International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

A Study on the Effect of Dialysis in Maintaining the Fluid and Electrolyte Balance in CKD Patients

Mehjabeen Khatoon[1], Ruksana Sultana[2],Tejeswini Lokula[3], Meena Kumari[4], Urooja Birjis Fatima[5]

[1, 2, 3]PG DIPLOMA, Department of Nutrition and Dietitics, St. Ann's College for Women, Hyderabad, India

[4]Head of Department, Department of Nutrition, St Ann's College for Women, Mehdipatnam, Hyderabad, India

[5]Department of Nutrition, St Ann's College for Women, Mehdipatnam, Hyderabad, India

Abstract: ***Aim: To study the effect of dialysis in maintaining the fluid and electrolyte balance in CKD patients. Objective: To assess the symptoms associated with age related decline in renal function and urine output. To determine the association between dialysis and maintenance of the fluid and electrolyte balance in CKD patients. To analyze and compare the biochemical parameters pertaining to renal function, before and after dialysis. Methodology: An observational, multicenter coherent study was carried out on 30 samples to assess the effect of dialysis on maintaining the fluid and electrolyte balance in CKD patients. The secondary data was collected by selecting patients with fluid overload at random. The data included height, weight before and after dialysis, number of years on dialysis, food preferences, social habits specific to alcohol use and biochemical parameters before and after dialysis such as sodium, potassium, creatinine, serum albumin and hemoglobin. A comparative study was done to see the effect on dialysis on the biochemical parameters. Results: This observational study concludes that there is a significant difference in the fluid and electrolyte balance before and after dialysis. After dialysis it has been observed that the fluid overload of patients has been reduced and their biochemical parameters which were abnormal before had almost come to normal ranges.***

1. Introduction

Chronic kidney disease is a worldwide public health problem with an increasing incidence and prevalence which includes not only kidney failure but also complications of decreased kidney functions and co-morbidities like diabetes and hypertension.

Statistics indicates that one in 10% in the general population are estimated to have some form of CKD.About 1,75,000 new people have kidney failure (stage -5 CKD). Every year in India people effected with CKD require dialysis or kidney transplantation 60-70% of CKD cases are due to diabetes and hypertension.[1]

CKD-Chronic kidney disease with its high prevalence, mortality and morbidity it is an important public health issue with< 3% of land mass, India hosts 17%of the earth population.[2]

Chronic kidney disease is recognized as major health problem effecting approximately 17% of population due to improper functioning of kidney. Kidneys are amazing organs that play a major role in keeping our body clean by flushing out unwanted waste and toxic materials and regulates blood pressure, the volume of fluids and electrolytes balance in the body.[3]

What is CKD?
Chronic kidney disease (CKD) is a condition in which the kidneys are damaged (or) can't filter blood as good as healthy because of the excess fluid and waste from the blood remains in the body and may cause other health complications.[4]
CKD is associated with age related renal function declined with co-morbidities like hypertension, obesity and primary renal disorders.[5]

CKD Classification/Staging:
CKD is defined as the severity of kidney damage, depending upon the decreased kidney function and abnormal excretion of albumin.[6]

CKD is classified into **5** stages based on the level of kidney function (or) to estimate glomerular filtration rate [GFR], that persists for more than three months. GFR can be estimated from blood levels of serum creatinine concentration, using the Cockcroft –Gault formula

1. $\frac{140\text{-age x body weight}}{72\text{x serum creatinine level}}$ = for male
2. $\frac{140\text{-age X body weight}}{0.82\text{x serum creatinine level}}$ = for females

CKD staging is determined by e **GFR**

Stages of **CKD** are calculated by using the crocks croft – goult formula.

Stages of **CKD** are
Stage -1: Normal e **GFR≥** 90 ml/min per 1.73 m2 and persistent albuminuria. In this stage patients are usually asymptomatic.
Stage -2: e GFR between 60-89 ml /min per 1.73 m2
In this stage 2, it has mild symptoms, but some complain about frequent urination at night.
Stage -3: e GFR between 30 to 59 ml /min per 1.73 m2
In this stage urinary abnormalities are present.
Stage -4: e GFR is between 15-29 ml/min per 1.73m2
In this stage symptoms vary from mild to severe.
Stage -5: e GFR is of < 15 ml /min per 1.73 m2 (or) known as end stage renal disease. Symptoms are severe.
In this stage patient will need dialysis or kidney transplantation.[7]

Signs and Common Symptoms of Patients with CKD

- Shortness of breath.
- Fatigue.
- Lethargy.
- Cognitive dysfunction.
- Symptoms of neuropathy.
- Sleep disturbances, lack of concentration and dizziness.
- Anorexia.
- Nausea.
- Restless legs.
- Frequent urination especially at night. [8]

Causes and Complications of CKD

The most common causes of CKD are

- Diabetic nephropathy.
- Hypertension.
- Glomerulonephritis's.
- Intestinal nephritis.
- Polycystic kidney disease.
- Obstructive nephropathy.

It can also be caused due to untreated (AKI) Acute Kidney Injury which caused by infections, medicines, toxic substances and heavy metals.[9]

Complications of CKD

The complications of CKD include

- Dyslipidemia.
- Cardio vascular disease.
- Anemia – due to less production of erythropoietin hormone.
- Bone and mineral disorder.[10]
- Acidosis.
- Drug Dosing.
- Malnutrition.
- Infection and immunization.[10]

Risk Factors for Developing CKD Include

- Age over 60 year
- Diabetes.
- Hypertension.
- CVD.
- A family history of CKD.
- A history of infections and immunization like autoimmune disease – like (lupus nephritis).
- Urinary tract infections.
- Systemic infections and cancers.
- Untreated (AKI) Acute Kidney Injury.[11]

Diagnosis of CKD

It is a first step which determines the severity of damage of kidney. Chronic kidney disease (CKD) can be diagnosed with

Hemoglobin Test- It is done to determine the Hb levels which are usually low due to decreased production of erythropoietin hormone which may lead to anemia.

