# Evaluation of the health and nutritional status of patients with renal failure undergoing hemodialysis

# تقييم الحالة الصحية والتغذوية لمرضى الفشل الكلوي الخاضعين لغسيل الكلى الدموى

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## Evaluation of the health and nutritional status of patients with renal failure undergoing hemodialysis

**Abstract:**

Hemodialysis, is a medical procedure that effectively removes waste products and excess fluid from the blood when the kidneys are unable to perform this function adequately. In addition to its life-sustaining benefits, hemodialysis also presents various challenges and potential complications that patients must navigate. While the procedure is essential for removing toxins from the bloodstream, it can lead to issues such as hypotension, muscle cramps, and even allergic reactions, which occur in a small percentage of patients . Moreover, advancements in dialysis technology have aimed to reduce these adverse The study aimed to evaluate the nutritional status of hemodialysis patients attending Kafr El-Zayat General Hospital and undergoing dialysis. Their ages range between (30-55) males and females, with a meal rich in bananas or oranges provided by the Ministry of Health, and the levels of creatineine, phosphorus, calcium, sodium, liver enzymes, bilirubin, and physical parameters were estist results were obtained by patients when eating a meal rich in bananas or oranges. .after laboratory results. The following was concluded: It is necessary to limit potassium intake so that it does not lead to weak heart and blood vessel functions and cause kidney damage. Hyperkalemia. It is one of the common life-threatening complications in hemodialysis patients and increases the risk of malignant arrhythmia and sudden death. Fruits and vegetables rich in potassium must be limited. Experimental studies have shown that restricting dietary phosphate prevents the development of kidney weakness, and patients on dialysis must continue to take various types of phosphorus binders to maintain normal phosphorus levels in the blood.



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**Keywords**:creatinine, bilirubin, Phosphorus, Potassium, hemodialysis.

**المستخلص:**

غسيل الكلى هو إجراء طبي يزيل النفايات والسوائل الزائدة من الدم بشكل فعال عندما تكون الكلى غير قادرة على أداء هذه الوظيفة بشكل مناسب. بالإضافة إلى فوائده التي تحافظ على الحياة، فإن غسيل الكلى يمثل أيضًا تحديات مختلفة ومضاعفات محتملة يجب على المرضى التغلب عليها. في حين أن هذا الإجراء ضروري لإزالة السموم من مجرى الدم، فإنه يمكن أن يؤدي إلى مشاكل مثل انخفاض ضغط الدم، وتشنجات العضلات، وحتى الحساسية، والتي تحدث في نسبة صغيرة من المرضى. وعلاوة على ذلك، فإن التقدم في تكنولوجيا غسيل الكلى يهدف إلى الحد من هذه الآثار السلبية. وتهدف الدراسة إلى تقييم الحالة التغذوية لمرضى غسيل الكلى المترددين على مستشفى كفر الزيات العام ويخضعون لغسيل الكلى. تتراوح أعمارهم بين (٣٠-٥٥) ذكور وإناث، مع وجبة غنية بالموز أو البرتقال مقدمة من وزارة الصحة، وتم الحصول على نتائج تحليلية لمستويات الكرياتينين والفوسفور والكالسيوم والصوديوم وأنزيمات الكبد والبيليروبين والقياسات الجسميه عند تناول المرضى وجبة غنية بالموز أو البرتقال. .بعد النتائج المخبرية. واستنتج ما يلي: ضرورة الإقلال من تناول البوتاسيوم حتى لا يؤدي إلى ضعف وظائف القلب والأوعية الدموية ويتسبب في تلف الكلى. فرط بوتاسيوم الدم وهو أحد المضاعفات الشائعة التي تهدد الحياة لدى مرضى غسيل الكلى ويزيد من خطر عدم انتظام ضربات القلب الخبيث والموت المفاجئ. يجب أن تكون الفواكه والخضروات الغنية بالبوتاسيوم محدودة وقد أظهرت الدراسات التجريبية أن تقييد الفوسفات الغذائي يمنع تطور ضعف الكلى، ويجب على المرضى الذين يخضعون لغسيل الكلى الاستمرار في تناول أنواع مختلفة من رابطات الفوسفور للحفاظ على مستويات الفوسفور الطبيعية في الدم.

**الكلمات المفتاحية**: الكرياتينين، البيلروبين ، الفوسفور، البوتاسيوم، غسيل الكلى

## Introduction

The kidney (plural kidneys) (Latin: Ren) is an organ found in vertebrates that is similar in shape to a bean seed, reddish-brown in color, and is about 12 cm long. The kidney is the organ responsible for purifying and filtering the blood from toxins and metabolic products. The kidney receives blood



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through the renal arteries and exits through the renal veins. A kidney patient needs to undergo dialysis when the kidneys are unable to perform the purification process, and toxins begin to accumulate in the body. The most important of these toxins are urea and creatine in the blood, which are measured in the laboratory. Doctors also measure the extent of blood purification from creatine by examining the urine. One of the reasons that cause a problem in the functioning of the kidneys is kidney failure, which may be either acute or chronic. When toxins exceed a certain limit or when the purification rate falls below a certain limit, the body needs dialysis. This happens when the kidneys function less than 10-15% of the normal level. It is worth noting that dialysis does not perform all the functions of the kidneys, but only removes toxins.

The issue of quality of life has become the focus of many researches and studies in recent years, especially in the field of health care, when the results of traditional medical treatment related to mortality and morbidity were criticized in terms of their focus on a narrow and limited field. These indicators failed to identify a wide range of possible medical outcomes. For example, in the treatment of kidney patients, it appeared that the effects of the treatment itself can cause serious harm to the patient. Therefore, attention must be paid to nutrition and the meals provided most importantly within 24 hours. The individual can choose to live for a short period of time with a good quality of life instead of living for a longer period of time with a low quality of life.

