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Original Research Article

Assessment of the Nutritional Status of the Dialysis Dependent Patient in Institute of Kidney Diseases Peshawar

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Abstract: ***Background***: Objective: To determine the nutritional status of the dialysis dependent patient in institute of kidney diseases Peshawar. Study type: Cross-sectional study.
Place: Department of Nephrology, Institute of Kidney Diseases, Peshawar. Duration: July 2025 to September 2025. ***Methodology:*** The study included 104 patients of either gender between the ages of 18 and 60 who were receiving dialysis (a condition in which a person with CKD (GFR of less than 60 mL/min/1.73 m² is considered evidence, if sustained for 3 months or more) needs regular dialysis treatment to perform the essential function of filtering waste products, surplus fluids, and electrolytes from blood). Patients with severe sepsis, cancer, congestive heart disease, and tuberculosis were not included. All enrolled patients were then asked to provide written informed consent. Age, gender, BMI, socioeconomic position, level of education, occupation, and place of residence were among the baseline data that were documented. Additionally noted were comorbid diseases such as diabetes and hypertension. Dialysis patients with chronic renal disease had their nutritional condition assessed. ***Results:*** Mean age was 45.05 ± 6.08 years with 64 (61.54%) of the 104 patients being male and 40 (38.46%) being female. The duration of dialysis was 1.89 ± 1.23 years. In this study, normal nutrition was observed in 72 (69.23%), mildly malnutrition in 20 (19.23%) and severe malnutrition in 12 (11.54%) dialysis dependent patients. ***Conclusion:*** This study demonstrated the significant prevalence of malnutrition and clarified the connection between low physical activity and malnutrition in individuals with chronic renal disease.

Keywords: Chronic kidney disease, hemodialysis, malnutrition.

INTRODUCTION

The frequency of chronic kidney disease (CKD) has significantly increased over the last three decades worldwide; 77.5% of end-stage kidney disease (ESKD) cases are treated with kidney replacement therapy, with 43.1% of these cases relying exclusively on dialysis. 89% of ESKD cases treated globally involve hemodialysis.[1,2] Medical practice guidelines recommend that modern technical administration of hemodialysis patients be ideal in terms of dialyzer membrane biocompatibility, dialyzer reutilization frequency, and dialysis duration.[3]

In these people, malnutrition-related morbidity considerably lowers quality of life, increases the risk of infection, weakens the body, and increases mortality. The mechanisms underlying malnutrition in dialysis patients differ from those underlying acute hospitalization and severe illness. Initial advanced features of CKD, the use of a low-protein diet to slow the course of CKD, and the prolonged use of potentially life-saving dialysis for patients with end-stage renal disease are the causes.[4,5]

There has been a lot of research done on the prevalence of malnutrition in the dialysis population.

There are other names for malnutrition, including protein-energy wasting, malnutrition–inflammation complex syndrome, and uremic wasting syndrome, depending on the presence of hypercatabolism, inflammation, and high uremia. diverse malnutrition descriptors are derived from diverse aspects, and the varying implications of some factors point to a lack of consistency in the diagnosis of malnutrition. There is no correlation between the assessment of malnutrition and echocardiographic findings in patients receiving hemodialysis.[6,7] In dialysis-dependent patients, a research found that normal nutrition was 70.3%, moderate malnutrition was 18.8%, and severe malnutrition was 10.9%.[8]

Complications can have a major impact on the health outcomes, quality of life, and survival rates of dialysis-dependent patients, particularly those receiving hemodialysis. Determining the nutritional status of the dialysis-dependent patient at the Institute of Kidney Diseases in Peshawar is the aim of this study because there is a dearth of local literature on this topic. In addition to informing efforts to improve nutritional management, improve quality of life, and lower the occurrence of problems connected to dialysis, this study will give our medical experts important insights into the nutritional needs of patients who are reliant on dialysis. The goal of this study is to improve patient care and nutrition management for dialysis-dependent individuals by concentrating on nutritional status assessment.

METHODOLOGY

This cross-sectional study was conducted from July to September 2025 in the Department of Nephrology, Institute of Kidney Diseases, Peshawar, with ethical review committee clearance. A sample size of 104 was determined using the WHO sample size calculator, taking into account a 95% confidence interval, a 6% allowable error, and an anticipated severe malnutrition rate of 10.9% among dialysis-dependent patients.[8] The study included patients of either gender between the ages of 18 and 60 who were receiving dialysis (a condition in which a person with CKD (GFR of less than 60 mL/min/1.73 m² is considered evidence, if sustained for 3 months or more) needs regular dialysis treatment to perform the essential function of filtering waste products, surplus fluids, and electrolytes from blood). Patients with severe sepsis, cancer, congestive heart disease, and tuberculosis were not included.