Urine Test- Albumin (or) protein in urine (called albuminuria (or) proteinuria) is an early sign of CKD. Albuminuria can be evaluated by three methods.

→ Urine dipstick- test detects a type of urinary protein and albumin.

→24- hour urine collection- provides data on renal parameters.

→Random (or) spot urine sample for albumin/creatinine ratio.[12]

→Ultra sound of the kidney,

→Biopsy of kidney.

Treatment of CKD

→The three treatment options for CKD are medical management, dialysis (or) transplant.

→All the patients with CKD are treated initially by medical management (medicine, dietary management and monitoring).

→If the damage of kidney is severe it requires kidney replacement by dialysis (or) kidney transplant.

Goals of Medical Management in CKD

CKD is a condition with no cure. It is airreversibledisease. The aims of medical management are to –

- Slow down the progression of the disease.
- To relieve the symptoms and complications of the disease.
- To treat the causes and risk factors of CKD.
- To reduce the risk of developing CVD.
- To delay the need of dialysis

Dialysis

- Dialysis is a treatment (or) procedure that replaces the functions which are done by healthy kidney.
- It is needed when u a kidney can no longer respond to your body needs.
- It is also called as artificial laundering of kidneys.

When is Dialysis Needed?

- It is needed when you develop end stage kidney failure (stage 5) and glomerular filtration rate (GFR) is< 15 ml/per/1.732.
- It is needed at the time in which 90% of kidneys are damaged.

What Does Dialysis Do?

When your kidneys fail, dialysis keep your body electrolytes in balance

Importance Of Dialysis:

- Removing the toxic waste and excess water which is accumulated in the bodycalled as fluid overload.
- Keeping a normal level of certain chemicals and electrolytes in blood such as potassium, sodium and bicarbonate.
- It also helps to control blood pressure.

Where is Dialysis Done?

Dialysis can be done in hospital, in dialysis unit (or) it can be done home also which depends on the medical condition of patients. (14)

Types of Dialysis

The two types of dialysis are:

- HEMODIALYSIS and
- PERITONEAL DIALYSIS

HEMODIALYSIS: (Artificial kidney like apparatus)

a) It is a process done by using a machine / artificial kidney like apparatus.
b) The mechanism of hemodialysis is to remove toxic waste and excess water which is accumulated in the body.
c) It is removed by passing blood through a filter called DIALYZER.
d) It is done for patients with no residual renal function.

Types of Hemodialysis:

- Synthetic AV Graft.
- Central venous catheter.
- AV Fistula. (15)

1) ADVANTAGES of hemodialysis

- A flexible lifestyle and independence.
- Doesn't use needles
- Provides continues therapy, which is more like your natural kidneys.
- Don't have to travel to dialysis unit for treatment.

2) DISADVANTAGES of hemodialysis

- Needs to schedule exchanges into your routine, 7 days a week.
- Requires a permeant catheter outside the body.
- Runs some risk of infection
- May gain weight or have a larger waistline.
- Needs storage space in your home for supplies.
- Need space in your bed room for equipment (APD)

3) Peritoneal Dialysis: (peritoneal gland acts as the filter)

- It is a type of dialysis, in which blood is cleaned inside the body.
- Surgery is done to place a plastic tube called a catheter into the abdomen (belly) or peritoneal cavity.
- It is a treatment in which abdominal area is filled with dialysate through catheter.
- The blood stays in the arteries and that line peritoneal cavity.
- Extra fluid and waste toxic substances are drawn out of blood into dialysate. (16)

4) Two Types Of Peritoneal Dialysis

- CAPD:Continuous ambulatory peritoneal dialysis
- APD: Automated peritoneal dialysis.
- This dialysis is recommended for younger patients because of its flexibility and can be performed at home.

5) Advantages of peritoneal dialysis

- Nurses and technicians perform treatment for you.
- Regular contact with other hemodialysis patients and staff.
- Usually tree treatment per week four days off.
- No equipment or supplies kept at home.
- Medical help is available quickly in an emergency.

6) Disadvantages of peritoneal dialysis

- Travel to center 3 times a week on a fixed schedule.
- Permanent access required, usually in your arm.
- Insertion of 2 needles for each treatment.
- Restricted diet or limited fluid intake.
- Runs some risks of infection.

Stages and Role of Dialysis
↓
Inflammation of Kidney
↓
Disturbs Renal Function
↓
Metabolic Waste and Toxic Acummulation
↓
Dialysis
↓
Clears and Purifies the Metabolic Waste.
↓
Slowly Renal Function Regains According to Age and Health Condition. (16)

Kidney Transplantation:

- Kidney transplantation is a process of placing healthy kidneys which take over the work of cleaning the toxic wastes from blood through a surgery in patients with End stage renal disease ESRD.
- It is classified into living donor transplantation and deceased donor transplantation on the sources of organof thedonor. (17)

Dietary Restrictions

Depending upon the type and severity of kidney disease, dietary restrictions are needed.