Therefore, studies began to focus on identifying and predicting the quality of life and identifying the importance of meals provided during hemodialysis and the factors affecting it, especially in the field of diseases, including kidney diseases. This research dealt with multiple variables such as anxiety and


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depression, as a study by (1), and socio- economic status, ethnic group, and gender, as a study by (2) the educational level, as a study by (3)and age and history of infection, as a study by (4) and a study by (5). The results of these studies varied regarding the impact of gender, social status, education, history of infection, number of dialysis sessions, and age. While some studies indicated that there is a statistically significant effect of these variables on quality of life, other studies indicated that there are no differences between patients according to these variables. Based on the above, the idea of the current research and its problem was It is formulated as follows: What is the nature of the quality of life of kidney failure patients
age, education, and date of onset of dialysis) .

## 2. SUBJECTS AND METHODS

### 2.1. SUBJECTS

#### 2.1.1. Sample size

The study was conducted on one hundred patients age from 30 years and 55 years.

#### 2.1.2 Setting of study

This study was conducted on patients who undergo hemodialysis and attend Kafr El-Zayat General Hospital three times a week.

#### 2.1.3 Duration of study

The present of study started in January 2024 and ended in April 2024.

#### 2.1.4 Inclusion criteria

**The following inclusion criteria were used:**

Kidney disease is mainly for patients who suffer from kidney failure and are on hemodialysis and have many chronic diseases that are closely related to kidney failure, such as diabetes, high blood pressure, heart disease, and anemia. Most of them live in the countryside of Gharbia Governorate and in urban areas.


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2.1.5 Exclusion criteria

Patients who undergo hemodialysis for emergency purposes only, patients in the final stage and whose condition is unstable and dialysis patients infected with Hepatitis C.

2.2 METHODS

2.2.1 Experimental design

Interviews were conducted several times a week with the patient during hemodialysis sessions in the dialysis department. Data were collected from patients using a questionnaire about the following:

2.2.1.1 Socio-demorgraphic:

Marital status, job, level of education and residence.

Anthropometric assessment:

Including body weight before and after the session, dry weight, height in centimeters, thickness of the skin layer using the Caliber device, arm muscle circumference, and body mass index (BMI) according to the formula weight in (kg)/height in metre2 (kg/m2).

2.2.1.3 Dietary assessment:

The 24-hour recall method was used to recall the amounts of foods and beverages in household measures consumed in the past 24 hour's household measures.

2.2.1.4 Biochemical analysis:

Serum samples were analyzed to determine the following: creatinine and urea before and after the washing session, and analysis of, calcium, phosphorus, and potassium. , liver enzymes

2.2.2 Statistical analysis

The statistical package eor social sciences (SPSS version 17.0) 28 was used to analyze collected data Results were expressed as the arithmetic mean and standard deviation (SD). Also, the frequency distribution and percentage were used for string variables.


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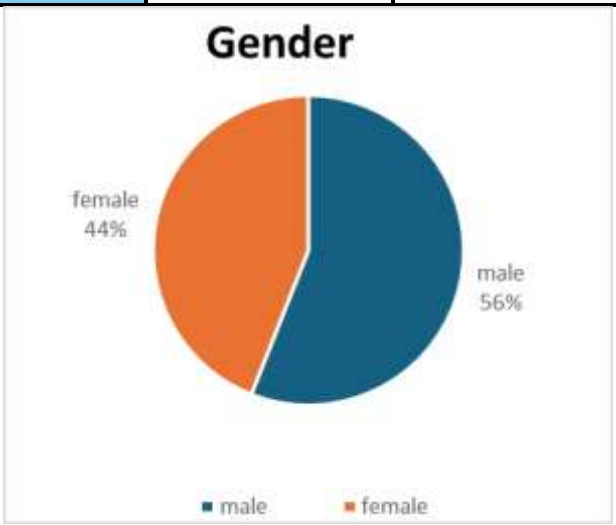
## 3. Results and Discussion

Provided table (1) shows the distribution of gender among 100 individuals. The results indicate that 56% of the participants are male, while 44% are female..Here are some potential discussion points based on these findings:Gender balance: The sample appears to be slightly skewed towards males, with a 56% to 44% ratio. This could be due to various factors such as the specific population studied or sampling methods used.

**Table (1): Estimation of study samples of patients with renal failure according to sex**

| Gender | N | Percent |
|---|---|---|
| **Male** | **56** | **56.0** |
| **Female** | **44** | **44.0** |




**(n=100)**

**Figure (1): Number and percent of demographic characteristics based on Gender**



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The provided table (2) shows the number and percentage of participants
in a study based on their body mass index (BMI) categories.
here are some key observations from the table:
Normal weight: 24 participants (24%) fall into the normal weight range
(18.5-24.9 BMI). This is the largest group, suggesting that a significant
portion of the study population has a healthy weight.
Overweight: 36 participants (36%) are classified as overweight (25-29.9
BMI). This is the second largest group, indicating that a considerable
number of participants are above a healthy weight range.Obese: 32
participants (32%) are classified as obese (30-39.9 BMI). This group is
also substantial, highlighting the prevalence of obesity among the study
population.
Severely obese: 8 participants (8%) fall into the severely obese category
(BMI $\geq$ 40). While this is the smallest group, it still represents a
concerning proportion of the participants.
The table reveals that a significant number of participants in the study are overweight or obese; indicating a need for interventions to address weight . Research confirms that obesity is responsible for about 20% - 25% of kidney diseases worldwide.states like type 2 diabetes (the most common global cause of CKD) and hypertension (the second most common cause in the United States). diabetes and hypertension alone explain most obesity-associated kidney risk. . (6). the presence of


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obesity increases the lifetime risk of CKD by 25% compared with individuals with normal weight (7).

