



Daffodil
International
University

An Internship Report

**Nutritional Management of Dialysis Patients at Kidney Foundation
Hospital and Research Institute**

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*Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of
B.Sc. in Nutrition and Food Engineering*

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OCTOBER 2023

APPROVAL

This internship, “**Nutritional Management of Dialysis Patients at Kidney Foundation Hospital and Research Institute**”, has been turned in by **Bodrun Nahar Swarna Moni** to the Department of Nutrition and Food Engineering at Daffodil International University. It has been accepted as a partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved for its style and content. The date of the presentation was October 2023.

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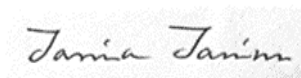
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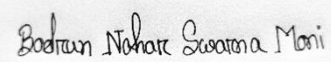
The project was completed under the supervision of **Ms. Tasmia Tasnim, Assistant Professor**, Department of NFE at Daffodil International University. I also affirm that neither this project nor any portion of this project has been submitted elsewhere for the purpose of earning a degree or certificate.

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ACKNOWLEDGMENT

First and foremost, I express my deep gratitude to the divine being for bestowing upon me the determination necessary to successfully accomplish my internship report.

I express my utmost gratitude to Mrs. Tasmia Tasnim, Assistant Professor, my supervisor, for her invaluable assistance and unwavering support during the duration of this internship initiative, particularly during periods of adversity.

During my internship at the Kidney Foundation, I was afforded a valuable opportunity to engage in academic studies and cultivate my practical aptitude. Throughout this process, I had the opportunity to encounter a multitude of persons who possessed a commendable level of expertise and proficiency. Their valuable assistance proved to be vital in my endeavors.

I am deeply grateful for the approval of my internship application by the director of the Kidney Foundation.

EXECUTIVE SUMMARY

The internship program offered by the Kidney Foundation has provided a valuable educational experience lasting for a duration of three months, starting in June 2022 and ending in August 2022. The Kidney Foundation, a well-recognized non-profit organization dedicated to advancing kidney health and offering support to individuals affected by renal disease, has established a stimulating and educational platform for professional growth. Throughout the course of the internship, I have been afforded the privilege of working with a cohort of committed individuals that exhibit a deep passion for the goals and objectives of the organization. Throughout my stay, I was bestowed with a wide range of tasks, enabling me to gain significant experiential knowledge in several aspects of kidney health and healthcare administration. An outstanding feature of this internship has been the chance to acquire direct experience and knowledge pertaining to the wide array of healthcare services provided by the Kidney Foundation.

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Chapter 1

Introduction

1.1 Background

According to several epidemiological studies, 10% of people worldwide suffer from chronic renal disease. As the people ages, chronic illness including diabetes, hypertension and obesity are becoming more prevalent. A significant public health issue on a world-wide scale is chronic kidney disease. The number of kidney patients suffering from kidney disease is increasing day by day.

Worldwide, more than 850 million people are diagnosed with some form of kidney disease each year. About 18 million people are suffering from different kinds of kidney diseases in Bangladesh. About 18 million people are suffering from different kinds of kidney diseases in Bangladesh. 40% of patients are dying in Bangladesh. There is also acute kidney injury (AKI) or acute renal failure (ARF), i.e., sudden kidney failure, which can later develop into chronic kidney disease. Currently, about 10% of the total population worldwide suffers from chronic kidney disease. [16th Annual Convention and Scientific Seminar of Kidney Foundation, Bangladesh]

Bangladesh is similarly on the list of countries with an increasing prevalence of CKD, or renal insufficiency. A global analysis of six areas, including Bangladesh, found an overall rate of CKD of 14%. Research done in Dhaka among people aged 30 and up revealed a 26% rate of CKD. Community-based research indicated that one-third of rural populations were at risk of CKD, which went mostly untreated. However, due to the lack of a comprehensive national health database, the changing trend of CKD among the Bangladeshi population is unknown.



Figure 1.1: Kidney Foundation Hospital and Research Institute

The prevalence of kidney disease among Bangladeshis is higher than the global prevalence, and in Bangladesh, women suffer more from kidney disease than men. According to the Bangladesh Bureau of Statistics (BBS), the death rate from kidney disease has increased three times between 2019 and 2020. Recent studies have shown that 10–12 percent of people worldwide suffer from chronic kidney disease. This rate is higher in the

developing world than in the developed world. Currently, more than 2 crore people in Bangladesh are suffering from some form of kidney disease. The main reason for this is that the treatment of end-stage kidney disease is very expensive, the specialized institutions providing the treatment are very inadequate, the cost of dialysis and kidney transplantation is beyond the financial capacity of most of the patients, etc. According to the Kidney Foundation's study, we have found that those patients can start dialysis, but 75% of them have to stop dialysis after three to six months due to a lack of money.

The number of people receiving dialysis worldwide is rising rapidly, particularly in low-and middle-income nations; millions of individuals all around the world have had their lives extended over the past 60 years by the availability acts as a temporary fix before kidney transplantation. Thus, decreased life expectancy, frequent hospitalization (especially for CVD and infection) and poor quality of life are the result of dialysis

Patients on dialysis have an extremely high mortality rate, particularly in first 3 months after starting hemodialysis. hemodialysis is used by about 89% of dialysis patients worldwide; the majority (>90%) of these patients reside in so-called upper middle-income nations like Brazil and South Africa. Compared to hemodialysis, PD is less generally accessible globally. According to 2017 assessment of 125 countries, PD was reputedly offered available in 75% of the nations, where's hemodialysis was 96% of the nations. A little more than half of the patients undergoing PD in 2018 lived in China, Mexico, the USA and Thailand.

Today, Chronic kidney diseases are one of the most common threats in the whole world. It has no specific cure for complete recovery. Regardless of the cause of kidney diseases, diet and nutrition become important in addition to patient treatment when kidney function declines. A controlled diet plan is used to prevent the progression of kidney diseases and to maintain a proper balance of various elements in the body.

Chapter 2

About kidney foundation

2.1 Historical background

Kidney foundation hospital and research institute were formally established in June 2002, and with a small financial investment of around 75,000 taka, the facility's operations got underway in October 2003, it began in a rented space with only seven employees and six loaned dialysis equipment. It called non-profit diagnostic centers and also provide outpatient care at reasonable costs. With 140 employees and a 150- bed hospital, they began their extended operations in July 2011. They provide treatment using state – of the – art – technologies, including affordable dialysis, kidney transplantation, interventional nephrology, a laboratory facility, indoor amenities, and outpatient facilities. It is presently Bangladesh's largest hospital for the treatment of urological and renal illnesses, dialysis, and transplants. Due to the commitment and diligence of those working on the kidney. It has evolved into an organization that offers excellent healthcare and hope to patients with kidney disorders and renal failure due to the devotion and hard work of the individuals working in the kidney foundation. Treatment is provided without fee to those with limited or no finances.