- SODIUM: Salt restriction is advised for CKD patients. To control high blood pressure and swellings in legs.
- Restriction includes: Salt should not be added on table and avoiding salt rich foods such as fast food, papad, pickles and decreasing the use of canned foods.
- HOW MUCH SALT SHOULD ONE TAKE?
- The daily intake of salt is (4-6 grams) /day.
- CKD patients with edema (swelling) and high blood pressure are usually advised to take less than 2 grams of sodium per day.
- FLUID INTAKE
- Decreased urine volume in CKD patients can cause swelling and in more severe case it can also cause breathlessness.
- The fluid restriction is advised for all CKD patients with swellings.
- POTASSIUM
- Blood potassium levels usually rise in CKD patients which can affect to the hearty activity.
- To prevent this the intake of potassium rich foods (such as high potassium fruits and vegetables) should be restricted.
- PROTEIN
- CKD patients who are not on dialysis are advised to limit dietary proteins to < 0.8gms/kg body weight.
- Once dialysis is started, dietary intake can be increased to 1-1.2 grams /kg body weight.
- As the proteins are lost during dialysis.

2. Review of Literature

In this study it indicates that 1 in 10 persons, in general population are estimated to suffer from Chronic Kidney Disease (CKD). We can also notice the estimated rate of

CKD cases are the offshoots of diabetes and hypertension.(EtHealthworld, 2017) [1]

According to a recent study most of the patients with CKD can be managed by their primary physicians with timely nephrology referrals. The Indian society of nephrology modules should increase competence and reduce the drastic reduction in commercial transplant and improving care of patients with ESKD.(Varughese & Abraham, 2018) [2]

This publication provides guidelines about the kidney health, detailed explanation of dietary selection and restriction for the patients.The practical treatment advice for helping delayed dialysis or even avoid it altogether is also stated.(Lermar & Pandey, 2015) [3]

This study quotes the risk factors of CKD that include heart diseases, obesity. It also states the adults suffering from diabetes and hypertension falls under greater risks of suffering from CKD than that of people without these diseases.(Services, US Department of Health and Human, 2017) [4]

The comprehensive meta-analysis of observational studies confirms that CKD has a high prevalence and extensive evidence and intervention of chronic kidney disease.(Hill , O'Callaghan , Lasserson, & Hobbs, 2016) [5]

This study analysis the progression of CKD is associated with a number of serious complications, including increased incidence of cardiovascular diseases, hyperlipidemia, anemia, and metabolic bone diseases.(Thomas, Kanso, & Sedor , 2008) [6]

The study indicated that patients suffering from CKD should be assessed for the presence of complications and should receive optimal treatment to reduce the mortality and the morbidity rates.(Cabrera , Hansson, & Kliger, 2017) [7]
The goal of this present study is to examine the causes and complications of CKD in patients undergoing dialysis (Eleftheria , et al., 2010) [8]

This study is closely linked with cardiovascular diseases and also showing the data of the patients which has high mortality rate. This study also provides a strong evidence that control high blood pressure, blood glucose, and use of angiotensin converting enzyme inhibitors.(Yang , Fox , Vassalotti, & Choi , 2011) [9]

This study provides information on early detection and management of CKD will decrease the rate of progression to end-stage renal diseases (Kavoussi , Lim, Skinner , Lebovic , & As, 2016) [10]

The study determines the detailed methodology of CKD prevalence and also hold a say in the dietary pattern and the restricted amounts of fluid intakes depending upon the severity of kidney damage. (EtHealthworld, 2017) [11]
This publication provides guidelines about the kidney health, detailed explanation of dietary selection and restriction for the patients. The practical treatment advice for helping delayed dialysis or even avoid it altogether is also stated. (Lermar & Pandey, 2015) [12]

This recent study concludes the importance of maintaining the glomerular filtration rate levels in the patients undergoing dialysis and also the influence of dietary intake in people suffering from choric kidney disease. (Varughese & Abraham, 2018) [14]

The quoted study indicates the main causes of CRF and also a detailed explanation on the 5 stages of kidneys depending upon the GFR and also discusses about the end stage renal disease (ESRD)(EtHealthworld, 2017) [15]

This study provides the information about the sodium restrictions and also the data in which the renal failure and the complications of the diseases is stated(Lermar & Pandey, 2015)[16]

3. Methodology

Description
Anobservational study at individual – level was conducted &60 people diagnosed with CKD with fluid overload wereanalyzed as part of this study.

Participants
The study was taken up by 3 students pursuing Post graduate diploma and each one followed 20 diagnosed cases from one of the reputed hospitals of Hyderabad. Overall 60 subjects were studied &analyzed.

Method
A questionnaire was designed to know the effect of dialysis on fluid overload patients with CKD. The questionnaire was framedConsisting of16 questions and included both open and closed ended questions. From thisQuestionnaire the age, sex, food preferences, social habits specific to alcohol use, weight before and after dialysis, fluid intake, urine output and the biochemical parameters were recorded on daily basis and evaluated.

Later the data was analyzed, and the comparison was done between before and after weight and biochemical parameters of the fluid overloaded patients were recorded.

The data was finally analyzed to conclude the result of the study.

4. Results & Discussion

The survey which was done on patients undergoing dialysis along with fluid overload and suffering from CKD, In this survey various factors were considered which includes;
1) Age
2) Sex
3) Food Prefernces
4) Social Habits (Alcoholic)
5) Fuild Intake
6) Urine Output
7) Before And After Dialysis Weight
8) Co-Morbities
9) Number Of Months On Dialysis
10) Bio-Chemcal Parameters
    - Sodium Levels

- Potassium Levels
- Ceratinine Levels
- Serum Albumin Levels
- Hemoglobin Levels