Chronic kidney disease patients suffer from body composition disorders resulting from excess body fat

(leading to obesity) accompanied by muscle wasting. Both these factors not only influence the patients' problems in everyday existence, but also significantly lower their prognosis. This is largely due to metabolic changes occurring during the course of the disease, to the imbalance in the metabolic balance of insulin-dependent tissues. This means that in the muscles of CKD patients there is an increase in catabolic processes (regulated by glucagon, catecholamines or pro-inflammatory cytokines), accompanied by an increase in adipose tissue (8) and (9) and (10).

**Table (2) Body mass index estimation for patients with renal failure**

| Number | Percent | Body max index |
|---|---|---|
| **24** | **24** | **18.5 :23.9** |
| **36** | **36** | **24 :29.9** |
| **32** | **32** | **30 : 34.9** |
| **8** | **8** | **> 40** |

size (n=100).

Table (٣) presents a summary of the mean and standard deviation for various demographic characteristics, providing insights into the variabilitand central tendencies of the data.Key Findings Weight:

Mean: The average weight before the session was 88.7kg, while after the session it decreased to 85 kg.

Standard Deviation: The weight before the session exhibited a higher standard deviation (26.5) compared to after the session



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(27) indicating a slightly wider range of weight values before the session.

Height: Mean: The average height was 163cm.

Standard Deviation: The height had a relatively lower standard deviation (9.5) suggesting a more consistent distribution of heights among the participants.

Skin Thickness: Mean: The average skin thickness was 9.6 cm.

**Standard Deviation:** The skin thickness had a moderate standard deviation (3) indicating some variability in skin thickness measurements.

**Arm Circumference: Mean:** The average arm circumference was 33 cm. Standard Deviation: The arm circumference had a standard deviation of 3.3 suggesting a moderate level of variation in arm circumferences.Arm Muscle Circumference:

**Mean**: The average arm muscle circumference was 299cm.

**Standard Deviation**: The arm muscle circumference had the highest standard deviation (30.2), indicating a wide range of values and potentially a larger degree of variation in muscle development among participants.Body Mass: Mean: The average body mass was 33.7 kg.

**Standard Deviation:** The body mass had a standard deviation of 9.2, suggesting a moderate level of variation in body mass among participants.

The results provide a baseline understanding of the demographic characteristics of the study population. The variations observed in the standard deviations highlight the differences in the distribution .


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**Table (3): Estimation of means and standard deviation of anthropometric measurements after sessions for hemodialysis patients**

| Variable | N | Mean±SD |
|---|---|---|
| **Weight After Session** | **100** | **85±27** |
| **Height** | **100** | **163±9.5** |
| **Skin Thickness** | **100** | **9.6±3** |
| **Arm Circumference** | **100** | **33±3.3** |
| **Arm Muscle Circumference** | **100** | **299.1±30.2** |
| **Body Mass** | **100** | **33.8±9.2** |

It is noted from the table (4) and the graph that the objectives of the research are to try to identify the nature of diseases among patients with kidney failure who are undergoing dialysis in light of some demographic variables (such as gender, age, educational level, marital status, and date of start of dialysis). The sample consisted of 100 patients. According to the table, 53% of patients suffered from high blood pressure, 10% from diabetes, and 20% from heart disease. The results were not recorded for their liver disease and gout, while the rate of anemia was 17%. All of this leads to a decrease in kidney function by 15%. (11) agreed with us.

Cardiovascular disorders are a group of heart disease disorders and blood vessels, including hypertension, coronary heart disease, cerebrovascular disease, peripheral vascular disease, heart failure, rheumatic heart disease, congenital heart disease, and cardiomyopathy (World Health Organisation). including congestive heart failure, coronary heart disease, fatal stroke,


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cardiac arrhythmia, sudden cardiac arrest, cerebrovascular disease, and peripheral vascular disease (12).

Anemia is a common complication in chronic kidney disease (CKD), and is associated with a reduced quality of life, and an increased morbidity and mortality. The mechanisms involved in anemia associated to CKD are diverse and complex. They include a decrease in endogenous erythropoietin (EPO) production, absolute and/or functional iron deficiency, and inflammation with increased hepcidin levels, among others. Patients are most commonly managed with oral or intravenous iron supplements and with erythropoiesis stimulating agents (ESA). However, these treatments have associated risks, and sometimes are insufficiently effective. Nonetheless, in the last years, there have been some remarkable advances in the treatment of CKD-related anemia, (13).Prevalence of Dental Issues:

High Rate of Incomplete Dental Conditions: The overwhelming majority (96%) of individuals in the sample have incomplete dental conditions. This suggests a significant dental health problem within the studied population.

Low Rate of Complete Dental Conditions: Only 4% of participants reported complete dental health. This indicates a need for improved oral health practices and access to dental care

**Table (4) Assessment of the health status of patients with renal failure for the study sample**

| Diseases | N | Percent |
|---|---|---|
| Hypertension | 53 | 53 |
| Diabetes | 10 | 10 |
| Heart | 20 | 20 |


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| | | |
|---|---|---|
| **Liver** | **0** | **0** |
| **Gout** | **0** | **0** |
| **Anemia** | **17** | **17** |
| **Dental condition Complete** | **4** | **4** |
| **Incomplete** | **96** | **96** |

Based on table (5), the following are some of the prominent findings: Swelling in Feet and Hands: A relatively low percentage of participants (8%) reported swelling in their feet and hands

**Weak Immunity:** A significant portion (28%) of the sample reported weak immunity. Do not suffer from Weak Immunity :(77%)

**Obesity:** Obesity was prevalent, with 16% of participants identifying as obese. Do not suffer obesity 84%

**Diet and Appetite:** A majority (80%) of participants had not followed a diet. Appetite loss was a common symptom, affecting 52% of the sample.

**Other Symptoms:** Excessive sweating, dizziness, tremors, and dialysis-related complaints were also reported by a significant number of participants. **The data suggests that a range of health issues are prevalent among the study population. The high incidence of weak immunity and obesity, in particular, aligns with known risk factors for various diseases. The symptoms of appetite loss, excessive sweating, and dizziness may indicate underlying health conditions, such as metabolic disorders or hormonal imbalances.**

**Other Symptoms:** Excessive sweating, dizziness, tremors, and dialysis-related complaints were common **Urinary Issues**: Blood in the urine and foam in the urine were reported by 12% each.