2.2 Location

Plot No – 5/2, Road No – 1 (main Road), Section 2, Mirpur, Dhaka-1216

2.2.1 Other branches

- Kidney Foundation Hospital and Research Institute, Bono-gram Pabna
- Kidney Foundation, Sirajganj
- Kidney Foundation, Sylhet

2.3 Activities

1. With 287 employees, kidney Foundation Hospital now operates 300- bed facilities on average. Modern facilities are available for treatment, including dialysis, kidney transplantation, interventional nephrology, laboratory resources, indoor and outpatient facilities, and affordable care for both acute and chronic kidney disease.
2. Investigating the causes, symptoms, and treatments of acute renal injury and chronic kidney disease in rural and urban populations.
3. Training medical professionals, including techs, nurses, and other personnel.
4. It also collaborates on research projects with the Royal London Hospital in the UK and Wayne state University in Michigan, USA.
5. The Renal Foundation is dedicated to improving services in light of the increased public demand and the rising number of people suffering from kidney disease. Additionally, there has been a rise in academic activity and the launch of training programs.

2.4 International recognition

With the assistance of Royal London Hospital and Kidney Foundation Hospital and Research Institute Dhaka Bangladesh Renal sister Center, the international kidney Association (ISN) has been conducting advanced training (dialysis, kidney transplantation, kidney biopsy, training of nurses) and research activities for the past two years. The kidney Foundation Hospital and Research institute has been given recognition on a scale of C to B and B to A in this situation. The kidney Foundation Hospital and Research institute will become a worldwide training and research center if the training and research projects are successfully finished in 2022-2023.

2.5 Aim and objectives

1. Providing affordable therapy in clinical nephrology, dialysis, and transplantation using state- of - the- art facilities.
2. Engaging in academic work and research.
3. Training medical professionals such as technicians' nurses, and other paraprofessionals.

2.6 Facilities of kidney foundation

- Clinical Nephrology Facilities
- Clinical Urology Facilities
- Dialysis Facilities
- In-door Facilities
- Out-door Facilities
- CAPD Facilities
- Laboratory Facilities
- Radiology and imaging Facilities
- ICU Facilities
- Home Kitchen Facilities
- Attach Pharmacy
- Nutrition Department
- A book of nutritional guidelines.
- Academic Activities
- Continued Medical Education (CME)
- Diploma in Renal Nursing.
- Annual Convention & Scientific Seminar.
- Research Activities.
- Training On Renal Nutrition.

2.7 Long term planning and programs

- Providing of financial support.
- A range of education- and training- related initiatives for medical personnel involved in organ transplantation, such as transplant coordinators and bereavement counselors.
- Establishing six divisional organ and tissue characterization centers.
- Training of the organ rescue committee in regards to all solid organs, with an emphasis on the heart, lungs, and pancreas.
- Having transplant coordinators and bereavement counselors available in all trauma centers and medical collages.

2.8 SWOT Analysis

Table 2.1: SWOT analysis of Kidney Foundation

STRENGTHS	WEAKNESSESS
Low cost with excellent health care Special renal expertise	Limited number of nutritionists Lack of online services
OPPORTUNITIES	THREATS
Collaboration works Providing training	Financial sustainability Insufficient space

2.9 Summary

The Renal Foundation of Bangladesh offers kidney patients affordable healthcare without compromising quality. Additionally, it supports research projects and facilitates in the teaching and training of physician’s nurses, dieticians, and paramedics. The foundation intends to increase the number of facilities it has around the nation.

2.10 Learning Outcomes

An internship is an important part of the learning process for nutrition graduates. As a student of Nutrition and Food Engineering, I had an interest in Renal Nutrition. So, I went to the Kidney Foundation Hospital & Research Institute because it is the best place for learning or gathering

practical knowledge about renal nutrition. The duration of my internship was 3 months (June–September).



During my internship period, I learned the following things:

1. firstly, I learned how to assess of a CKD patient.
2. There, Ma'am provides me lecture sheets and guidelines that help me a lot to understand the nutritional management of CKD patients.
3. I gained knowledge about different biochemical markers (sodium, potassium, chloride, uric acid, phosphorus, creatinine, eGFR, Albumin, and hemoglobin) that can help me understand a patient's health conditions.
4. I visited Indoors (the Word and Dialysis Unit) with Ma'am, where I gained practical knowledge on how to deal with an admitted patient.
5. In the outdoor chamber, Ma'am took me with her, where I observed how to counsel a patient properly and how to make a diet chart according to a patient's requirements.
6. I wrote in my notebook about things I didn't fully understand. Then, when I met Tareen Ma'am, I told her about those topics that I didn't understand. After that, Ma'am patiently heard those problems and made them clear by delivering a speech about them. Now I can understand easily any topic about renal nutrition.
7. Now I am able to make a diet plan properly.

2.11 Overview of the internship experience:

During my internship experience with Kidney Foundation Hospital, I was able to develop a direct communication level with patients, which was useful in improving my counseling skills. Now I am able to give the proper diet chart to kidney patients according to their health conditions.

I feel very lucky to have learned details about renal nutrition from my beloved Tazeen Ma'am. Her teaching method amazed me. I am very grateful to her for making that 3-months journey beautiful and memorable.



In conclusion, the Kidney Foundation Hospital experience was crucial to my growth as a renal nutritionist. Which knowledge and skills I grabbed from KF I will use in my future what I had learnt from them.

As I had an interest in renal nutrition, so, I am blessed to intern with the Kidney Foundation.