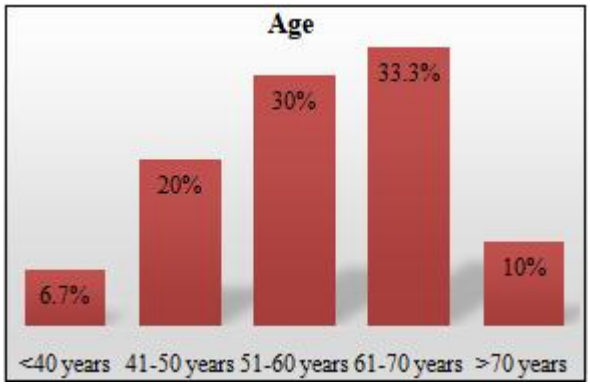
General Classification

A. Age Classification

The age distribution of the patients is shown in table (I)

Table I: Age Classification

Age		Number (n)	Percent
	<40 years	4	6.7
	41-50 years	12	20
	51-60 years	18	30
	61-70 years	20	33.3
	>70 years	6	10
	Total	60	100



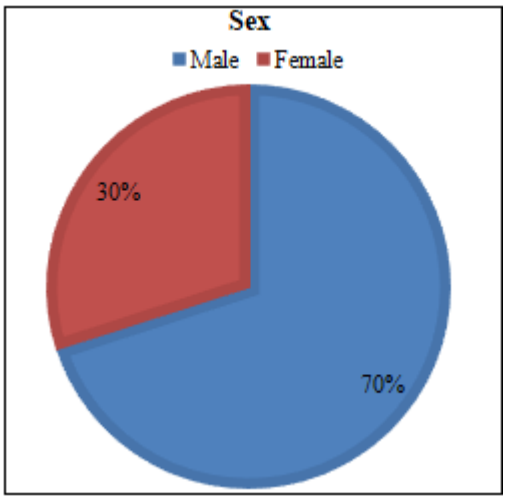
From the above diagram, most of the patients who were diagnosed with fluid overload along with CKD belong to the age group of 61-70years with 33.3%followed by 30% proximity in 51-60years, whereas 41-50yearsof age group holds 20% and 10% lies under 70 years and above of age. As seen in the study the chances of people undergoing dialysis with fluid overload with CKD increases with increasing age

B. Sex

The sex distribution of the patients is shown in table (II)

Table II

Sex		
Gender	Number (n)	Percent (%)
Male	42	70
Female	18	30
Total	60	100



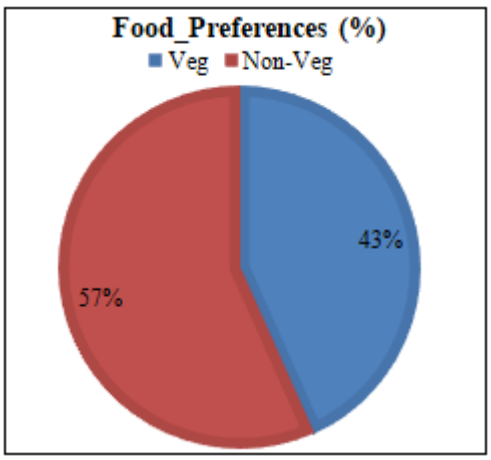
The above pie chart shows that the percentage of males suffering with CKD is gradually high compared to that of females. Which comprises of 30% of females and 70% of males.

C. Food Preferences

The food preferences of the patients were collected. The details are charter in following table.

Table III: Food Preferences

Food Preferences		
Food preference	Frequency	Percent (%)
Veg	26	43.3
Non-Veg	34	56.6
Total	60	100

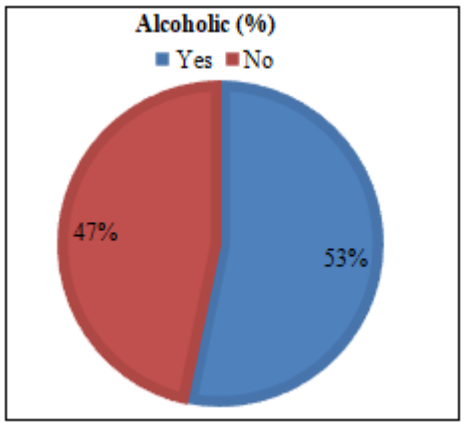


The above pie chart depicts the food prefernces of the patients from the data in which the people who prefer non-veg hold a higher percentage i.e 57% than that of the peole who prefer vegetarian which was observed to be 43%.

D. Social Habits

Table IV: Social Habits

Alcoholic		Number	Percent
	Yes	32	53.3
	No	28	46.7
	Total	60	100.0



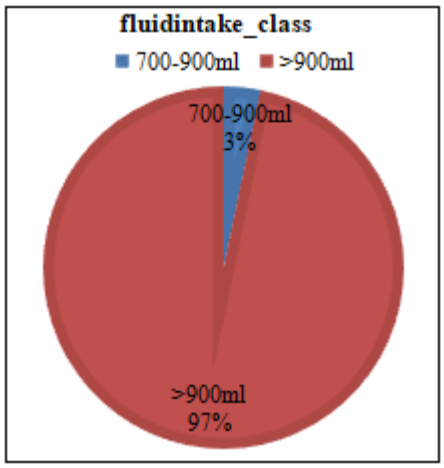
From the above diagram people who are alcoholic have the highest hold rather than the people who don't consume alcohol. 53% depicts for the people whoconsumesalcohol and the rest 47% for the people who don't consume alcohol.

E. Fluid Intake

The following table shows the details of the patients based on the amount of fluid intake per day.