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**Respiratory and Skin Issues:** Shortness of breath and severe itching were experienced by 52% and 64%, respectively. **Anemia:** Anemia affected 36% of the sample. **Respiratory and Skin Issues:** Shortness of breath and severe itching were experienced by 52% and 64% of participants, respectively. **Anemia:** Anemia was prevalent, affecting 36% of the sample. **Diarrhea:** 16% of respondents reported suffering from diarrhea. **Bladder Infections:** 40% of respondents reported experiencing bladder infections. Prevalence of Diarrhea: The prevalence of diarrhea is relatively low at 16%. This could indicate that factors like sanitation, access to clean water, and proper hygiene practices are relatively good in the surveyed area. However, it's essential to consider other factors that might influence diarrhea rates, such as dietary habits, medication use, and underlying health conditions Prevalence of Bladder Infections: Bladder infections are more prevalent, with 64% of respondents reporting them.

Patients with chronic kidney disease (CKD) frequently experience unpleasant symptoms. These can be gastrointestinal (constipation, nausea, vomiting and diarrhoea), psychological (anxiety and sadness), neurological (lightheadedness, headache and numbness), cardiopulmonary (shortness of breath and oedema), dermatological (pruritus and dry skin), painful (muscle cramps, chest pain and abdominal pain) or involve sexual dysfunction, sleep disorders and fatigue. These symptoms often occur in clusters, with one of them as the lead symptom and others as secondary symptoms. Uraemic toxins (also called uremic toxins) are often considered to be the main cause of CKD (14).

Worldwide. CKD may lead to structural and functional gastrointestinal alterations, including impairment in the intestinal barrier, digestion and absorption Chronic kidney disease (CKD)


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affects 9.1% of the population of nutrients, motility, and changes to the gut microbiome. These changes can lead to increased gastrointestinal symptoms in people with CKD (15).

CLINICAL CONSEQUENCES

Anemia is linked to several symptoms, including headache, insomnia, fatigue, and dyspnea, that lower quality of life. It has to do with diminished cognitive ability as well. These symptoms are generic, though, and maybe a result of uremia in CKD patients. Many patients may not disclose problems independently because symptoms take time to manifest (16).

In addition, anemia is associated with left ventricular hypertrophy (LVH), an increased number of hospitalizations, a possible progression of CKD, and death (17) and (18).

The increase in mortality occurs mainly when Hb≤ 8 g/dL-associated symptom burden, but treatment of uraemia by dialysis often fails to resolve them and can engender additional symptoms. Indeed, symptoms can be exacerbated by comorbid conditions, pharmacotherapies, lifestyle and dietary regimens, kidney replacement therapy and ageing. Patients with kidney disease, (20).

The symptoms of stage 4/5 chronic kidney disease (CKD) include discomfort, anorexia, nausea, pruritus, exhaustion, excessive daytime sleepiness, and difficulties concentrating. (21).

This uremic symptom burden is known to increase with age (22). In the EQUAL study, including elderly patients with advanced (stage 4/5) CKD, more than half of the patients reported fatigue, dry skin, bone or joint pain, loss of strength, muscle cramps, dry mouth, itching and decreased interest in sex

**Table (٥): Relative Distribution of Research Sample Responses Regarding Their symptoms**

| Symptoms | answer | N | Percent |
|---|---|---|---|



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| | | | |
|---|---|---|---|
| Is There Swelling in the Feet and Hands | yes | 8 | 8.0 |
| | no | 92 | 92.0 |
| Total | | 100 | 100 |
| Weak Immunity | yes | 23 | 28.0 |
| | no | 77 | 77.0 |
| Total | | 100 | 100 |
| Is There Obesity | yes | 16 | 16.0 |
| | no | 84 | 84.0 |
| Total | | 100 | 100 |
| Have You Followed a Diet | yes | 20 | 20.0 |
| | no | 80 | 80.0 |
| Total | | 100 | 100 |
| Do You Suffer from Appetite Loss | yes | 52 | 52.0 |
| | | | |
| | no | 48 | 48.0 |
| Total | | 100 | 100 |
| Do You Suffer From Excessive Sweating | yes | 48 | 48.0 |
| | no | 52 | 52.0 |
| Total | | 100 | 100 |
| Do You Suffer From Dizziness | yes | 56 | 56.0 |


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| | | | |
|---|---|---|---|
| | **no** | **44** | **40.0** |
| **Total** | | **100** | **100** |
| **Do You Suffer From Tremors** | **yes** | **52** | **52.0** |
| | **no** | **48** | **44.0** |
| **Total** | | **100** | **100** |
| **Do You Have Complaints After Dialysis** | **yes** | **44** | **44.0** |
| | **no** | **56** | **56.0** |
| **Total** | | **100** | **100** |
| **Do You Have Difficulty Emptying the Bladder** | **yes** | **40** | **40.0** |
| | **no** | **60** | **60.0** |
| **Total** | | **100** | **100** |
| **Is There Blood in the Urine** | **yes** | **12** | **12.0** |
| | **no** | **88** | **88.0** |
| **Total** | | **100** | **100** |
| **Is There Foam in the Urine** | **yes** | **12** | **12.0** |
| | **no** | **88** | **88.0** |
| **Total** | | **100** | **100** |
| **Do You Suffer From Shortness of Breath** | **yes** | **50** | **52.0** |
| | **no** | **50** | **52.0** |
| **Total** | | **100** | **100** |


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| | | | |
|---|---|---|---|
| **Do You Suffer From Severe Itching** | **yes** | **60** | **60.0** |
| | **no** | **40** | **40.0** |
| **Total** | | **100** | **100** |
| **Do You Suffer From Anemia** | **yes** | **64** | **64.0** |
| | **no** | **36** | **36.0** |
| **Total** | | **100** | **100** |
| **Do You Suffer From Diarrhea** | **yes** | **16** | **16.0** |
| | **no** | **84** | **84.0** |
| **Total** | | **100** | **100** |
| **Bladder Infections** | **yes** | **64** | **8.0** |
| | **no** | **36** | **40.0** |
| **Total** | | **100** | **100** |

In table (6): The provided table outlines the results of an independent samples-test comparing the levels of potassium and creatinine between individuals who do and do not eat bananas.Key findings: Potassium: There was a statistically significant difference in potassium levels between the two groups (p-value = 0.000). Individuals who did eat bananas had significantly higher potassium levels compared to those who did not.