Chapter 3

About dialysis

3.1 Dialysis

When the kidneys are unable to eliminate excess fluid and waste from the blood, a form of treatment called dialysis can support the body. The father of dialysis is regarded to be Dr. Willem Kolff. In 1943, this young Dutch physician invented the first dialyzer (an artificial kidney). In the late 1930s, Kolff began working in a tiny ward at the University of Groningen Hospital in the Netherlands, which was the start of his path toward developing an artificial kidney. In the 1940's dialysis was the first used successfully. After that, it became a standard treatment for kidney failure starting in the 1970's. Since then, these treatments have benefitted millions of people. Dialysis can be carried out in a hospital, dialysis center or at a home. Depending on the patients' medical needs and preferences, the doctor and the patients will decide which type of dialysis is best and where is appropriate. In fact, kidneys are the part of our urinary system. These two bean-shaped organs sit below of our ribcage on each side of our spine and filtered toxins from blood then returned to the circulation nutrient-rich blood to the bloodstream after removing contaminations from it. Urine is produced by the waste and surplus water and travels from the kidneys into the bladder. Kidneys also help regulate the blood pressure. Basically, the function that the kidney originally do is carried out through dialysis. In other terms, it removes toxins in the blood that would otherwise accumulate in the blood and cause illness since the body does not require them. In the event that, the kidneys have decreased the volume of urine they are producing dialysis also eliminates salt and water from the body. Dialysis can be obtained in 2 methods. Kidney failure may sometimes just be a short-term issue (AKI), in which case dialysis can indeed be stopped once kidneys are recovered. In stage 5 kidney disease, at this point kidneys are carrying out 10-15% of their normal function and this stage is considered end-stage renal disease (ESRD) or kidney failure. However, renal failure patients usually require kidney transplantation. It is not always possible to transplant in straight way because unavailable of suitable donor. In fact, some patients are not suitable for kidney transplantation because they are not well enough to have a major operation. They may require dialysis for the rest of their life.

3.2 The functions of dialysis

Dialysis is a lifesaving treatment. It performs some of the duties that our kidney typically does to keep our body in balance. Such like-

- Removing waste and extra fluids from the body to protect them from accumulating in the body.
- Maintaining safety limits of minerals in our blood, such as potassium, sodium, calcium, magnesium, chloride, phosphate and bi-carbonate.
- Helping to regulation of our blood pressure and produce red blood cells.

3.3 The usages of dialysis

Dialysis is beneficial for 2 different situations:

- **Acute kidney injury (AKI):** Is a short period of kidney damage or failure that occurs in a period of hours or days. Intravenous fluids are primarily used to treat AKI in a hospital setting (given through the vein). Dialysis may also be needed in severe cases for a short period until the kidneys recover.
- **Kidney failure:** An estimated glomerular filtration rate (eGFR) of less than 15 mL/min indicates kidney failure, which occurs when only 10-15% of kidney function is still present. Kidneys are no longer sustain to keep alive without some extra help and the name of this stage is end stage renal diseases (ESKD). Dialysis is not a cure for kidney disease but with kidney failure, dialysis can only partially replace the function of healthy kidneys when there is renal failure.

3.4 Dialysis types

There are 2 main types of dialysis:

- **Hemodialysis (HD)** – In hemodialysis waste and excessive fluid are eliminated from blood using a dialyzer (a filtering device) and filtered blood is then returned to the body. Hemodialysis is typically given 3 times a week for roughly 4 hours. Depending on patients' individual requirements, some patient could require longer therapy. It can be done at a home or a dialysis center.
- **Peritoneal Dialysis (PD)** – In peritoneal dialysis, blood is filtered inside rather than externally using a dialyzer. The lining of the abdomen or belly area, commonly known as the peritoneum, serves as a filter for this form of dialysis. A little surgical procedure is needed to insert a catheter (a soft tube) in abdomen before starting peritoneal dialysis. Through this catheter, a sterile cleaning solution is inserted into stomach and the fluid exits from the body via the catheter when the filtration procedure is completed. PD is done by every day. It can be done almost anywhere if patients have the supplies needed to perform the treatment.

3.4.1 Peritoneal Dialysis (PD)

There are 2 types of peritoneal dialysis. They are-

- **Continuous ambulatory peritoneal dialysis (CAPD):** It doesn't use a machine and blood is filtered numerous times during the day and it can exchange by hand.
- **Automated peritoneal dialysis (APD):** In which a device filters the blood during the night (while sleeping).

3.5 Possible Side effects from dialysis

Side effects are the part of both types of dialysis. It can be mild or severe. Patients are frequently report the following adverse effects;

3.5.1 Hemodialysis

1. Muscle cramps- Hemodialysis can cause muscle cramps in certain patients if too much fluid is drained too soon.
2. Hypotension- low blood pressure, which can happen when too much fluid is withdrawn from the circulation during treatment.
3. Blood loss- If a tube from the dialyzer or a needle exits with access, it might loss blood.
4. Dizziness- The most typical adverse effect on hemodialysis is low blood pressure. As a result, the pressure decreases, resulting in nausea and vertigo.
5. Blood clots- An access can become clotted with blood.
6. Itchy/dry skin- Excessive phosphorus levels are responsible for itchy skin because dialysis doesn't properly remove phosphorus.

3.5.2 Peritoneal dialysis

1. Hernia- Weakness of abdominal muscle because of the placement of catheter to allow dialysis solution to enter and exit the abdominal cavity.
2. Feeling to full- Due to the fact that the dialysis solution causes them to feel full. So that, some PD patients find eating to be unpleasant.
3. Bloating and weight gain- The fluid bloat from the dialysis solution provides for some the weight. The body may absorb the sugar in the dialysis fluid, which result might in weight gain.

3.5.3 Both HD and PD

- Infection- If untreated, infections of the skin, blood or peritoneum (the region around the belly button) can result in sepsis (a life-threatening condition leading to multiple organ failure).
- Fatigue- Anyone can experience fatigue (feeling tired), but those who have been receiving dialysis for a long time, it can affect frequently them.
- Pruritus- basically itching is caused by high blood levels of phosphorus, it can make uncomfortable, irritation sensation that can bothered dialysis patients.
- Sexual side effect- loss of libido, dryness of vagina can all be sexual adverse effects of dialysis.
- Mental illness- being physically unwell, experience worry, depression, anxiety and a change in self-image can cause mental illness.

3.6 The impact on quality of life

Even though initiating dialysis is major life change, it is possible to still have an active life. Obviously, this can differ from normal life before to starting dialysis. Because dialysis patients have many limitations.

With the exception of the time required for treatment; most dialysis patients are able to maintain regular schedule. Because it helps remove waste materials that have accumulated in the blood between treatments, dialysis frequently makes individuals feel better. However, some individuals claim to feel exhausted after dialysis, specifically if they have received lengthy dialysis sessions.

According to the study, peritoneal dialysis patients rate their quality of life (QoL) in all of its aspects far higher than HD patients do. Having restricted diet and at the same time, the incidence of the side effects of dialysis therapy can reduce QoL. In addition to giving up their favorite pastimes and social activities, people with chronic renal disease also stop to playing sports and pursuing other interest.

The quality of medical treatment and the surroundings, especially the training and expertise of the medical staff, have an impact on patients' quality of life.

Patients' health is negatively impacted from family and friends impacted by a lack of love and acceptance. Which results in reduced self-esteem, feeling hopelessness, lower mood, sadness and a diminished sense of the significance of life.

The quality of life influenced by their familial networks but not just the family is crucial, but also healthy social connections since they promote emotions, boost self-esteem and enhance QoL.