Every patient who took part in the trial was verbally informed of its purpose, advantages, and hazards. All enrolled patients were then asked to provide written informed consent. Age, gender, BMI, socioeconomic position, level of education, occupation, and place of residence were among the baseline data that were documented. Additionally noted were comorbid diseases such as diabetes and hypertension. Dialysis patients with chronic renal disease had their nutritional condition assessed.

- **Well-nourished patients** were those with a Body Mass Index (BMI) between 18.5 and 24.9 kg/m2, serum albumin levels ≥ 3.5 g/dL, a sufficient daily caloric intake (≥ 2000 calories), and no indications of fat or muscle atrophy.
- A patient was considered **mildly malnourished** if their BMI was between 17.0 and 18.4 kg/m2, their serum albumin level was between 3.0 and 3.5 g/dL, they consumed slightly too few calories (1500–1600 calories per day), and they had lost less than 5–10% of their body weight in the previous six months.
- A patient was considered **extremely malnourished** if their BMI was less than 17.0 kg/m2, their serum albumin levels were less than 2.5 g/dL, they consumed fewer than 1000–1200 calories per day, and they had lost more than 10–20% of their body weight in the previous six months.

A consultant with at least five years of post-fellowship experience oversaw the entire examination. Every patient detail was recorded using a pre-made organized proforma.

IBM SPSS 25 was used to gather and analyze the data. For categorical data, such as gender, nutritional status, diabetes, hypertension, hemodialysis frequency and duration, socioeconomic status, education, occupation, and place of residence, frequencies and percentages were presented. Data normality was evaluated using the Shapiro-Wilk test. Age, BMI, and length of illness were examples of numerical data that were expressed as Mean + SD or Median (IQR). In order to observe the effect modifiers, nutritional status was stratified by age, BMI, gender, diabetes, hypertension, hemodialysis length, frequency, socioeconomic status, education, occupation, and place of residence. At the 5% level of significance, the post-stratification Chi-square or Fisher's exact test was conducted. Tables were used to display the results.

RESULTS

The study's participants ranged in age from 18 to 60, with a mean age of 45.05 ± 6.08 years. According to Table I, the majority of the patients, 61 (58.65%), were between the ages of 41 and 60 years.

Figure I illustrates the male to female ratio of 1.6:1, with 64 (61.54%) of the 104 patients being male and 40 (38.46%) being female. The average height was 158.44 ± 12.35 cm. The average weight was 89.67 ± 9.84 kg. According to Table II, the mean BMI was 28.57 ± 3.76 kg/m2. The duration of dialysis was 1.89 ± 1.23 years. Table I displays

the distribution of patients based on several confounding variables.

In this study, normal nutrition was observed in 72 (69.23%), mildly malnutrition in 20 (19.23%) and severe malnutrition in 12 (11.54%) dialysis dependent patients (Figure II). Stratification of nutritional status with respect to confounders is shown in Table II.

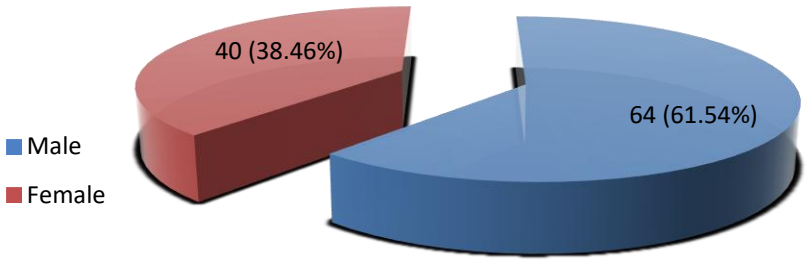

Figure I: Distribution of patients according to gender (n=104).

Table II: Distribution of patients according to different variables (n=104)

		Frequency	%age
Age (years)	**18-40**	43	41.35
	41-60	61	58.65
Hypertension	**Yes**	58	55.77
	No	46	44.23
Diabetes mellitus	**Yes**	51	49.04
	No	53	50.96
Duration of dialysis (years)	**≤2**	67	64.42
	>2	37	35.58
Frequency of dialysis/week	**≤2**	65	62.50
	>2	39	37.50
Residence	**Rural**	42	40.38
	Urban	62	59.62
Socioeconomic status	**Poor**	26	25.0
	Middle	35	33.65
	Upper	43	41.35
Employment	**Unemployed**	71	68.27
	Employed	33	31.73
Education	**Uneducated**	31	29.81
	Educated	73	70.19

