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Original article

Impact of Protein-Energy Wasting and Dietary Management on Complications in Chronic Kidney Disease Patients Undergoing Hemodialysis: A Study from Tripoli, Libya

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Abstract
Chronic Kidney Disease [CKD] is a severe, widely spread disease that leads to advanced kidney dysfunction, mainly at the advanced stage, necessitating interventions like dialysis or kidney transplantation. Lately, the results clarified that dietary modifications are mandatory to counteract the adverse effects of this disease, particularly for patients experiencing Maintenance Hemodialysis [MHD]. This study aimed to assess CKD patients' awareness and nutritional status under hemodialysis, focusing on the relationship between dietary intake and disease complications and the effects of phosphorus and sodium intake on CKD patients' morbidity and mortality rate. The study conducted Interviews with 111 hemodialysis patients at two Kidney dialysis centers in Tripoli, Libya. The study utilized a 35-question questionnaire covering personal information, medical history, and dietary health assessments. Findings revealed that only 31% of pre-dialysis patients had adequate knowledge of food management systems to enhance dialysis and treatment protocols, whereas 69% of hemodialysis patients understood their dietary needs but did not follow a proper diet. Among hemodialysis patients, 63% experienced loss of appetite and sudden weight loss, with 16% unable to regain their baseline weight and facing protein-energy wasting [PEW]. A staggering 99% reported symptoms of short-term hyperphosphatemia, with 55% using Reangle pills for relief, while 44% did not due to financial reasons or lack of awareness. Hypertension affected 40% of post-dialysis patients, and 38% experienced edema and shortness of breath, emphasizing better fluid regulation. In conclusion, while a majority of CKD patients were aware of their dietary needs, many struggled with appetite loss and weight issues, leading to significant nutrient deficiencies and complications.
Keywords. Chronic Kidney Disease, Dialysis, CKD diet, Hyperphosphatemia, Protein-Energy Wasting.

Introduction
Chronic Kidney Disease (CKD) is a widely spread fetal disease that leads to severe kidney dysfunction. Globally, CKD affects approximately 850 million people, with an estimated 2.5 million patients undergoing dialysis annually [1]. The prevalence of CKD in Libya is increasing, following trends seen in other countries, primarily due to rising rates of diabetes and Hypertension [2]. It is estimated that around 10-15% of the adult population in Libya is affected by CKD to some degree. Kidney disease mostly ends with advanced complications such as kidney dysfunction and kidney failure, which mainly necessitate interventions like dialysis or kidney transplantation [3]. Among individuals requiring renal replacement therapy, including dialysis, the numbers are significantly increasing annually, with thousands of patients relying on hemodialysis or peritoneal dialysis [4,5]. The scientific and medical society agreed that Dietary modifications are crucial to counteract the adverse effects of this disease, particularly for patients experiencing Maintenance Hemodialysis [MHD]. The three most common causes of CKD are diabetes mellitus, Hypertension, and glomerulonephritis [6]. In contrast, the progression of CKD is responsible for several serious complications, including hypertension, anemia, bone disease, and increased incidence of cardiovascular and metabolic disease [7].
For hemodialysis patients the term Protein-energy wasting [PEW], a term created by the International Society of Renal Nutrition and Metabolism, describes a range of nutritional and catabolic changes involving the reduction of stored protein and energy, affecting most chronic CKD patients undergoing dialysis, estimated between 20% to 75% [8]. PEW stands out as a strong, independent predictor of mortality in individuals with CKD [9]. Inadequate protein and energy intake lead to PEW if accompanied by kidney disease-specific factors like uremic toxins, inflammation, and acidosis. The presence of pro-inflammatory cytokines comes with hypercatabolic states and reduced appetite, often leading to insufficient protein and energy intake [10]. This situation can be exacerbated by prescribed dietary restrictions and lacking monitoring of the patient's nutritional status [11,12].
As CKD progresses, patients become more susceptible to the negative consequences of uncontrolled diets, including elevated phosphorus and potassium levels. Uremic metabolites, some of which suppress appetite and many of which are byproducts of protein breakdown, can have detrimental effects on the body, ranging from oxidative stress to endothelial dysfunction, disruptions in nitric oxide levels, renal interstitial fibrosis, loss of muscle mass [sarcopenia], and deterioration of kidney function and increased protein excretion [13]. Given these intricate pathways, nutritional interventions in CKD involve various strategies, such as dietary limitations and supplementation, to optimize patients' biochemical markers and clinical outcomes when