3.6.1 Cost

Dialysis is often an imperative for end stage kidney patients. But The cost of dialysis treatment is high. Even kidney treatment in the country is not easily available. The specialized institutions for providing treatment are very inadequate in Dhaka city. In addition, it has not yet reached the village level. But the kidney foundation is providing dialysis at low cost without compromising the quality of dialysis. The cost of one session in KF is 1600(US\$ 18.00 whereas in private dialysis centers the cost varies from US\$ 40.00 – 58.00).

3.6.2 Discomfort ness during dialysis

Dialysis itself a painless procedure. But it has some side effects during dialysis that can cause of discomfort ness. Like as pressure drop, vomiting, cramps, feeling full, headaches etc. Moreover, while the needles are inserted into access site, it can also experience some discomfort. But with frequent treatment, those problems generally go away.

3.6.3 Life expectancy

Patients underlying medical issues, then how closely they adhere to their treatment plan and a number of other factors will all affect how long they will live on dialysis. According to the National Kidney Foundation, on dialysis, the average life expectancy is 5-10 years. Though for someone between the ages of 75 and 74, life expectancy is closer to 4 years on dialysis. Research shows, survival on dialysis differs substantially with age. For patients starting dialysis at under 50 years of age, the approximate overall 1-year survival is 95%, 5-years survival is 80% and 10-years survival is 50%. Nevertheless, many patients have successfully maintained 20-30 years on dialysis treatment.

Chapter 4

Treatment and self-care

4.1 Diagnosis

An estimated glomerular filtration rate (eGFR) of less than 15 mL/min indicates kidney failure, which occurs when only 10-15% of kidney function is still present. Kidneys are no longer sustain to keep alive without some extra help and the name of this stage is end stage renal diseases (ESRD).

The doctor will assess the levels of-

- albumin and creatine (which are molecules associated with kidney function, in persons urine).
- The doctor may additionally prescribe the following to support an ESRD diagnosis
- An ultrasonography of the kidneys
- A biopsy of the kidney.
- Blood testing to check electrolyte levels and anemia.

4.2 Dialysis treatment options

Hemodialysis (HD) – In hemodialysis waste and excessive fluid are eliminated from blood using a dialyzer (a filtering device) and filtered blood is then returned to the body. Hemodialysis is typically given 3 times a week for roughly 4 hours. Depending on patients' individual requirements, some patient could require longer therapy. It can be done at a home or a dialysis center.

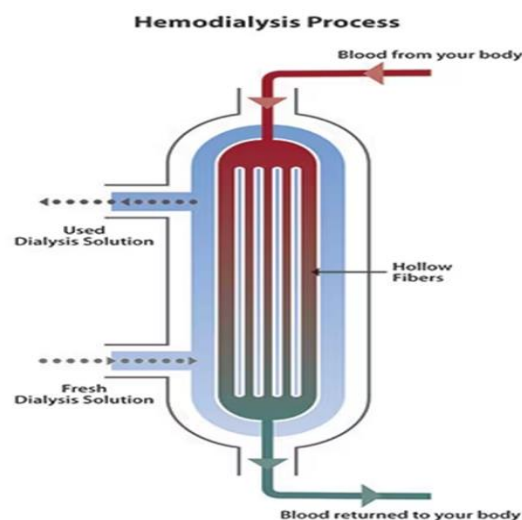


Figure 4.1: Hemodialysis (HD)

Preparation - A small surgical procedure is needed to construct a vascular access site (an access into a blood artery, typically in the arm) prior to initiating hemodialysis. So that, before first session patients begin preparing for hemodialysis several weeks to months in advance. Because they must wait for the surgical access to heal before starting hemodialysis treatment. It is crucial to have this access point to easily transfer blood from the body via the dialyzer and back into the body. There are 3 different kinds of access-

Arteriovenous fistula (AV): The most secure vascular is the AV fistula. It is a least prone to develop infections or blood clots and can endure for years. Under the skin of arm, a surgeon joins an artery (a large blood vessel that takes blood away from your heart) and a vein (blood vessel that returns blood to your heart). The AV fistula is often set on less dominant arm. For example, if patients are right-handed, fistula would likely occur in patients' left arm.

AV graft: The next-best vascular access method is an AV graft. It is more prone to experience issues with blood clots and infections. An artery and vein are joined deep within the skin of your arm by a surgeon using a plastic tube. The ideal time for receiving an AV graft is two to three weeks before beginning dialysis.

Catheter: A catheter is a plastic tube with a Y form. Patients using catheter are more susceptible to issue with infection, blood clots and scarring. A big vein more inside the body is where catheters one ends exits through skin. Catheter's come in 2 varieties-

Central venous catheter- a plastic tube (catheter) may be placed into a major vein in patients' neck if required emergency hemolysis. The catheter is just a temporary fix.

A tunneled catheter- Most frequently attaches to a neck vein. Compared to a venous catheter, it is safer and has a longer useful life.

The procedure – Two needles are placed into the arm through the access site for hemodialysis, and they are secured in place to keep them there. Each needle is joined to a plastic tubing that is flexible and connects to a dialyzer. The dialyzer filters a few ounces of blood at a time via a single tube, transferring waste products and surplus fluid into a purifying solution known as dialysate. Through the second tube, the filtered blood is sent back into the body.

Finishing – the needles are taken out of access site when hemodialysis is finished. After that, patients are free to continue their regular activities until the next session.

Peritoneal Dialysis (PD) – In peritoneal dialysis, blood is filtered inside rather than externally using a dialyzer. A cleaning solution(dialysate) comprised of a combination of water, salt and other chemicals, is gradually injected into the abdomen area through the catheter during each session. The dialysate draws additional fluid and waste products into the abdomen area as a blood naturally circulates through the region (almost like a magnet). PD is done by every day. It can be done almost anywhere if patients have the supplies needed to perform the treatment.

Preparation - A little surgical procedure is needed to insert a catheter (a soft tube) in abdomen before 3 weeks prior to starting peritoneal dialysis. The lining of the abdomen or belly area, commonly known as the peritoneum, serves as a filter for this form of dialysis. This catheter is

implanted for life. Patients have to learn from medical expert or health care how to do peritoneal dialysis at home and prevent catheter related infections.

Procedure – firstly, connect one branch of a Y-shaped tube to the catheter. The bag containing the dialysis fluid is connected to this tube. The fluid enters the peritoneal cavity through the catheter and tubing. After 10 mins later, when the bag is empty disconnect the catheter and tube. Then close the catheters cap and patients can carry their regular activities while the peritoneal cavity’s dialysis solution removes waste and surplus fluids from the body. This procedure usually takes approximately 60 and 90 mins. The fluid can be drained into a clean, empty bag using the opposite branch of the Y-shaped tube when the catheters cap is removed. Patients may do this up to 4 times daily.