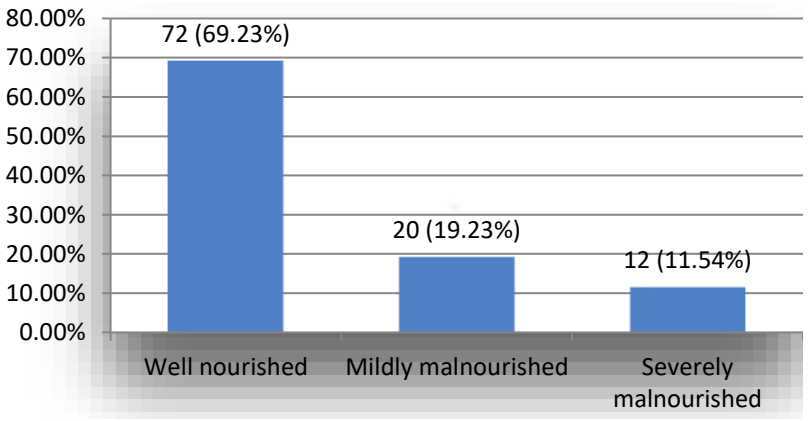

Figure II: Nutritional status of the dialysis dependent patient (n=104).

Table II: Stratification of nutritional status with respect to confounders.

		Well nourished (n=72)	Mildly malnourished (n=20)	Severely malnourished (n=12)	P-value
Age (years)	18-40	35	05	03	**0.078**
	41-60	37	15	09	
Gender	Male	47	11	06	**0.482**
	Female	25	09	06	
Hypertension	Yes	33	06	04	**0.372**
	No	39	14	08	
Diabetes mellitus	Yes	31	11	09	**0.103**
	No	41	09	03	
Duration of dialysis (years)	≤2	51	11	05	**0.092**
	>2	21	09	07	
Frequency of dialysis/week	≤2	49	12	04	**0.069**
	>2	23	08	08	
Residence	Rural	30	07	05	**0.862**
	Urban	42	13	07	
Socioeconomic status	Poor	15	06	05	**0.068**
	Middle	21	08	06	
	Upper	36	06	01	
Employment	Unemployed	53	12	06	**0.180**
	Employed	19	08	06	
Education	Uneducated	19	07	05	**0.480**
	Educated	53	13	07	

DISCUSSION

This study was carried out at the Institute of Kidney Diseases in Peshawar to ascertain the nutritional status of the dialysis-dependent patients. According to this study, participant sex and degree of physical activity are factors linked to malnutrition in CKD patients. Similarly, the length of hemodialysis and degree of physical activity are factors linked to malnutrition in hemodialysis patients.

Similar to other studies that indicate the prevalence of malnutrition has been estimated to range from 20 to 75% depending on the diagnostic criteria and the participants, this study found that 72 (69.23%) dialysis dependent patients had normal nutrition, 20 (19.23%) had mild malnutrition, and 12 (11.54%) had severe malnutrition.9 With a prevalence of 23 to 75%, malnutrition is particularly prevalent in the later stages of CKD.10 The researchers concluded that malnutrition is very common among CKD patients. The global prevalence of malnutrition among CKD patients was 42.7%, according to a systematic review and meta-analysis carried out across 61 countries; however, our study discovered that the prevalence of malnutrition among CKD patients in India was higher at 56.7%.11 Malnourished CKD patients have greater risks of death and morbidity, according to numerous research. It is interesting to notice that among CKD patients, malnutrition is rarely listed as a cause of mortality. Nonetheless, an increasing amount of evidence suggests that the food status of these people significantly affects their prognosis.9

Depending on the diagnostic criteria utilized, including the assessment technique and the population type under study, malnutrition may impact 25–75% of people with end-stage renal disease (ESRD).12 Undernutrition affects 40% of dialysis patients (maintenance HD and peritoneal dialysis (PD)); mild to moderate protein energy malnutrition (PEM) affects 33% of them, and severe PEM affects 6–8% of them.13 Subjective Global Assessment

(SGA) or Malnutrition Inflammation Score (MIS) scores for dialysis patients from a wide geographic range ranged from 28% to 56% for HD patients and from 32% to 49% for PD patients, according to a recent meta-analysis and observational studies carried out in 2018 and 2021.14,15.

In patients with chronic kidney disease (CKD), malnutrition is a common and serious issue that is closely related to the course of the disease and unfavorable clinical outcomes. Reduced appetite, dietary restrictions, inflammation, metabolic acidosis, and gastrointestinal problems are some of the symptoms that patients frequently encounter when kidney function deteriorates. These symptoms lead to insufficient nutritional intake and nutrient loss.10 Protein-energy wasting (PEW), a disorder characterized by the depletion of body protein and energy stores, is highly likely as a result of this intricate interaction and severely impairs immunological function, physical performance, and general quality of life.11,12.