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combined with non-nutritional treatment approaches [14]. However, the effectiveness of many nutritional interventions and their impact on outcomes in CKD patients with PEW were not extensively investigated [15]. Protein-rich nutritional support in treating PEW improves the quality of life and survival [16]. However, patients on dialysis attempt to follow diets low in sodium, phosphorus, and potassium, sometimes inadvertently resulting in low protein consumption [17]

Protein-energy wasting (PEW) can have a significant impact on the health of patients undergoing maintenance hemodialysis [MHD], leading to higher rates of hospitalization and increased mortality [18,19]. Patients may lose essential nutrients such as glucose, vitamins, and amino acids during hemodialysis treatments, resulting in protein degradation and inflammation. Therefore, proper nutritional therapy is crucial for individuals with CKD[CKD], especially those on hemodialysis. It is generally recommended that these patients consume high-quality dietary protein at 1.2-1.5 grams per kilogram daily to compensate for nutrient losses during dialysis [20]. However, patients must adapt to overconsumption of protein, although many protein sources are rich in phosphorus, which can cause hyperphosphatemia—a condition associated with risks like vascular calcification, heart failure, metabolic bone disorders, and increased mortality [20].

To control phosphorus levels for CKD patients, hemodialysis patients must follow a dietary restriction of 800-1000 milligrams daily [21]. Phosphorus can be organic [naturally present in animal and plant proteins] or inorganic [as chemical additives in processed foods]. Since dietary protein is a significant phosphorus source, patients requiring higher protein intake must be carefully monitored for hyperphosphatemia. They might need phosphate binders during meals to regulate blood phosphorus levels. Processed foods typically contain more phosphorus than natural foods [22,23].

The current primary strategy for addressing this challenge involves a pharmacological approach. Oral phosphorus binders are commonly prescribed to reduce the absorption of dietary phosphorus; however, issues with clinical efficacy and patient compliance may hinder the effectiveness of this method [24,25]. Given the varying phosphorus content in different protein-rich foods, consuming protein sources with lower phosphorus levels could be a viable option to meet the recommended protein intake without increasing phosphorus consumption [26]. A plant-based diet could fulfill daily protein requirements without elevating phosphorus intake for dialysis patients [27].

This research aims to assess the understanding of the impact of nutritional status on CKD patients undergoing hemodialysis in Libya, highlighting the connection between dietary intake and the development of disease complications, particularly the effects of protein, phosphorus, and sodium intake on morbidity and mortality rates among CKD patients. The study hypothesized that following a specific diet for patients with MHDCKD will extend the period between the diagnosis of the disease and the initiation of dialysis treatment and reduce mortality time [28,29].

Methods

Study setting

The study included 111 CKD patients undergoing hemodialysis at two centers in Tripoli: the Center for Kidney Services in Janzour and the Center for Kidney Services in Tripoli. The study is a descriptive cross-sectional study using a random sample of Tripoli dialysis patients. The interview was done by conducting several interviews after providing patients with a manual explanation of the best diet to follow for HDP, promoting following a low phosphorus diet. Questions included in the questionnaire were designed to assess the patient's ability to follow the planned diet instructions. The interviews were repeated weekly for four months while the analysis results for the same patients were monitored.

Questionnaire design

A standard interview-based questionnaire was designed to obtain demographic information and clinical and family history data. The questionnaire consists of 3 sections: demographic information. Awareness questions, health status, and clinical data.

Statistical analysis

Data were statistically analyzed using Excel 2018 and the SPSS software version 20 [SPSS, Inc., Chicago, IL, USA]. F values were calculated to evaluate the significance of differences at a p-value< 0.5. Descriptive statistics expressed as mean and frequency with percentages were calculated for interval and categorical variables. The least significant differences (LSD) test was performed to find the significant differences among data obtained from the survey.