Finishing - Through the catheter, a sterile cleaning solution is inserted into stomach and the fluid exits from the body via the catheter when the filtration procedure is completed.

There are 2 types of peritoneal dialysis. The main different is the exchange time table and one is performed manually while other is automated. Patients can select any type of peritoneal dialysis which will best suits for them.

Continuous ambulatory peritoneal dialysis (CAPD)

It doesn’t use a machine and blood is filtered numerous times during the day and it can exchange by hand. Each session lasts between 30-40 mins and patients can read, speak, watch tv or sleep during an exchange. Patients can keep CAPD solution in their stomach for at least 4-6 hours and this is referred as dwell period. Patients can change the solution at least 4 times each day. in this dialysis, a nighttime awakening is not necessary because patients can sleep with the solution in their abdomen while they are sleeping.

Automated peritoneal dialysis (APD)

In this dialysis a device filters the blood during the night (while sleeping). The device known as cyclor filler. It can empty abdomen 3 to 5 times over the night and that’s why patients can start with fresh solution in the next morning. In addition, they have an option to keep solution entire the day in the belly or they can exchange the solution in the middle after-noon without machine. This procedure is commonly reoffered as CCPD or continuous cycle-assisted peritoneal dialysis.

Which form dialysis is the best-

Hemodialysis	Peritoneal dialysis
1. Efficient; 4 hours three times per week is usually adequate.	1. less efficient. Four exchanges per day
2. 2-3 days between treatments	2. A few hours between treatments
3. requires visits to hospital (although home treatment is possible for some patients)	3. performed at home

4. Requires adequate venous circulation for vascular access	4. Requires an intact peritoneal cavity without major scarring from previous surgery.
5. Careful adherence to diet and fluid restrictions required between treatments.	5. Diet and fluid less restricted.
6. Fluid removal compressed into treatment periods; may cause symptoms and hemodynamic instability.	6. Slow continuous fluid removal, usually asymptomatic.
7. Infections related to vascular access may occur.	7. Peritonitis and catheter – related infections may occur.
8. Patients are usually depending on others.	7. Patients can take full responsibility for their treatment

Now Choosing dialysis

Basically among 2 main types of dialysis, each type of dialysis has pros and cons. But it is essential to keep it mind that, even after selecting a certain type of dialysis, they can always have the choice to switch. it is not like that; they are locked in to one type of dialysis. sometimes patients are may not be a fine fit for a certain type of dialysis for medical, health or lifestyle reasons. Doctor can inform which is best fit according patient’s conditions. Infect, both type of dialysis is effective for most people. So, it’s usually also a case of personal preference.

4.3 Medication

It’s probably that usually the kidney patients’ diet does not give them adequate minerals and vitamins. As a result, people can obtain the required quantity of minerals and vitamins through dietary supplements. But only on the advice of the appropriate healthcare professional. Taking medications and vitamins can help to manage patients’ health and replace nutrients that may lose due to treatment or eating kidney restricted diet.

Some common medication and vitamins for dialysis patients are given below-

4.3.1 Insulin (diabetes)

diabetes is the leading cause of kidney disease and one of the prevalent causes of renal disease. several blood sugars lowering medications are given for type 2 diabetes patients.

4.3.2 Erythropoietin

Anemia affects almost all dialysis patients with end-stage renal disease (ESRD). A person develop anemia when their red blood cell count is low. Erythropoietin is a hormone produced and secreted by the kidney and in charge of maintaining a normal red blood cell count. In hemodialysis patients, erythropoietin will often be intravenously injected into the return

dialysis tubing during each session. In peritoneal dialysis patients, erythropoietin will get by directly injection under the skin. Typically, between 36-40% of blood is made up of red blood cells. Prior to development of this, the majority of dialysis patients had a 20-26% red blood cell count. Now with proper management people of CKD on dialysis have normal red blood cell count.

4.3.3 Iron

Iron is required for the production of red blood cells by erythropoietin in order for it to function properly. Less red blood cells are produced without iron, and those that are produced are smaller in size and less able to transport oxygen. During hemodialysis, a small quantity of red blood cells containing iron are lost. Dialysis patients ultimately run out of iron and erythropoietin and become less functional if iron is not replenished. That's why most dialysis patient needs to receive iron.

4.3.4 Active vitamin D

Active vit d taken orally may be the useful in lowering PHT (parathyroid hormone) and it can control the balance of calcium, phosphorus because when calcium and phosphorus mix together it form calcification which can create complications in body.

4.3.5 Phosphorus binder

Increased PTH levels cause bone inflammation, as well as calcium and phosphorus, loss from the bones and move to bloodstream. The additional phosphorus in the blood can no longer be excreted by the kidneys due to renal failure. Only a little amount of phosphorus is removed during dialysis. Dietary changes and medications like phosphorus binders can stop or revers this process.

4.3.6 Angiotensin receptor blockers (ARBs)

This medication can lower blood pressure by widening blood vessels.

4.3.7 Diuretics (water pills)

Are prescribe to increase urination, which help to kidneys eliminate surplus salt and fluid that might raise blood pressure.

4.3.8 B- complex vitamins & folic acid

Water -soluble vitamins including vitamin C, the B -complex vitamins, and folic acid are heavily excreted during the dialysis process. The majority of nephrologists believe that combining folic acid with a B-complex vitamin is an effective defense against malnutrition in patients. Patients with heart disease and dialysis recipients both frequently have high homocysteine levels. High dosage folic acid treatment can reduce homocysteine levels.

4.3.9 Vitamin E

It can prevent crams. Crams can occur during dialysis and at night for certain patients.

4.3.10 Heparin

for preventing blood clots through dialysis tubing or the dialyzer during treatment.

4.3.11 Stool softener

It can relieve constipated patients that can be caused by limited fluid intake for people on dialysis, certain medications or lack of physical activity.

4.3.12 Topical cream or antihistamines

It gives relief for those patients who are bothered by itching and dry skin problems.

4.4 Supportive treatment

If anyone chooses not to get dialysis or a kidney transplantation for renal failure or if they are not appropriate for them, supportive care will be provided. The aim of this treatment is to treat and control the symptoms of kidney failure. It includes physical, psychological, practical care for both the person with kidney failure and their family.