Table V

Fluid intake	Number (n)	Percent
700-900ml	2	3.3
>900ml	29	96.7
Total	30	100



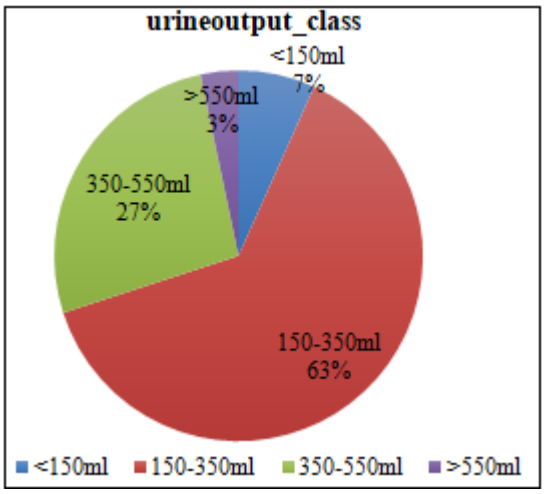
Above diagram illustrates that, most of the CKD patient'sfluid intake was found to be greater than 900ml in a day and the rest falls under the category of below 900ml.In the total percentage of 100 only 3% shows below 900ml fluid intake and the rest 97% covers the people whose intake is greater than 900ml.

F. Urine Output

The patients were assessed based on their urine output. The following tableportrays:

Table VI

Urine(ml)	Number (n)	Percent
<150ml	4	6.7
150-350ml	38	63.3
350-550ml	16	26.7
>550ml	2	3.3
Total	60	100

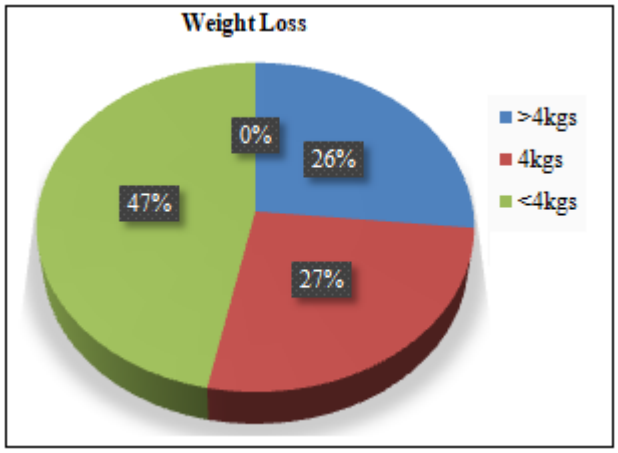


The above chart illustrates the urine output of the CKD patients. It is depicted that 63% falls under the category of 150 to 300ML and the rest 27% falls under the category of 350 to 550 ML and 7%contributing less than 150ML and the rest 3% is greater than 550ML.

G. Weight Before and After Dialysis

Table VII: Weight Change after Dialysis

Weight Loss(kg)	Number(n)	Percentage (%)
>4kgs	16	26.60%
4kgs	16	26.60%
<4kgs	28	46.80%

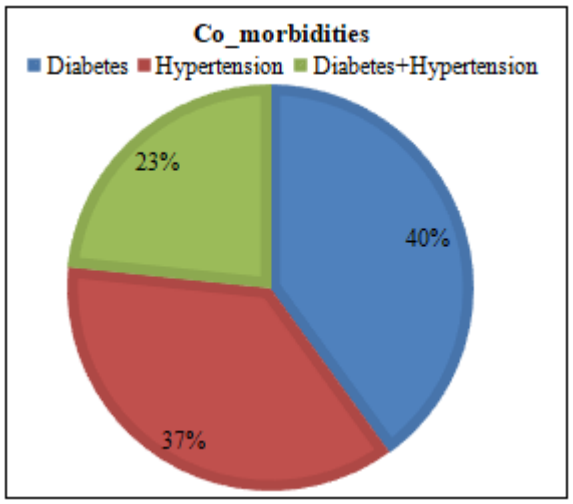


The above pie diagram illustrates the weight change in patients after undergoing dialysisin which47% constitutes in <4kgs weight change followed be 27% of 4kgs and 26% more than 4kgs weight chance.

H. CO-Morbidites:

Table VIII: Comorbidites

	Number	Percent
Diabetes	24	40
Hypertension	22	36.7
Diabetes+ Hypertension	14	23.3
Total	60	100

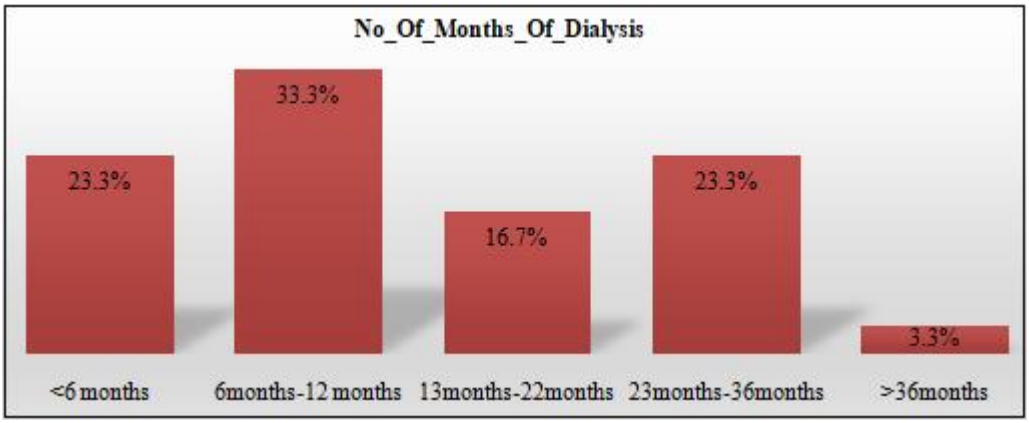


From the about pie chart we can observe that people suffering from CKD have co-morbidities like diabetes and hypertension. From this studyit was found that 40% suffer with diabetes and 37% constitutes for people suffering from hypertension and the rest 23% constitutes for people suffering from both hypertension as well as diabetes.