Results

The sex distribution of patients receiving hemodialysis in this study (Figure 1) was higher in males than females; differences between sexes may differ from differences in normal biological function and lifestyle. The results of our study agreed with the study conducted in [2014] by Manfred Heckling, which describes HD prevalence and patient characteristics by sex, comparing adult male females. Some of these sex-specific differences may arise because of sex- a specific difference in normal biological function, other sex-specific

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differences related to the difference in patient care, or patient awareness of CKD [28]. This topic needs further investigation about why the Sex distribution of patients receiving hemodialysis is higher in males than females. The age distribution of patients receiving hemodialysis in this study was high in males, 51-60 years, and 41-50 years in females, as in figure 1. In this study, we note that the age group for males differs, and the age group for females agreed with a study conducted (2023) in India by Jha that the age distribution of HD patients was high in 40-49 years in males and females [30].

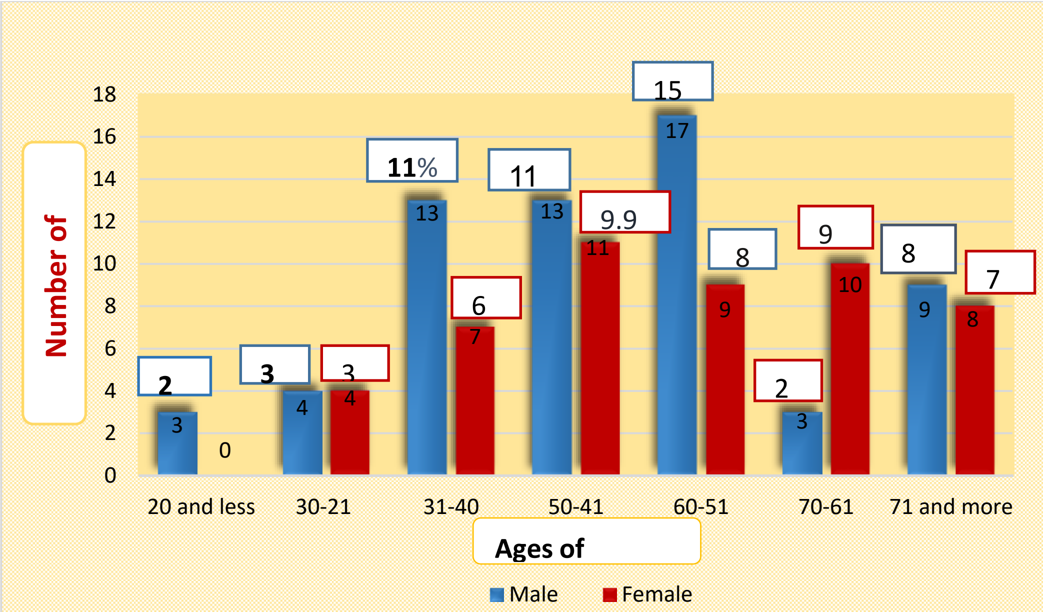

Figure 1. Ages and number of patients.

Hypertension is the leading cause of CKD in all high, middle, and low-income countries [30,31]. The study results in Table 1. agreed with this information and showed that more than 51.4% of CKD patients were Hypertensive patients before even though they had it solely or accompanied by another disease such as diabetes or Obesity. In addition, more than 17% of glomerulonephritis patients agreed with a study conducted in [2019] by Ku E, and Lee Bj that glomerulonephritis is one of the more common causes of CKD [2, 32]. Moreover, 11 % of the coronavirus patients' results in this study agreed with results in research conducted in 2021 by Alessandri F that Acute kidney injury [AKI] is a frequent complication in coronavirus disease COVID-19 patients admitted to intensive care unit [ICU] for severe respiratory failure [33]. It was revealed that when a patient with AKI does not recover well mostly develops CKD [34] and 7% of polycystic kidney disease agreed with a study conducted in 2002 by Peter Igarashi that polycystic kidney disease is a common genetic cause of CKD in children and adults is characterized by the accumulation of fluid-filled cysts in the kidney and other organs [35], while other causes are undoubtedly considered one of the causes of CKD. Still, they are not the main and most common 5% of congenital, 3% of obesity, 1% of take antibiotics,0.9% of secondary hyperparathyroidism, urinary reflex, and kidney donors as in Table [1].