4.4.1 Self-care

- Regular attending dialysis session- skipping can create serious consequences. It is essential for maintaining good quality of life.
- Following the dietary restrictions and prescribed medications- unless other problems can affect drastically. Like as hypertension, diabetes, anemia, bone disease, heart disease etc.
- Care about dialysis access site- another good self-management is care about catheter, fistula or graft. It can save from any type of infections and should not ignore infection or complication warning signs.
- Stop smoking and alcohol consumption- smoking can increase cardiovascular problems and imbalances.
- Mental and emotional well-being- engaging physical activity can improve overall well-being. It is crucial to prioritize mental satisfaction for better quality of life.

Chapter 5

Nutritional management

5.1 Dietary recommendations

Eating well-balanced diet, with the right amount of protein, calories, fluid, vitamins and minerals, is essential for dialysis patients or patients with end stage kidney diseases (ESRD) to stay fit and healthy as their kidneys are no longer functioning at its full capacity.

5.1.1 Getting the right number of calories

The energy requirement is an estimate of how many calories a person needs to consume, on average, each day to stay healthy, based on their age, sex, height, weight, and physical activity level. Getting the right number of calories is important to overall health and well-being.

Kidney patients have another energy requirement, such as:

- normal requirement = 30 - 35 calories, above 60 years = 30 calories and Below 60 years = 35 calories per kg body weight (Cal/kg/w)
- For PD patients- the dialysate used provide extra calories (dextrose). So, excessive calorie intake needs to reduce to maintain good quality of life.

5.1.2 Adequate in protein of dialysis patients

Every kidney patient needs a limited amount of protein to intake in a whole day. An assigned registered dietitian will estimate how many grams of protein need each day.

Dialysis patients with/without diabetes: 1-1.2 g/kg/w/day, in obese: 1.0 g/kg/w/day, Malnutrition: 1.2 g/kg/w/day and Severe malnourished: more than 1.2 [depends on IBW]

Dialysis patients need higher protein intake because of losing protein during dialysis process. Insufficient protein intake leads to protein energy malnutrition.

5.1.3 Potassium

- requirement of kidney patients: > 2000 mg per day.
- high level of potassium can be life-threatening in HD patients.
- PD patients do not need to strictly restricted because potassium removal is more efficient in PD.

5.1.4 Low in Phosphorus

- requirement of Kidney patients: > 800 mg per day.
- both HD and PD patients need to control phosphate level because only a little amount of phosphorus is removed during dialysis.

5.1.5 Low in Sodium

- requirement of kidney patients: < 2000 mg, (<2gm) salt, (<5gm) sodium chloride. (KIDGO)
- Salt is one of the main sources of sodium. Sodium will increase thirst that will increase the tendency of drinking more fluid also increase blood pressure and added burden to the heart.
- Both HD and PD patients can maintain restricted sodium diet.

5.1.6 Calcium

- Requirement of calcium intake for kidney patients not more than 2000mg daily.
- Both HD and PD dialysis patients have to maintain calcium restricted diet for preventing bone disease and tissue calcification.

5.1.7 Maintain Uric acid level

- requirement of Kidney patients: < 400 mg per day. (Kaneko at 2014)
- there is a close correlation between creatinine and uric acid synthesis.
- High levels of uric (hyperuricemia) acid may cause of gout (a form of arthritis)

5.1.8 Control in fluid

- Fluid requirements (During dialysis): 1.5-2 liters per day. [if water retention is here, not more than 1.5 liters] [tea, coffee, gravy all are include here]
- Both HD and PD patients will need to maintain of their fluid intake. Because excess fluid is retained in the body and symptoms such as swelling of legs, shortness of breath and high blood pressure.

5.1.9 Prevention of anemia

- Anemia is common among dialysis patients. A person develop anemia when their red blood cell count is low. Erythropoietin is a hormone produced and secreted by the kidney and in charge of maintaining a normal red blood cell count.
- To reduce anemia of dialysis patients some factors have to maintain like as -iron, folate and other vitamins.

5.1.10 Avoid saturated and trans fat

- Saturated fats are not good for health it can increase cardiovascular disease to dialysis patients.
- Micronutrients rich fruits and Vegetables-
- Potassium rich foods (fruits, vegetables, and pulses)

Very high >300mg	High 200-300mg	Low <100-200mg
fruits	fruits	fruits
Chinese Date, Sourwood apple, Custard apple, Date,	Mango Fazli, Melon (Cucumis melo), Amla, Fig	Apple, Watermelon, Melon, Pear, Lychee, Orange,

Banana, Stone apple, Tamarind, Date palm	Leaf, Grapefruit, Plum fruit, Guava, Jackfruit.	Orange juice, Blackberry, Hog plum, Pineapple, Song, Malta, Mango, Ripe papaya, Green-grapes
vegetables	vegetables	vegetables
Bitter cucumber, Asparagus Bean, Beet, Pumpkin, Garlic, Arum, Bulbous root of arum.	Onion, Cauliflower, Bean, Pea, Drumsticks, Pepper, Water spinach, Spinach, Potato	Carrot, Radish, Green papaya, cabbage, Lady's Finger, Cucumber, Pointed Gourd, Brinjal, Boiled bitter gourd, Spiny gourd, Tomato, Green banana, red amaranth, sweet potatoes
Fruits and vegetables with too much potassium are not suitable for kidney patients	high-potassium fruits and vegetables - not more than 50 grams)	Low and moderate potassium fruits and vegetables are suitable for kidney patients till 100g

- All types of pulses contain high levels of potassium – >more than 250 mg
- Chickpeas, Mung beans, White Peas, Peas
- Red lentils are low in potassium: <230

5.1.11 Cooking method

reduce potassium levels on vegetables-

- First cut the vegetables into small pieces and soak the cut vegetables in a bowl of hot enough water for two hours.
- Drain the water after two hours.
- Boil the vegetables in a pot with enough water for 3 minutes.
- Drain the boiling water.
- Now cook the vegetables as required.

reduce potassium levels on pulses-

- Soak 1 cup of dal (190 g) in a bowl of water for 12 hours or more
- Now discard the water (full of potassium) and wash the pulses well.
- Cook lentils by diluting them in 3 cups (700 grams) of water.

5.1.12 Foods that are high and low in uric acid:

High uric acid	Low uric acid
Fish and meat - marine fish, shrimp, fish roe, beef, chicken or meat broth, dried fish, internal organs of animals, especially liver, kidney, brain.	rice, bread, other fruits and vegetables, dairy products, eggs, butter, oil.

Vegetables, seeds, nuts and pulses Spinach, beans, sunflower seeds, jackfruit seeds, broccoli, cauliflower, asparagus, tofu, lentils	
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5.1.13 Ways to reduce uric acid-

- Fasting for long periods of time or rapid weight loss will increase uric acid levels.
- Certain foods such as strawberries, oranges, tomatoes and nuts are not high in purines but can raise uric acid levels.
- Patients who have very high uric acid levels they must spend meat free day once a week.
- Frequent consumption of sugary soft drinks can increase uric acid levels.