Creatinine: There was a statistically significant difference in creatinine levels between the two groups (p-value = 0.000). Individuals who did eat bananas had significantly lower creatinine levels compared to those who did not.The results suggest that consuming bananas may have a positive effect on


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both potassium and creatinine levels. Individuals who regularly eat bananas appear to have higher potassium levels and lower creatinine levels compared to those who do not.

Creatinine: A significant difference was found in creatinine levels between banana consumers and non-consumers. Banana consumers had higher creatinine levels (10) compared to non-consumers (9.4).

Calcium: No significant difference was observed in calcium levels between the two groups. Phosphorus: A slight difference was found in phosphorus levels, but it was not statistically significant.

Bilirubin: No significant difference was found in bilirubin levels.GOT (Glutamic Oxaloacetic Transaminase): No significant difference was found in GOT levels. GPT (Glutamic Pyruvic Transaminase): No significant difference was found in GPT levels. banana consumption is associated with significantly higher creatinine levels.Banana consumers: 4.8 Non-consumers: 4.8 Standard Deviation: Banana consumers: 6667

Non-consumers: 8161 Based on the provided data, there was a slight difference in potassium levels between banana consumers and non-consumers difference in potassium levels between subjects who consume bananas and those who do not.

Dietary Potassium Intake: The overall potassium intake from other sources in the participants' diets could have influenced the results.

Individual Variations: Individual variations in potassium absorption and excretion can also contribute to differences in potassium levels.

The prevalence of chronic kidney disease (CKD) is increasing and dietary interventions may be a strategy to reduce this burden. In the general population, higher potassium intake is considered protective for cardiovascular health. Due to the risk



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of hyperkalemia in CKD, limiting potassium intake is often recommended. However, given that poor cardiovascular function can cause kidney damage, following a low-potassium diet may be deleterious for patients with CKD (23).

For healthy patients, it is preferable to increase potassium intake, as this leads to a reduction in the incidence of heart and blood vessel diseases. and cerebrovascular diseases. However, since hyperkalemia is a common and life-threatening complication in maintenance hemodialysis patients, which can increase the risk of malignant arrhythmia and sudden death, the current mainstream of management for hemodialysis patients is dietary potassium restriction in order to prevent hyperkalemia. Hemodialysis patients are usually advised to reduce dietary potassium intake and limit potassium-rich fruits and vegetables, (24).

Hyperkalaemia occurs frequently in people with type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD), increasing in incidence as kidney function declines, and is associated with discontinuation of renin–angiotensin–aldosterone (RAAS) inhibitors due to its potential to cause life-threatening arrhythmias that are clinically relevant to both physicians and patients (25,26,27).

In individuals with CKD, the association between serum potassium and adverse outcomes is U-shaped such that both high and low levels are associated with increased risk of hospitalization and death Clase (28, 29)

**Table(6) Estimation of Laboratory tests for patients with renal failure when eating a meal containing bananas after dialysis**


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| Do You Eat Bananas | | Renal failure patients | Mean and ±Std | Mean Difference | T.test | P-value |
|---|---|---|---|---|---|---|
| Creatinine mg/dl | EatBanana | 52 | 10.3±.8 | .6 | 4.2 | .0 H. S |
| | Do not eat Banana | 48 | 9.5±.5 | | | |
| Calcium(mg/Dl | yes | 52 | 8.6±.6 | .2 | 1.7 | .1 N. S |
| | no | 48 | 8.4±.5 | | | |
| Phosphorus (mg/dL) | yes | 52 | 4.7±.7 | -.1 | -.2 | .8 N. S |
| | no | 48 | 4.7±.8 | | | |
| Bilirubin Mg/dl | yes | 52 | .8±.1 | .0 | .2 | .8 N. S |
| | no | 48 | .8±.1 | | | |
| Na(mmol/L) | yes | 52 | 129.2± 25.2 | -9 | -2.5 | .0 H. S |
| | no | 48 | 138.1± 5. 5 | | | |
| K(mmol/L) | yes | 52 | 3.9±.3 | -3122 | -4.4 | .000 H. S |
| | no | 48 | 3.6±.4 | | | |
| GOT(u/l) | yes | 52 | 23.9±7.4 | .3 | .1 | .9 N. S |


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| | | | | | | |
|---|---|---|---|---|---|---|
| | **no** | **48** | **23.7±13.4** | | | |
| **GPT(u/l)** | **yes** | **52** | **17.5±5.6** | **-2.4** | **-.9** | **.3 N. S** |
| | **no** | **48** | **19.9±16.6** | | | |

Na: Sodium; k: Potassium; GOT: Glutamic pyruvic Transminase; GPT: Glutamic Oxaloacetic Transaminas.
T: independent sample Ttest.
Significant. NS: P-value > 0.05 is considered non-
Significant. HS: P-value < 0.05 is considered highly

The provided table outlines the results of an independent samples -test comparing the levels of phosphorus and creatinine between individuals who do and do not eat oranges. Phosphorus: There was a statistically significant difference in phosphorus levels between the two groups (p-value = 0.0). Individuals who did not eat oranges had significantly higher phosphorus levels compared to those who did. Creatinine:

There was no statistically significant difference in creatinine levels between the two groups (p-value = 0.5).