I. Number of Years on Dialysis

Table IX

Month	Number (n)	Percent
<6 months	14	23.30%
6months-12 months	20	33.30%
13months-22months	10	16.70%
23months-36months	14	23.30%
>36months	2	3.30%
Total	60	100

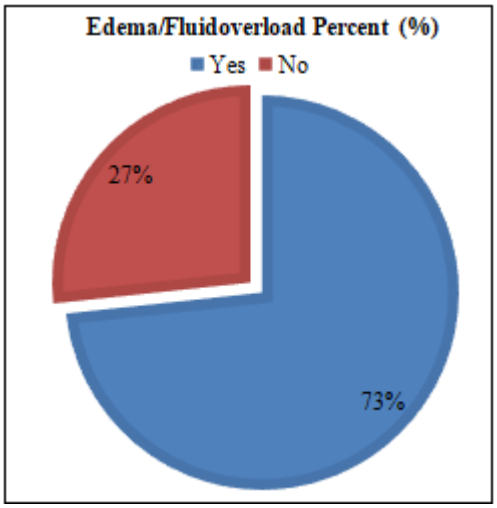


From the above subjective data, it is observed that 33.3% o the total people are on dialysis from over 6-12months whereas 46.6% has been on dialysis for less than 6 months and 23-36months in which each has 23.3% of equal division. 16.7% of patients has been on dialysis for 13-22months and least number of patients i.e., 3.3% more than 36 months.

J. Edema/ Fluid Overload

Table (X)

	Number	Percent
Yes	44	73.3
No	16	26.7
Total	60	100



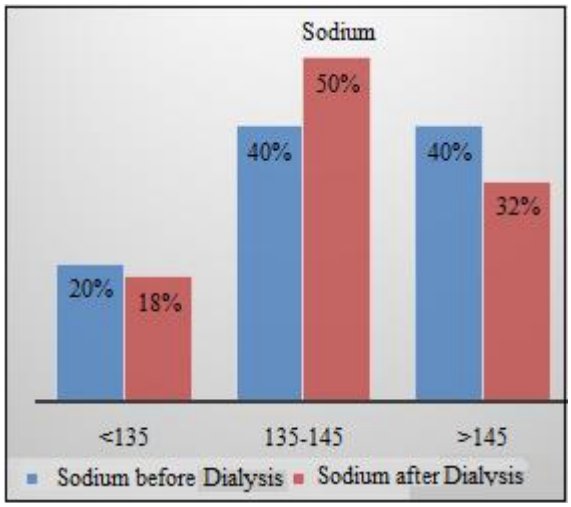
The about pie chart illustrates the percentage of fluid overload in CKD patients undergoing Dialysis. In this we can observe that 73% are with fluid overload that's also called as edema and the rest 27% are without fluid overload.

Biochemical Parameters

K. Sodium Before and After Dialysis

Table XI

Serum Sodium levels	Before Dialysis		After Dialysis	
	Number	Percentage	Number	Percentage
<135	12	20	10	18
135-145	24	40	30	50
>145	24	40	20	32
Total	60	100	60	100

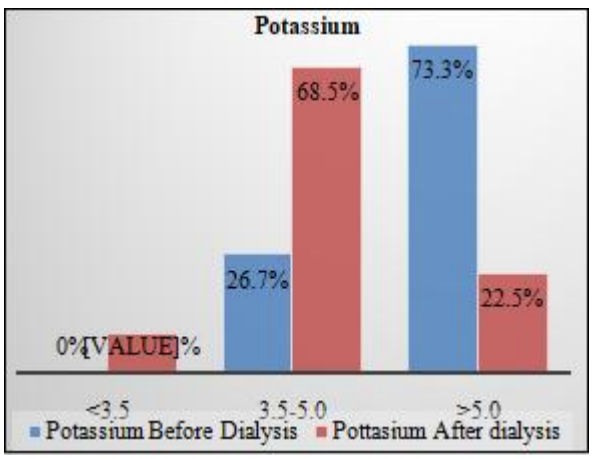


The above data illustrates the information of the sodium levels before and after dialysis, which can be interpreted as 20% of the patients before dialysis had less sodium levels i.e. >135mg, from which 2% were observed to have attained normal range leaving 18% still in the below range after dialysis. 24% of the patients had normal sodium levels before dialysis, which increased to 30% after dialysis, whereas 24% had >145mg of serum sodium before dialysis which decreased by 4% making 20% of the patients still in the higher range of serum sodium.

L. Potassium Before and After Dialysis

Table XII

Potassium	Before Dialysis		After Dialysis	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
<3.5	0	0	8	9
3.5-5.0	16	26.7	40	68.5
>5.0	44	73.3	12	22.5
Total	60	100	60	100

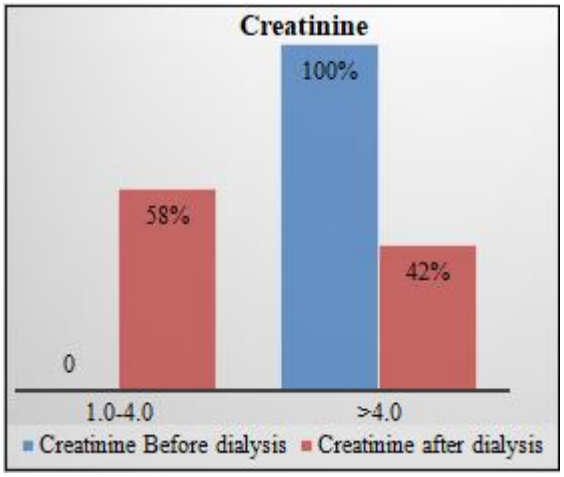


The above data illustrates the information of the potassium levels before and after dialysis. In which 9% of the patients after dialysis had potassium levels of i.e. <3.5mg. 26% of the patients had normal potassium levels before dialysis , which increased to 68.5% after dialysis, whereas 73.3% had >5.0mg of potassium before dialysis which decreased to 22.5% of the patients still in the higher range of potassium.

