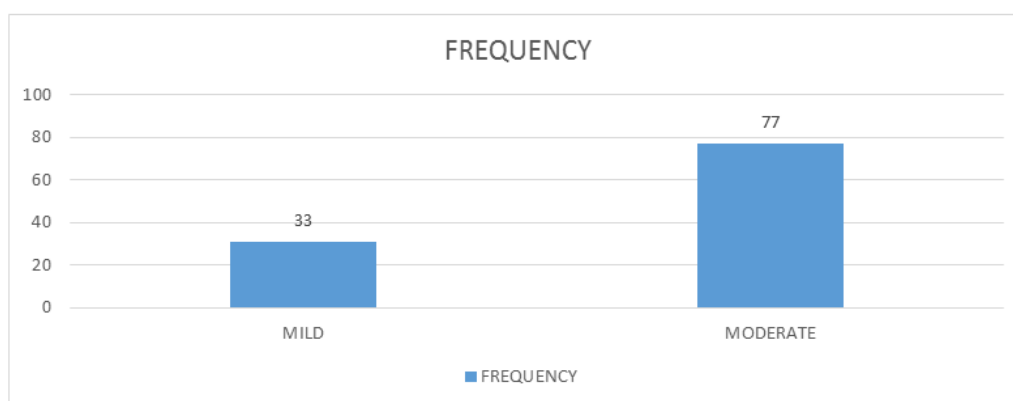
	ADEQUATE	PERCENTAGE	NOT-ADEQUATE	PERCENTAGE
MILD	0	0	33 (68.75%)	100%
MODERATE	62	81%	15 (31.25%)	19%
TOTAL	62	56.36%	48 (100%)	43.63%

In the study, the subjects with adequate knowledge of lifestyle (56.36%) had moderate symptomatic improvement and the subjects with inadequate knowledge of lifestyle (43.63%) had mild improvement (68.75%) in the treatment.

	FREQUENCY	PERCENTAGE
MILD	33	30%
MODERATE	77	70%
COMPLETE	0	0

In the study, it was found that the treatment were moderately effective on 77 patients (70%) and the treatment were mildly effective on 33 patients (30%)

EVALUATION OF EFFECTIVENESS



DISCUSSION

In the present study on CKD patients undergoing maintenance haemodialysis 85 are males and 25 were females. This was analogous to a study done by Shiva Krishna Ravulapalli et al.

The results shows that males are more likely to have CKD than females. In the current study, the average age group of patients having CKD were observed to be in the range of 41-50 years for males and 51-60 years females, which were similar to the study conducted by Sumy George et al.

The current study is in correspondence with the previous study that were conducted. The result shows that as the age increases the chances of developing CKD also increases and the CKD is more prevalent in middle age to old age group.

In the present study, the most frequent risk and co-morbidity were found to be Hypertension (45%), Diabetes mellitus (17%), Ischemic heart disease (1%), DM with Hypertension (15%), CLD (2%). These results

were similar to the present study analogues with the study done by Christian pothen et.al, and Mahadevamma et.al, where the hypertension was the leading risk factor as well as most commonly associated co-morbidity.

In the current study, the laboratory values were also analyzed to evaluate the outcome of the therapy, serum creatinine, serum urea and haemoglobin changes in laboratory value at the time of admission and after discharged was statistically significant ($p < 0.001$).

Reduction in Serum Creatinine (7.919 ± 3.529) at the time of admission vs (3.641 ± 1.471) at the time of discharged ($p < 0.001$) was comparable with the study conducted by Leelavathi D Acharya where the result were statistically significant and also Youssef MK Farag et al. There was no significant improvement in the level of hemoglobin before and after treatment which is comparable to study by Wei-Hung Kuo et al. The serum urea were also improved after treatment and was statistically significant.

In the current study, the most common category of drug used were Hematopoietic agent (20%) followed by antihypertensive (17%), diuretic (12%), systemic

alkalizer (12%), antibiotics (11%), GIT agents (9%), antiemetic (5%), antidiabetics (4%), antipyretics and analgesic (4%), bronchodilators (3%), Antifungal, antiplatelets and transfusion (1%).

In the present study there was mild-moderate improvement in the symptoms among which the most common symptoms associated was breathlessness, decreased appetite, edema, fever and decreased urine output. Improvement in symptoms are evaluated by comparing the symptoms associated at the time of admission vs time of discharge. In the present study among 110 patients 56.36% of patients had adequate knowledge of lifestyle which made their treatment outcome moderate. Following 43.63% patients had inadequate knowledge about the lifestyle which was comparable with the study conducted by Abinaya R et al. where 55% of participant adequate knowledge about the life-style modification.

CONCLUSION

In this study 'Evaluating the effectiveness of the treatment and lifestyle modification in patient with Chronic Kidney Disease on maintenance hemodialysis'. It was found that males were more prone to advanced CKD than females. The most common comorbidities seen in the study population were hypertension and diabetes mellitus. The reason for the occurrence of the CKD were correlated with patient past medical history of having kidney disease in which it is mentioned the number of years the patient was suffering from disease and its causative risk factor.

We have assessed the treatment outcomes among 110 patients of which had moderate effectiveness (70%) in the treatment whereas had mild treatment outcome (30%). The study population with moderate treatment outcome (62) had adequate knowledge of lifestyle and the study population with moderate treatment outcome (15) had inadequate knowledge about lifestyle modification, and study population with mild outcome (33) hindering the treatment outcome.

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