Table 1. Causes of Chronic Kidney Disease

Causes of chronic kidney disease	Number of samples	Percentage %
Diabetes	10**	9
Hypertension	19**	17.1
Obesity	4*	3.6
Diabetes and hypertension	22***	19.8
Diabetes, hypertension and obesity	5*	4.5
Glomerulonephritis	19**	17.1
Polycystic kidney disease	8**	7.2
Congenital	6*	5.4
Corona virus	13**	11.7
Secondary hyperparathyroidism	1*	0.9
Urinary reflux	1*	0.9
Kidney donor	1*	0.9
Taking antibiotics	2*	1.8
total of samples	111	100

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Obesity before undergoing dialysis is one of the causes of CKD, according to a study conducted in 2011 by Eknoyan CKD and obesity are highly prevalent in substantial health care costs. This study's results indicated that 26% of the dialysis patients were obese according to their Body Mass Index (BMI) measurements (Figure 2).

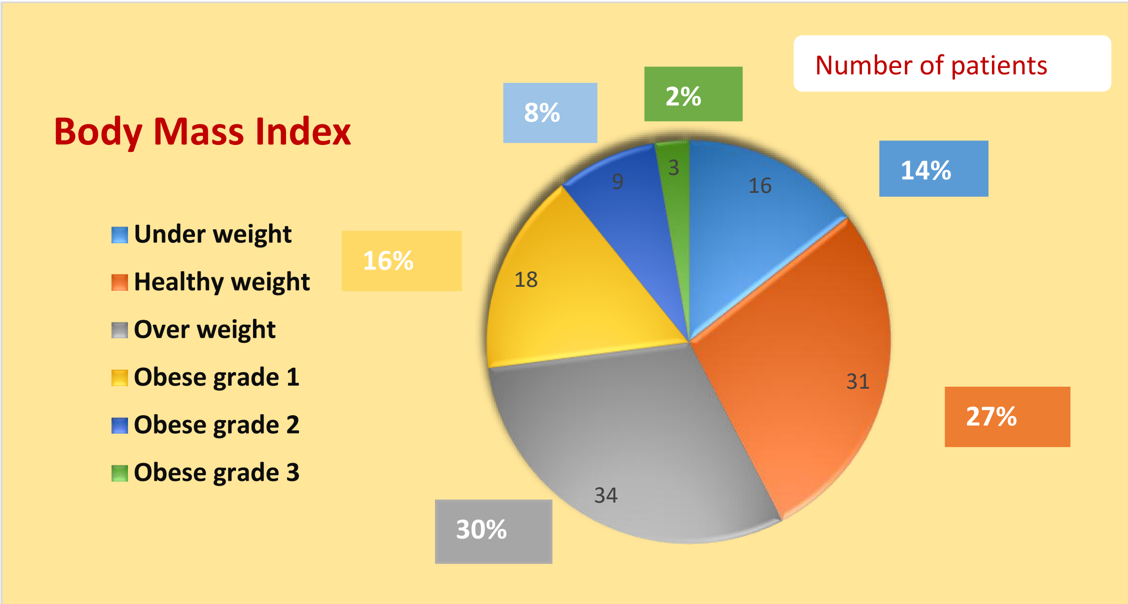

Figure 2. Patients' Body Mass Index [BMI] after dialysis

In addition, obesity could be a predictor of incident chronic renal disease and advancement to kidney failure [36], and the weight gain after undergoing dialysis was likely due to fluid builds in the body which agreed with a study conducted in 2023 by Francisco Maduell in which patients who restricted their intake of foods high in sodium content led to decreased thirst and consequently, weight gain between dialysis sessions [37,47]. Weight gain after dialysis may also be due to an increase in fat mass combined with a trend toward decreasing body-cell mass due to following unhealthy diets high in carbohydrates and low in protein, as documented in a study in 2001 by Jolly et al. This study observed 114 patients treated for at least two years at the Toronto Western Hospital Peritoneal Dialysis Unit, identifying eight who gained an "excessive" weight equal to or greater than 10 kg of their initial weight [38]. Such excessive weight gain may also occur if these patients have polymorphisms of the UCP-2 gene, which can alter metabolic rates [39].