The results suggest that consuming oranges may have a positive effect on phosphorus levels. Individuals who regularly eat oranges appear to have lower phosphorus levels compared to those who do not. However, the consumption of oranges does not seem to significantly influence creatinine levels. In the current review, we address the role of serum phosphorus on the progression of renal dysfunction and cardiovascular outcomes in patients with chronic kidney disease, as well as its involvement in significant health risks in the general population. Experimental studies have demonstrated that restricting dietary


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phosphate prevents the progression of kidney dysfunction, while high dietary phosphate aggravates renal function.(30).

Chronic kidney disease (CKD) causes dysregulation of bone and mineral metabolism, and rising parathyroid hormone levels are an adaptive response to keep calcium and phosphorus levels within normal ranges. This reaction turns maladaptive in end-stage renal failure, and elevated phosphorus levels may result. Based on a comprehensive assessment of clinical trial literature and empirical observational data on phosphorus control in hemodialysis patients with CKD-mineral bone disease (CKD-MBD), we provide an overview of methods for managing hyperphosphatemia. These studies demonstrate that existing therapy strategies (diet and lifestyle changes; frequent dialysis treatment; and usage of phosphate binders, vitamin D, calcimimetics) have their own benefits and limitations with diverse clinical outcomes. In order to improve patient management, a more comprehensive approach to phosphorus control in dialysis patients may be required. This approach could involve measuring several biomarkers of CKD-MBD pathophysiology, such as calcium, phosphorus, and parathyroid hormone, as well as establishing a link between CKD-MBD medication and dietary changes. (31).

The quantity of phosphate eliminated from patients on a standard three-times-a-week, four-hour hemodialysis schedule is around 2.3–2.6 g, which is only half of the estimated food intake, if restricted to 800 mg/day [32]. Therefore, phosphate-lowering medications must be administered to dialysis patients in order to manage their serum phosphate content and reach the objective of neutral phosphate balance.

**Table (7):Estimation of laboratory tests for patients with renal failure when eating a meal containing oranges after dialysis**



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| Variables | | Renal failure patients | Mean±SD | Mean Difference | T.test | P-value |
|---|---|---|---|---|---|---|
| Creatinine mg/dl | Eat Orange | 76 | 9.8±.8 | .0904 | .643 | .522 N. S |
| | Do not eat Orange | 24 | 9.7±.5 | | | |
| Calcium (mg/Dl | Yes | 76 | 8.5±.5 | -.1105 | -.811 | .423 N. S |
| | No | 24 | 8.6±.6 | | | |
| Phosphorus(mg/dL) | Yes | 76 | 4.6±.6 | -.6167 | -3.236 | .003 H. S |
| | No | 24 | 5.2±.9 | | | |
| Bilirubin Mg/dl | Yes | 76 | .8±.1 | .0035 | .090 | .929 N. S |
| | No | 24 | .8±.1 | | | |
| Na(mmol/L) | Yes | 76 | 132±21 | -5.895 | -2.093 | .039 H. S |
| | No | 24 | 138±6.9 | | | |
| K(mmol/L) | Yes | 76 | 3.8±.4 | .0825 | .975 | .335 N. S |
| | No | 24 | 3.7±.4 | | | |
| GOT(u/l) | Yes | 76 | 23.6±6.7 | -.921 | -.239 | .813 N. S |
| | No | 24 | 24±18.5 | | | |
| GPT(u/l) | Yes | 76 | 17.4±5 | -5.465 | -1.152 | .261 N. S |
| | No | 24 | 22.8±23 | | | |


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Na: Sodium; k: Potassium; GOT: Glutamic pyruvic Transminase; GPT: Glutamic Oxaloacetic Transaminas.
T: independent sample Ttest.
Significant. NS: P-value > 0.05 is considered non-
Significant. HS: P-value < 0.05 is considered highly
Before vs. After: There was a significant decrease in creatinine levels both in January and April following the intervention.
January vs. April: The magnitude of decrease in creatinine levels was comparable between January and April.Session Efficiency Rate Before vs. After: There was a significant increase in session efficiency rate both in January and April. January vs. April: The session efficiency rate was slightly higher in April compared to January.Overall FindingsThe results suggest that the intervention was effective in reducing creatinine levels and improving session efficiency rate. The improvements observed were consistent across both January and April.

Additional factors: Considering other factors that might influence creatinine levels and session efficiency rate, such as patient characteristics or treatment regimenCreatinine Levels:
Before vs. After: There appears to be a general trend of decreasing creatinine levels after the intervention (likely the "session"). This decrease is statistically significant (p-value < 0.000) for both January and April. January vs. April: The magnitude of the decrease in creatinine levels seems to be comparable between January and April.

Net urea clearance is the standard measure of dialysis adequacy. The most extensively researched indicator of dialysis adequacy worldwide is still a single pool (sp) Kt/Vurea. Different metrics are tracked, including mineral metabolism, anemia correction, and hydration status management. Studies demonstrating improved patient survival with intermediate molecule clearance have led to an increase in the use of


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hemodiafiltration throughout Europe, as well as in several regions of Japan and Australia. The quality of dialysis services is determined by a nation's public health policy and income level in addition to local clinicalpractice standards (33). An essential component of dialysis administration is fluid status. Maintaining adequate fluid status is aided by both urine production and the fluid eliminated during dialysis. Routine treatment should include routine evaluation of fluid status, including clinical examination and blood pressure.

Regular review of the patient's appetite, clinical examination, body weight, and blood tests (albumin, potassium, bicarbonate, and phosphate) should all be used to determine their nutritional condition. It could also be necessary to evaluate and modify dietary intake of potassium, phosphate, salt, protein, carbohydrate, and fat. elimination of poisons. A formula known as Kt/Vurea and/or creatinine clearance can be used to assess this. Both indicate how much dialysis was administered. Regarding the need or advantage of reaching a particular goal value for these metrics, there is no high-quality data (34).