M. Creatinine Before and after Dialysis

Table (XIII)

Creatinine	Creatinine			
	Creatinine Before dialysis (n)	Creatinine Before dialysis (%)	Creatinine after Dialysis (n)	Creatinine after dialysis (%)
1.0-4.0	0	0	36	58
>4.0	60	100	24	42
Total	60	100	60	100

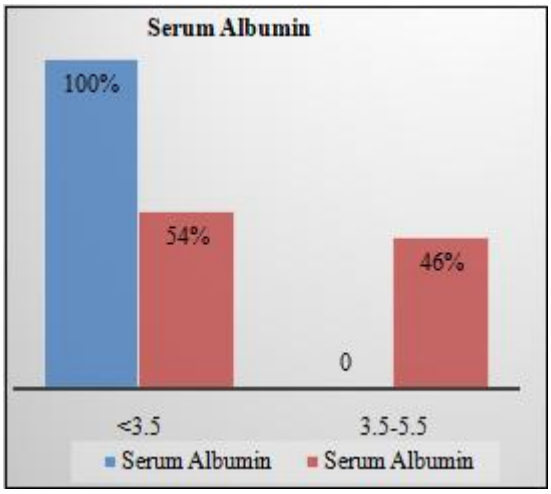


The about diagram illustrates the creatinine levels of patients before and after dialysis procedure in which we can observe that none of the patient's creatinine levels were normal before dialysis and after Dialysis shows 42% with more than >4.0 of creatinine level, 58% had between 1.0-4.0 range.

N. Serum Albumin Before and After Dialysis

Table XIV

Serum albumin				
	Before dialysis		After Dialysis	
Serum albumin	Number (n)	Percentage (%)	Number (n)	Percentage (%)
<3.5	0	0	34	54
3.5-5.5	60	100	26	46
Total	60	100	60	100

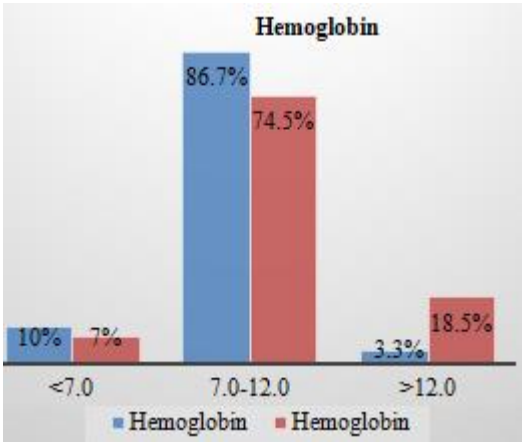


From the above diagram we can see that none of the patients were having normal serum albumin levels before dialysis and after undergoing dialysis procedure we can see that 54% had <3.5 range whereas 46% were in the range of 3.5-5.5.

O. Hemoglobinbefore and After Dialysis

Table XV

Hemoglobin				
	Before Dialysis		*After Dialysis*	
Hemoglobin	Number (n)	Percentage (%)	Number (n)	Percentage (%)
<7.0	6	10	4	7
7.0-12.0	52	86.7	44	74.5
>12.0	2	3.3	12	18.5
Total	60	100	60	100



The above diagram illustrates the hemoglobin levels of the patience before and after dialysis procedure, in which the hemoglobin content of the patients before dialysis 10% had <7.0gm/dl, 86.7% were in 7.0-12.0gm/dl and 3.3% had more than 12gm/dl. Whereas after dialysis 7% are in anemic criteria with <7.0gm/dl of hemoglobin content, 74.5% are in normal range of 7.0-12.0gm/dl and 18.5% had more than 12gm/dl after dialysis.

5. Summary & Conclusion

In this study with the obtained data we can conclude that maintaining the fluid and electrolyte balance along with some social factors such as food preference, alcohol consumption, age and sex pays an important role in people suffering from CKD. In view of these factors the survey was carried out with 60 patients who were diagnosed with CKD along with dialysis treatment. The patients medical profile data was collected and analyzed by using a pretested questionnaire method which concluded that out 60 patients 44 were with fluid overload and the rest 16 were not showing any such signs and also the change in their bio-chemical parameters were noticed before and after dialysis. Hence the association between maintaining bio-chemical parameters which results in fluid overload can be controlled by maintaining the normal ranges of parameters along with food, social habits and co-morbidities like diabetes and hypertension.

6. Recommendations

- Restrict protein intake <0.8gm/kg of body weight per day for people suffering from CKD.
- Limit the intake of fluid and water in case of swelling (edema).
- In order to avoid fluid overload (or) deficit in patients without edema, the allowable volume of fluid per day is equal to urine volume of previous day plus 500 ml. The additional 500 ml of fluid approximately makes up for the fluids lost through perspiration and breathing.
- Reduce salty, spicy and fried food in your diet as they increase thirst, leading to a greater consumption of fluids and hypertension.
- High blood sugar in diabetic patients can increase thirst. A stringent control of blood sugar is essential to reduce thirst.
- CAUTION – Avoid the use of salt substitutes as they contain high amount of potassium. High potassium content of salt substitutes can raise the potassium levels in blood.
- Physical activity should be enhanced.