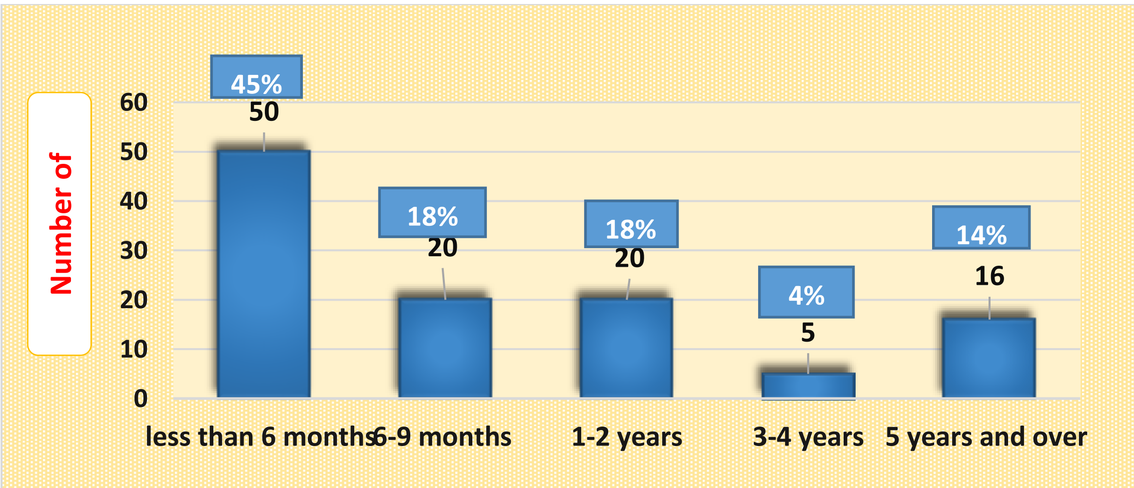

Figure 3. The period between renal insufficiency and dialysis.

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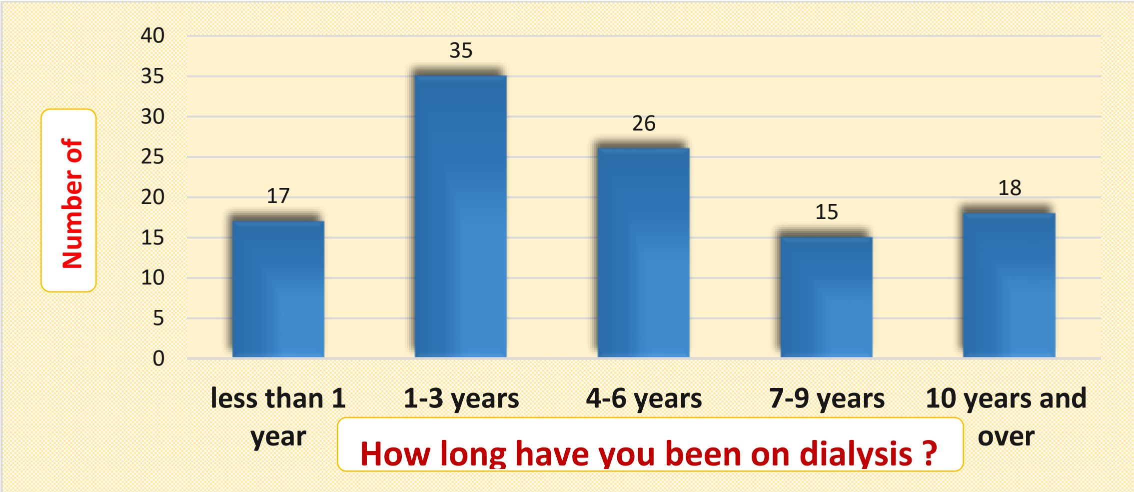

Figure 4. The estimated period since they are undergoing dialysis.