**Table (8):Statistical analysis of laboratory test results and session efficiency for hemodialysis patients**

| | N | Mean ±Std | Mean Difference | T.test | P-value |
|---|---|---|---|---|---|
| **Creatinine Before** | **100** | **9.8±.8** | **-58.4** | **-223.7** | **0.000 H. S** |
| **Session Efficiency Rate January** | **100** | **68.2 %±2.3%** | | | |
| **Creatinine** | **100** | **9.8±.8** | **-59.6** | **-214.8** | **0.000** |


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| | | | | | |
|---|---|---|---|---|---|
| **Before** | | | | | **H. S** |
| **Session Efficiency April** | **100** | **69.4 %±2.7%** | | | |
| **Creatinine After** | **100** | **9.4±.8** | **-58.8** | **- 247.4** | **0.000 H. S** |
| **Session Efficiency Rate January** | **100** | **68.2%±2.3%** | | | |
| **Creatinine After** | **100** | **9.4±.8** | **-60** | **-192** | **0.000 H. S** |
| **Session Efficiency April** | **100** | **69.4 %±2.7%** | | | |

**Significant. NS:p-value> 0.05 is considered non –Significant. HS:p-value<0.05 is considered highly**

## 4. CONCLUSION

From our study we concluded that the participating patients suffer from risk factors that cause chronic kidney disease, such as high blood pressure, obesity, diabetes, heart disease, and with low kidney efficiency and the occurrence of dialysis three times a week, and they were given a meal containing potassium alternating with a meal containing phosphorus, after laboratory results. The following was concluded: It is necessary to limit potassium intake so that it does not lead to weak heart and blood vessel functions and cause kidney damage. Hyperkalemia


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It is one of the common life-threatening complications in hemodialysis patients and increases and sudden death. Fruits and vegetables rich in potassium must be limited.

Experimental studies have shown that restricting dietary phosphate prevents the development of kidney weakness, and patients on dialysis must continue to take various types of phosphorus binders to maintain normal phosphorus levels in the blood, as phosphorus is found with foods that contain proteins, such as meat and dairy products. Therefore, medications that reduce phosphorus levels must be used, such as Calcium carbonate


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**References**

**Al-Nashri, F., & Almutary, H.** Impact of anxiety and depressiononthe quality of life of haemodialysis patients. *Journal of clinical nursing* ٢٠٢٢; 31(1-2), 220-230.

**Bharati, J., & Jha, V** Achieving dialysis adequacy: *a global perspective. In Seminars in Dialysis* **2020; November** (Vol. 33, No. 6, pp. 490-498).

**Biruete, A., Shin, A., Kistler, B. M., & Moe, S. M.** Feeling gutted in chronic kidney disease (CKD): *Gastrointestinal disorders and therapies to improve gastrointestinal health in individuals CKD, including those undergoing dialysis. In Seminars in dialysis* **2024, July ;** (Vol. 37, No. 4, pp. 334-349).

**Brown, E. A., Blake, P. G., Boudville, N., Davies, S., de Arteaga, J., Dong, J., ... & Warady, B.** International Society for Peritoneal Dialysis practice recommendations: Prescribing high-quality goal-directed peritoneal dialysis. *Peritoneal Dialysis International*, 2020;

40(3), 244-253.

**Clase, C. M., Carrero, J. J., Ellison, D. H., Grams, M. E., Hemmelgarn, B. R., Jardine, M. J., ... & Wingo, C. S.** Potassium homeostasis and management of dyskalemia in kidney diseases: conclusions from a Kidney Disease: *Improving Global Outcomes (KDIGO)* . **2020 ;** 97(1), 42-61.

**Delgado, C., Shieh, S., Grimes, B., Chertow, G. M., Dalrymple, L. S., Kaysen, G. A., ... & Johansen, K. L.**



**ISSN: 2537-0804** **eISSN: 2537- 0855**

Association of self-reported frailty with falls and fractures among patients new to dialysis. *American journal of nephrology*, **2015 ;** 42(2), 134-140.

**Eliasen, M., Jørgensen, T., Schröder, A., Dantoft, T. M., Fink, P., Poulsen, C. H., ... & Kreiner, S.** Somatic symptom profiles in the general population: *a latent class analysis in a Danish population-based health survey. Clinical epidemiology*, **2017 ;** 421-433.

**Hazin, M. A. A.** *Anemia in chronic kidney disease. Revista da Associação Médica Brasileira*, **2020 ;** 66(Suppl 1), s55-s58.

Hu, L., Napoletano, A., Provenzano, M., Garofalo, C., Bini, C., Comai, G., & La Manna, G Mineral bone disorders in kidney disease patients: the ever-current topic. *International Journal of Molecular Sciences*, 2022 ; 23(20), 12223.

**Hundemer, G. L., Talarico, R., Tangri, N., Leon, S. J., Bota, S. E., Rhodes, E., ... & Sood, M. M.** Ambulatory treatments for RAAS inhibitor–related hyperkalemia and the 1-year risk of recurrence. Clinical *Journal of the American Society of Nephrology*, **2021 ;**16(3), 365-373.

**Jun, M., Jardine, M. J., Perkovic, V., Pilard, Q., Billot, L., Rodgers, A., ... & Gallagher, M.** Hyperkalemia and renin-angiotensin aldosterone system inhibitor therapy in chronic kidney disease: *a general practice-based, observational study. PLoS one*, **2019 ;** 14(3), e0213192.

**Kader, A. A.** Effects on nutritional quality. *In Modified and controlled atmospheres for the storage, transportation, and*



**ISSN: 2537-0804** **eISSN: 2537- 0855**

*packaging of horticultural commodities* **2019 ;** (pp. 129-136). CRC Press.