Malnutrition has serious and varied effects on CKD patients. Malnourished CKD patients, especially those receiving dialysis, have been linked to greater rates of hospitalization, longer recovery periods, an increased risk of infection, and an increased all-cause mortality, according to numerous studies.14,15 Malnutrition also leads to frailty and muscle atrophy, which are both powerful indicators of poor clinical outcomes, such as cardiovascular events, falls, and disability. A vicious loop known as the malnutrition-inflammation complex syndrome (MICS) is created when inflammation, which is frequently seen in CKD, increases catabolism and reduces appetite, therefore exacerbating malnutrition.14-16

In contrast to the meta-analysis, which shows that men were more likely than women to suffer from malnutrition, the evidence from this study shows that male participants with CKD were less likely to experience malnutrition.11 Additionally, a different study from India revealed a negligible correlation between the participants' sex and malnutrition in CKD.17 In Iran, a study that is identical to this one, the sex of participants was not very helpful in predicting malnutrition in CKD patients receiving hemodialysis.18 This might have something to do with gender bias in Pakistani food culture, the research participants that were included, or the criteria used to evaluate malnutrition.

According to this study, malnutrition is linked to the length of hemodialysis; the shorter the duration (less than two years), the higher the chance of malnutrition. At the start of hemodialysis, there was a decrease in the consumption of proteins, lipids, and most nutrients, including as vitamins and minerals. Protein-energy malnutrition was observed in CKD patients during the initial stages of dialysis, according to studies.19 Poor intake from anorexia, nausea, and vomiting causes undernutrition, which usually improves with adequate dialysis and appropriate nutritional supplementation. After 16 years of hemodialysis, the body mass index slowed down after growing slowly and peaking during the tenth and twelfth years of dialysis.20 A higher number of individuals in pre-dialysis and the early stages of hemodialysis may have contributed to the observed correlation. However, a Tanzanian study found that patients receiving hemodialysis for more than four years are more likely to suffer from malnutrition.19

Similar to this study, other research supports the positive correlation between low levels of physical activity and malnutrition in CKD patients. Clinically, CKD patients' lack of physical activity has long been a problem, particularly for dialysis patients. The anabolic benefits of dietary therapies are enhanced by physical activity. Patients' nutritional health may be enhanced by increases in physical performance and activity.21 In patients receiving hemodialysis, higher levels of physical activity were linked to improved nutritional status and decreased comorbidity.22 One of the primary causes of muscle atrophy is inactivity, which may also contribute to muscular anomalies and a decline in functional status in the CKD population.23

Age, education level, occupation, ethnicity, and religion were among the predicted characteristics that were not significant in our investigations but were significantly linked to malnutrition in the prior study. For instance, a Nigerian study revealed that malnutrition rises sharply with age, with older patients experiencing greater rates than younger and middle-aged patients. Education and unemployment were substantially correlated with higher prevalence.24 The differences between the two may be explained by differences in the research population size, recruited age, data collection methods, socioeconomic position, dietary habits of the patients, and medical intervention.

All of the previously given data demonstrated the significance of interdisciplinary healthcare professionals collaborating to address the risk of malnutrition among patients with chronic kidney disease. Every follow-up should include anthropometric monitoring, regular patient education, and nutritional assessment, all of which should be carried out by medical professionals with the proper paperwork.

Due to the self-reported method and the memory duration for some information, there may be some possibility of recall bias in this study. Because there was so little literature accessible for Pakistan, we were unable to apply the study's findings to our own

country, even though they were in line with a substantial body of research from other low- and middle-income nations. Notwithstanding these drawbacks, the study's findings will advance our understanding of malnutrition in CKD patients and will generally benefit academics, policymakers, and decision-makers.

CONCLUSION

This study assessed the nutritional health of dialysis patients with chronic renal disease and identified characteristics related to nutritional status. 69.23% of dialysis-dependent patients had normal nutrition, 19.23% had mild malnutrition, and 11.54% had severe malnutrition. Malnutrition is more common among female participants who are less active and have been receiving hemodialysis for less than two years. Therefore, it is encouraged that patients with chronic kidney disease (CKD) participate in mild to moderate physical activity. Health professionals are encouraged to perform nutritional assessments every six months and, if necessary, provide diet charts. Additionally, evaluating and treating malnutrition in dialysis patients is advised.

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