5.1.14 Foods that are high in "Phosphate"

"Phosphate" 200-450ml/100g Planned based	"Phosphate" 100-150ml gm/100g Planned based
Parboiled rice, barley, Flattened and Fried Rice, wheat flour, corn, Chickpeas, Pulses, Indian Pea, Peas, Kidney bean, Coconut, Drum sticks, cauliflower.	Sago, Flour, atap rice, rice, puffed rice, Semolina, milled boiled rice, chickpea, beets, beans, sweet potatoes, gourds, rice pumpkins, bitter gourds, brinjals, sweet potatoes, raw mangoes, raw bananas, cucumbers, pumpkins.
Animal based	Animal based
Duck eggs, Powder milk, cheese, liver, Butter fish, hilsa fish, Shrimp fish, chital fish.	Milk, curd, shrimps., pangas fish, Olive barb, putty fish, shoal fish, chicken meat.

5.1.15 High sodium foods-

Most of the packaged foods are very high in salt such as packet chips, instant noodles, all kinds of bottled sauces: tomato sauce, soy sauce, pickled instant soup, cheese, salted nuts, restaurant or hotel food's mung beans, mushrooms, broccoli, corn, raisins, avocado, starch, tomatoes.
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5.1.16 Ways to reduce the amount of salt in food

- All types of salt intake should be reduced. Any other salt such as beet salt is not suitable, because all types of salt have the same effect on our body. Kidney patients should consume less than 2 grams of salt per day (less than half a teaspoon).
- Cook without salt or with less salt. Instead of salt, mild spices like red pepper, lemon juice, vinegar, garam masala & turmeric make the food tasty.
- Do not take extra salt on your plate while eating.

Some common food lists which can help to understand which foods are appropriate and which are not for dialysis patients:

High cholesterol foods	Iron rich foods	Calcium rich foods	Vitamin-D rich foods	Zinc rich foods	Copper rich foods
chicken/beef liver, beef, lamb, chicken skin, shrimp, egg yolks, butter, full-fat milk, and foods made with full-fat milk.	Chicken, fish, greens, beans, lentils, broccoli, watermelon. Foods rich in vitamin C that help iron absorption are lemons, grapefruit, oranges, tomatoes, white potatoes, capsicum, broccoli, cabbage, cauliflower.	Calcium-rich foods such as low-fat milk and milk products, green vegetables, oranges, pineapple, lychee, papaya, pumpkin, radish, sweet potato, broccoli, sunflower seeds, nuts (unsalted).	Foods containing vitamin D are limited. Eat oily fish (carp, carp, cuttlefish, trout) 2 days a week for vitamin D. every day, In the morning apply sun on the body for 15 to 20 minutes.	Chicken, greens, broccoli, garlic, lentils, pumpkin seeds, pomegranate, guava.	Unsalted nuts and seeds, dark green vegetables, potatoes, guava, pineapple, pomegranate, Mango, banana.

5.2 Additional information about nutrition management

5.2.1 How to maintain a normal and healthy weight in kidney disease

Those who are overweight:

- Maintaining a normal weight is very important for health. Excess weight can lead to diabetes, high blood pressure, and even complex diseases such as cancer and increases the risk of kidney disease.
- . If B.M.I is greater than 23, weight loss is necessary. Along with weight, waist circumference should also be measured. Waist circumference should be below 90 cm for men and below 80 cm for women
- Patients' current weight cannot be used to measure protein and calories if BMI is higher than normal. In that case, by measuring the ideal weight of the patient, he/she should consume calories and protein accordingly.

[Ideal body weight = Ideal BMI x height (meters)².]

5.2.2 Ways to lose weight for kidney patients

- Eat breakfast, lunch and dinner at the right times which are full of carbohydrates, proteins (meat), good fats (unsaturated fats), vegetables and fruits.
- Eat 5 servings of vegetables and fruits daily (those with high blood potassium levels should eat low potassium vegetables)
- Contains fat, eat less added, sugary, and salty foods like cakes, biscuits, fast food, oily food, soft drinks, sweets etc. Remove the fat and skin from the meat. You can eat low-fat milk and yogurt, but not more than 150 milliliters (1 tea cup).
- Fill your meals with vegetables instead of high carb foods (rice, bread).
- Food is best boiled, steamed, poached, or cooked with little oil.
- Physical activity and exercise are very important for weight loss. Any exercise like brisk walking, running, swimming, bicycling, playing sports etc. is good for health. Exercise for 150 minutes a week or 5 days a week for 30 minutes. Do not sit in one place for more than 1 hour and light exercise is good.

5.2.3 Those who are malnourished or who are losing weight

- Some kidney patients lose weight due to dietary changes and restrictions. If the patient is underweight (BMI < 18.5 kg/m²) or unintentional weight loss (>5-10% or 13-7 kg of weight over 3-6 months) then current weight for protein and calorie measurement. Cannot be used. In that case, calculate the patient's ideal weight (according to the equation above) and calories and protein accordingly
- (Meat) should be eaten. Kidney patients who have protein diet restrictions, mainly carbohydrates and fats rich foods should be taken for calories.

5.2.4 Extra calories be added to food-

- 1 tablespoon vegetable oil such as olive oil, sunflower oil, canola oil, soybean oil
- Oil, mustard oil (100 calories, 0 g protein/meat)
- 1 tablespoon butter or ghee (90 calories)
- 1 tablespoon or 30 grams of low-salt cottage cheese (desi cheese) (30 calories, 3 grams of protein/meat) - just once a day.
- 150 ml of milk (100 Cal, 4 gm protein/meat) (can be eaten with sago, semolina or Indian rice pudding), just once a day. However, it is not suitable if potassium levels are high.
- 1 teaspoon honey (50 calories), jam (50 calories), sugar (20 calories) [Not suitable for diabetic patients]

5.2.5 Ways to relieve constipation in kidney patients

- Generally, kidney patients suffer from constipation because they have dietary restrictions and cannot consume enough fiber and fluids. Other causes include reduced digestion and reduced walking and exercise. If patients follow the rules below, they can get rid of constipation.