**Kalantar-Zadeh, K., Lockwood, M. B., Rhee, C. M., et al .** Patient-centred approaches for the management of unpleasant symptoms in kidney disease. *Nature Reviews Nephrology*, **2022 ;** 18(3), 185-198.

**Kalantar-Zadeh, K., Lockwood, M. B., Rhee, C. M., Tantisattamo, E., Andreoli, S., Balducci, A., ... & Li, P. K. T. (**Patient-centred approaches for the management of unpleasant symptoms in kidney disease. *Nature Reviews Nephrology*, **2022 ;** 18(3), 185-198.

**Kovesdy, C. P.** Epidemiology of hyperkalemia: an update. *Kidneyinternational supplements*, **2016 ;**6(1), 3-6.

**Lazich, I., & Bakris, G. L.** Prediction and management of hyperkalemia across the spectrum of chronic kidney disease. *In Seminars in nephrology* **2014, May ;** (Vol. 34, No. 3, pp. 333-339). WB Saunders.

**Li, X., Zheng, S., and Wu, G.** Amino acid metabolism in the kidneys: nutritional and physiological significance. Amino Acids in Nutrition and **Health:** ***Amino acids in systems function and health*** **2020 ; 71-95.**

**Ma, J. Z., Ebben, J., Xia, H., & Collins, A. J. Hematocrit level and associated mortality in hemodialysis patients.** ***Journal of the American Society of Nephrology*** **1999;10(3),** 610-619.



**ISSN: 2537-0804** **eISSN: 2537- 0855**

**Murphy, A. B., Macejko, A., Taylor, A., & Nadler, R. B.** Chronic prostatitis: management strategies. *Drugs* **2009** ; 69, 71-84.

**Nemati, E., Einollahi, B., Pezeshki, M. L., Porfarziani, V., & Fattahi, M. R.** Does kidney transplantation with deceased or living donor affect graft survival?. *Nephro-urology monthly*, **2014 ;** 6(4).

Nissenson, A. R., Goodnough, L. T., & Dubois, R. W Anemia: not just an innocent bystander?. *Archives of internal medicine*, 2003 ; *163*(12), 1400-1404.

**Patti, G., Pasceri, V., Colonna, G., Miglionico, M., Fischetti, D., Sardella, G., ... & Di Sciascio, G.** Atorvastatin pretreatment improves outcomes in patients with acute coronary syndromes undergoing early percutaneous coronary intervention: results of the ARMYDA-ACS randomized trial. *Journal of the American College of Cardiology*, **2007 ;** 49(12), 1272-1278..1-./

**Picard, K., Silva, M. I. B and Mager, C.** Dietary potassium intake and risk of chronic kidney disease progression in predialysis patients with chronic kidney disease: a systematic review. *Advances in Nutrition*, **2020 ;** 11(4), 1002-1015.

**Portolés, J., Martín, L., Broseta, J. J., & Cases, A.** Anemia in chronic kidney disease: from pathophysiology and current treatments, to future agents. *Frontiers in Medicine* **2021 ;** 8, 642296.



**ISSN: 2537-0804** **eISSN: 2537- 0855**

**Rastogi, A., Bhatt, N., Rossetti, S., & Beto, J.** Management of hyperphosphatemia in end-stage renal disease: a new paradigm. *Journal of Renal Nutrition,* **2021 ;** 31(1), 21-34.

**Sarnak, M. J., Tighiouart, H., Manjunath, G., MacLeod, B., Griffith, J., Salem, D., & Levey, A. S. Anemia as a risk factor for cardiovascular disease in The Atherosclerosis Risk in Communities (ARIC) study.** ***Journal of the American College of Cardiology*** **2002; 40(1), 27-33.**

**Sun, Z., Jiao, J., Lu, G., Liu, R., Li, Z., Sun, Y., & Chen, Z. Overview of research progress on the association of dietary potassium intake with serum potassium and survival in hemodialysis patients, does dietary potassium restriction really benefit hemodialysis patients?.** ***Frontiers in Endocrinology*****, 2023 ; 14, 1285929.**

**Thurber, C., Dugas, L. R., Ocobock, C., Carlson, B., Speakman, J. R., & Pontzer, H. Extreme events reveal an alimentary limit on sustained maximal human energy expenditure.** ***Science Advances,*** **2019 ; 5(6), eaaw0341.**

**Wang, Y., & Harris, D. C. Macrophages in renal disease. Journal of the** ***American Society of Nephrology*****, 2011 ;22(1), 21-27.**

**Weiner, I. D., Mitch, W. E., & Sands, J. M.** Urea and ammonia metabolism and the control of renal nitrogen excretion. Clinical *Journal of the American Society of Nephrology*, **2015 ;**10(8), 1444-1458.



**ISSN: 2537-0804** **eISSN: 2537- 0855**

**Weiner, I. D., Mitch, W. E., & Sands, J. M.** Urea and ammonia metabolism and the control of renal nitrogen excretion. Clinical *Journal of the American Society of Nephrology*, **2015 ;** 10(8), 1444-1458.

**Wu, C., Shapiro, R., Tan, H., Basu, A., Smetanka, C., Morgan, C., ... & Unruh, M.** Kidney transplantation in elderly people: the influence of recipient comorbidity and living kidney donors. *Journal of the American Geriatrics Society*, **2008 ;**56(2), 231-238.

**Yang, S., Cao, C., Deng, T., & Zhou, Z.** Obesity-related glomerulopathy: a latent change in obesity requiring more attention. *Kidney and Blood Pressure Research* **2020 ;** 45(4), 510-522.

**Yarnoff, B. O., Hoerger, T. J., Shrestha, S. S., Simpson, S. K., Burrows, N. R., Anderson, A. H., ... & CRIC Study Investigators.** *Modeling the impact of obesity on the lifetime risk of chronic kidney disease in the United States using updated estimates of GFR progression from the CRIC study. PloS one*, **2018 ;** 13(10), e0205530.



**ISSN: 2537-0804** **eISSN: 2537- 0855**