7. Leaching Process of Vegetables

- Peel and place the vegetables in cold water so they won't darken.
- Slice the vegetables and rinse them in warm water for few seconds.
- Soak them for minimum two hours in warm water.
- Rinse them under warm water again for few seconds.
- Benefits of leaching includes lowering the amount sodium and potassium levels in the vegetables which can be advised for CKD patients.

8. Acknowledgement

I am thankful to the Almighty for his grace, which made me to work and complete this project work.

I am grateful to Sister Principal of St. Ann's College for Women, for providing me an opportunity of doing this work.

I express deep sense of gratitude to Mrs. Meena Kumari, Head, Nutrition department, St. Ann's College for Women for providing me an opportunity of doing this project work.

I am deeply indebted and grateful to Mrs. Urooja Birjis Fatima, Lecturer, Department of Nutrition, St. Ann's College for Women for her continuous guidance, constant support and valuable suggestions all through this project work.

I would like to express my heartfelt thanks to the Chief dietician Mrs.Radhika and other supervising dietician of – KIMS Hospitals, Hyderabad

This acknowledgement will be incomplete if I fail to express my deep sense of gratitude and indebtness to my group members and friends, for their patience and support without which this would not have been successfully completed.

References

[1] Cabrera , V., Hansson, J., & Kliger, A. (2017). Symptom Management of the Patient with CKD: The Role of Dialysis. *CJASN*, 687-693.
[2] Eleftheria , T., Vagia, B., Areti, S., Kostas, S., Michael , R., & Zacharias, Z. (2010). Causes and complications of chronic kidney disease in patients on dialysisCauses and complications of chronic kidney disease in patients on dialysis. *Health Science Journal*.
[3] EtHealthworld. (2017, December 13). *India Times.* Retrieved from Healthworld from Economic Times: https://health.economictimes.indiatimes.com/news/industry/indian-society-of-nephrology-to-organize-isncon-2017-in-new-delhi/62053225
[4] Hill , N., O'Callaghan , C., Lasserson, D., & Hobbs, F. (2016). Global Prevalence of Chronic Kidney Disease - A Systematic Review and Meta-Analysis. *journal.pone*, 1317.
[5] Kavoussi , S., Lim, C., Skinner , B., Lebovic , D., & As, S. (2016). New paradigms in the diagnosis and management of endometriosis. *Curr Opin Obstet Gynecol*, 267-276.
[6] Lermar, E. V., & Pandey, S. (2015). Save your kidneys (second edition). In *Save your kidneys (second edition).*
[7] Services, US Department of Health and Human. (2017). *National Chronic Kidney Disease Fact Sheet.* Atlanta: Centers for Disease Control and Prevention.
[8] Thomas, R., Kanso, A., & Sedor , J. (2008). Chronic kidney disease and its complications. *Primary Care*, 329-344.
[9] Varughese, S., & Abraham, G. (2018). Chronic Kidney Disease in India. *CJASN*, 802-804.
[10] Yang , M., Fox , C., Vassalotti, J., & Choi , M. (2011). Complications of progression of CKD. *Advances in Chronic kidney Disease*, 400-405.

Annexure-I

Case Study Format

Name - Consultant-
Age/Sex- Date of admission-
Date of discharge-
P.O.M.R-
Past Medical History-
Family History-
Socio-economic status-
Social habits-
Literacy-

Subjective Data
Appetite –
Hunger –
Thirst-
Bowel-
Micturition-
Sleep-

Objective Data
Height-
IBW-
CBWI-
BMI-
MAC-

Biochemical Data
BLOOD PROFILE-
Hb-
PCV-
Platelet-
RBS-
FBS-
PPBS-

Renal Profile
Urea-
Creatinine-
Na-
K-
Cl-
HCO2-

Medications
Name of the medicine Action

Clinical Findings

Diet History

Time	Food item	Quantity	Energy	Protein	Fat	CHO
		Total				

Total

Food Frequency
Cereals-
Pulses-
GLV-
Vegetables-
Non-Veg-
Egg-

Annexure-II

Questionnaire- A Study on the effect of Dialysis in monitoring the fluid and electrolyte balance in "Ckd" Patients

Name:
Age: Sex: Height:
Present Weight: Present BMI:
Diagnosis:

a) Food Preferences
i) veg ii) non-veg

b) Dietary Intake
i) Good appetite ii) Poor appetite iii) Moderate/sub-optimal

c) Gastrointestinal Symptoms
i) No Symptoms ii) Poor appetite /Nausea iii) Occasional vomiting

d) Functional Capacity
i) Normal to be improved ii) Occasionally difficulty or feeling tired frequently iii) Bed ridden

e) Number of years on dialysis
i) on HD < 1yrs. ii) 1-4 yrs. iii) > 4 yrs. iv) any severe MCC

f) Loss of subcutaneous (below eyes, triceps, biceps, chest
i) Normal ii) Mild iii) Moderate iv) Severe

g) Change in the end dialysis dry weight
i) No change ii) Minor weight loss iii) Weight loss more than 1kg iv)More than 5%

j) Presence of edema/fluid overload?
i)yes ii) no

Bio-Chemical Parameters

1) Sodium
i) <135meq/l
ii) 135-145meq/l
iii) >145meq/l

2)Potassium
i) <3.5meq/l
ii) 3.5-5meq/l
iii) >5meq/l

3) Creatinine
i) <0.6mg/dl
ii) 1mg/dl
iii) >1mg/dl

4) Serum albumin
i) <3.5gm/dl
ii)3.5-5.5gm/dl
iii)>5.5gm/dl

5) Hemoglobin
i) Less than normal
ii)12.5-14.5gm/dl

h) Daily fluid intake_____ml/day
i) urine output_____ml/day