- Eat fiber-rich foods regularly such as red rice, red flour (red flour bread, brown bread), oats, green vegetables, and fruits. For example, 160 grams (1/4 plate) of red rice at noon, 2 Red flour bread, oats 40 grams (without milk) in the morning.
- Eat 2 fiber-rich fruits daily such as apple 100g (medium 1), guava 50g (half seedless) or ripe papaya 100g (small pieces 12-14) (low potassium fruit)
- Eat 3 types of fiber-rich vegetables daily, at least 300 grams. For example, raw papaya fried, carrot, gourd, fried pointed gourd (vegetables with low and medium potassium can be eaten.
- Water or liquid food should be consumed as per doctor's advice.
- Medicines for constipation can be taken on doctor's advice.
- 30 minutes of regular physical activity and exercise (such as walking, running) is important.
- Sit in the correct position while using the toilet. Bring your knees up and one under the foot use (squat position) tool.

Chapter 6

Case study & diet plan

6.1 Case study-1 (dialysis)

Patient name- Azharul Islam

Age-62,

Gender-male

Address- Aqua, Mymensingh Sodor

BMI- 20.9, kidney stage-5, duration-4months,

Physical activity level-15mins

Medical condition- HTN, DM, CKD

Others' problems- high potassium.

Bio-chemistry report-

eGfr-14.4, albumin-3.2, creatinine-4.2, chloride-104, potassium-4.8, sodium-129.5, uric acid-230, HbA1c-7.8, hemoglobin-10.7

Medication- ARB, diuretics, insulin.

Nutritional estimation:

Total calorie- 1500 kcal

Protein-48-50gm (during dialysis, patients need higher protein intake because of losing protein during dialysis process so the amount of protein in the diet are increased)

Fat- 30 gm,

Carbohydrate- 190 gm

Water- 1 liters (if there is excess water in the body or if the feet are swollen, drink less than 1 liter of water per day. tea, coffee or any other liquid should be counted as water)

“Diet plan”

Meal	Time	Menu Plan	Calories
Breakfast	7-8 am	2 (Bread / white flour bread/rice powder bread) 1 whole egg (including the yolk and egg white) vegetable stir-fry -150 grams (4.5 tablespoons) Choose low potassium and low phosphate vegetables (Learn about cooking methods to lower potassium levels in vegetables)	12 gm of protein. 44 gm of carbohydrates. 330 kcal

Mid-morning	11 am	Tea (without milk) Choose an option from below: Biscuits -2pcs From the list of low-potassium fruits 1 fruit (100g) Puffed rice 1 cup (14 grams)	1 gm of protein. 15 gm of carbohydrates. 180 kcal
Lunch	2-2.30 pm	Rice (Atop Rice, Basha Rice) -160g (1/4 plate, 2 cups hand size) Vegetable Fry -150g (4.5 tbsp.) Fish or chicken -40g (boneless) Lentils – 75g (1/4 cup, 60 ml, 4-5 tablespoons) (red lentil) (Learn about cooking methods to lower potassium levels from pulses)	22 gm of protein. 70 gm of carbohydrate. 500 kcal
Mid-afternoon	5-6 pm	Tea (without milk) Choose an option from below: Biscuits -2pcs From the list of low-potassium fruits 1 fruit (100g) Puffed rice 1 cup (14 grams)	1 gm of protein. 15 gm of carbohydrates. 130 kcal
Dinner	8-9 pm	Rice (Atop Rice, Basha Rice) - 160g (1/4 plate, 2 cups hand size) vegetable stir-fry - 150 grams (4.5 tablespoons) Fish or chicken -40g (boneless)	13 gm of protein 44 gm of carbohydrates. 350 kcal

Recommendations- as potassium level is high (Learn about cooking methods to lower potassium levels from pulses and vegetables)

6.2 Case study-2 (dialysis)

Patient name- Sabina Begum

Age-65

Gender-female

Address- kathal union, Mymensingh

BMI- 23.3, kidney stage-5, duration-12 months,

physical activity level-15mins

Medical condition- HTN, CKD

Others' problems- sodium and uric acid high.

Bio-chemistry report-

eGfr-8.8 albumin-3.6, creatinine-6.3, chloride-102.6, potassium-2.96, sodium-150.3, uric acid-390, hemoglobin-10.2

Medication- ARB, diuretics, anti-gout.

Nutritional estimation:

Total calorie- 1600-1700 kcal

Protein-60-65gm {After a long period of dialysis, the patient gradually becomes malnourished. Becomes anemic at some point. In this case, the amount of protein in the diet (fish, meat, and vegetables) should be increased}

Fat- not more than 30 gm

Carbohydrate- 190 gm

Water- 1 liters (if there is excess water in the body or if the feet are swollen, drink less than 1 liter of water per day. tea, coffee or any other liquid should be counted as water)

“Diet plan”

Meal	Time	Menu Plan	Calories
Breakfast	7-8 am	2 (Bread / white flour bread/rice powder bread) 2 eggs (only egg white) vegetable stir-fry -200 grams (1/4 plate, 6 tablespoons) (Choose low potassium and low phosphate vegetables) (Learn about cooking methods to lower potassium levels in vegetables)	19 gm of protein. 50 gm of carbohydrates. 355 kcal
Mid-morning	11 am	Tea (without milk) Choose an option from below: Biscuits -2pcs From the list of low-potassium fruits 1 fruit (100g)	1 gm of protein. 15 gm of carbohydrates. 180 kcal

		Puffed rice 1 cup (14 grams)	
Lunch	2-2.30 pm	Rice (Atop Rice, Basha Rice) -160g (1/4 plate, 2 cups hand size) Vegetable Fry -200g (1/4cup,6 tbsp.) Fish or chicken -50g (boneless) Lentils – 75g (1/4 cup, 60 ml, 6 tablespoons)	24.3 gm of protein. 68 gm of carbohydrate. 570 kcal
Mid-afternoon	5-6 pm	Tea (without milk) Choose an option from below: Biscuits -2pcs From the list of low-potassium fruits 1 fruit (100g) Puffed rice 1 cup (14 grams)	1 gm of protein. 15 gm of carbohydrates. 130 kcal
Dinner	8-9 pm	Rice (Atop Rice, Basha Rice) - 160g (1/4 plate, 2 cups umbrella size) vegetable stir-fry - 200 grams (4.5 tablespoons) Fish or chicken -50g (boneless)	18 gm of protein 44 gm of carbohydrates. 445 kcal

Recommendations- as sodium and uric acid is high so you have to cut out high uric acid rich foods and processed foods.

Chapter 7

Conclusion

Basically, dialysis is a lifesaving treatment though it has many side effects. but when a patients can maintain her/his life with appropriate guidelines they can lead a good quality of life. Self-care is a most essential thing to maintain overall well-being. Most importantly, to maintain diet plan. especially there is no specific rules and regulation before and after diet plan on dialysis. But dialysis patients must need to maintain nutrition related management. That is a key of a healthy life on dialysis patients.

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