The results in Figures 3,4 show that the period between the start of renal dysfunction and the date of starting dialysis and the estimated period they are undergoing dialysis until the study time, are varies from patient to patient; however, the data suggest that the highest percentage in Libya move to dialysis quickly due to the country's lack of education and healthcare infrastructure. Furthermore, many pre-dialysis patients did not follow a therapeutic diet with a nutritionist before dialysis. In contrast, in the other under-dialysis group, a high percentage followed a specific diet. The calculated F value for both Tables is lower than the critical F value, indicating that adherence to a CKD-special diet significantly impacted the time between being aware of the disease and undergoing dialysis, as well as the period of dialysis.

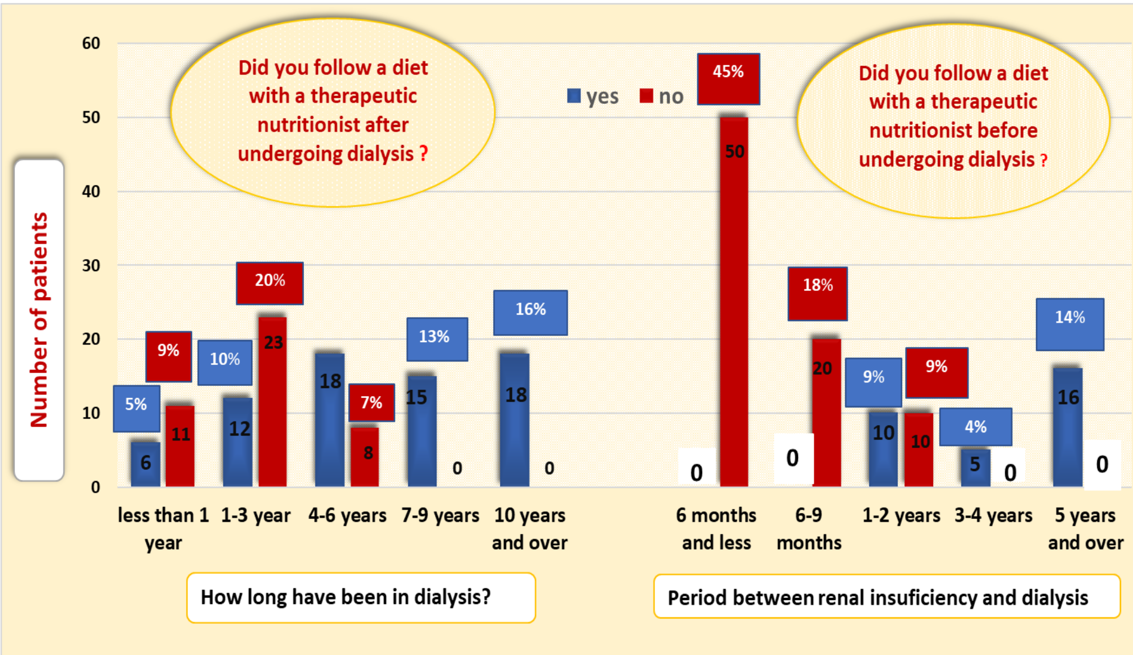

Figure 5. Comparison and evaluation of awareness among pre-dialysis and undergoing dialysis patients of their diet.

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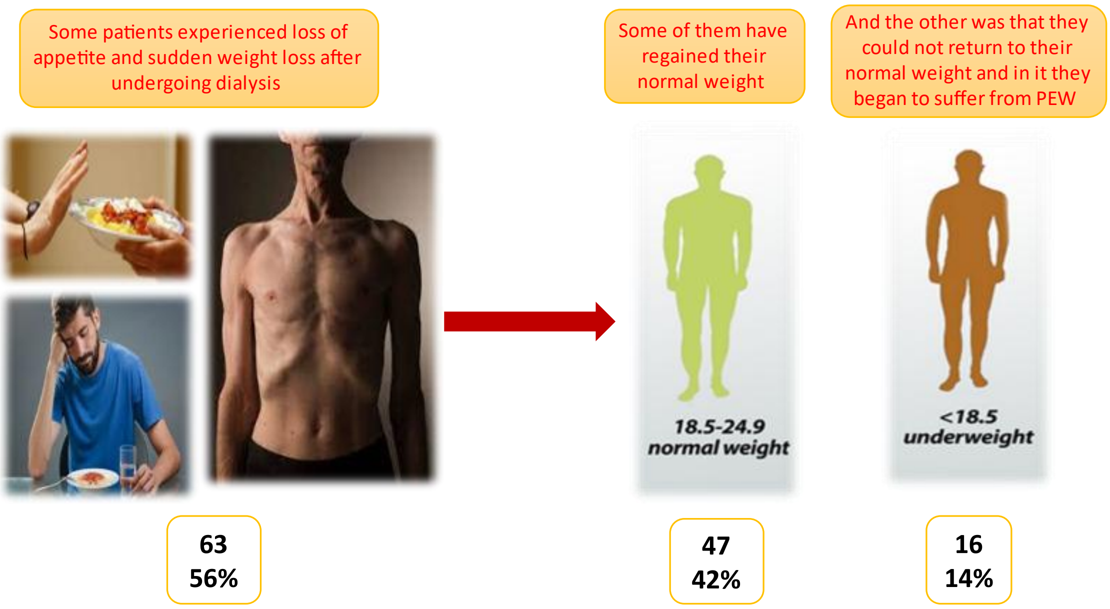

Figure 6. The loss of appetite and sudden weight loss for dialysis patients.

The results in Table 2 showed that 26% of patients in this study consumed animal products such as meat, poultry, fish, egg, milk, and cheese, while 46.7% consumed a mixed diet. Unfortunately, 5% suffered from anorexia and PEW, as depicted in Figure 6. According to the results, 63% of HD patients knew their dietary requirements and how to manage their intake. However, among the 56% of HD patients who experienced loss of appetite and sudden weight loss after dialysis, only 42% regained their normal weight. Fourteen percent experienced protein-energy wasting due to insufficient nutrient consumption, particularly protein. Nearly all HD patients (89%) experienced short-term hyperphosphatemia symptoms due to consuming high-phosphorus foods. Of these patients, 49% utilized Reangle pills to alleviate symptoms, while 39% could not afford them or were unaware of their availability. Frequent high blood pressure was an issue for 34% of HD patients. Among these, 21% consumed salty food daily, while 14% consumed it moderately, indulging in nuts and salty biscuits twice a week. Nevertheless, 63% of HD patients did not experience frequent high blood pressure as they controlled their sodium intake through their diet. Approximately 34% of HD patients suffered edema around the eyes, hands, and feet, as well as shortness of breath due to the lack of fluid intake regulation between their dialysis sessions [41].

Table 2. Major food consumed by hemodialysis patients.

Daily meals	Number of Samples	Percentage%
Animal sources	27*	25.6
Plant sources	29*	27.6
Mixed	49**	46.7
Total	105	100

The differences in the symbol mean there is a significant difference*

The results in Figure 7 indicated that 21% of HD patients suffered from bone and joint pain, 24% had itchy skin, and 43% suffered from combinations of bone, joint, and skin issues, while 10% of HD patients did not exhibit these symptoms, as depicted in Figure 7. This aligns with studies conducted in 2020 by Khor, which linked sugar-sweetened beverages to higher consumption of inorganic phosphate and serum phosphorus levels, and another study by Streja in 2013, which found that patients with high dietary protein intake tripled their risk of developing hyperphosphatemia [42,43]. A high percentage (49%) of patients took the Reangle pill to alleviate hyperphosphatemia symptoms. In comparison, 39% of those affected by these symptoms did not take the pill, as some could not afford it due to its high price in Libya, and others had not heard of it.

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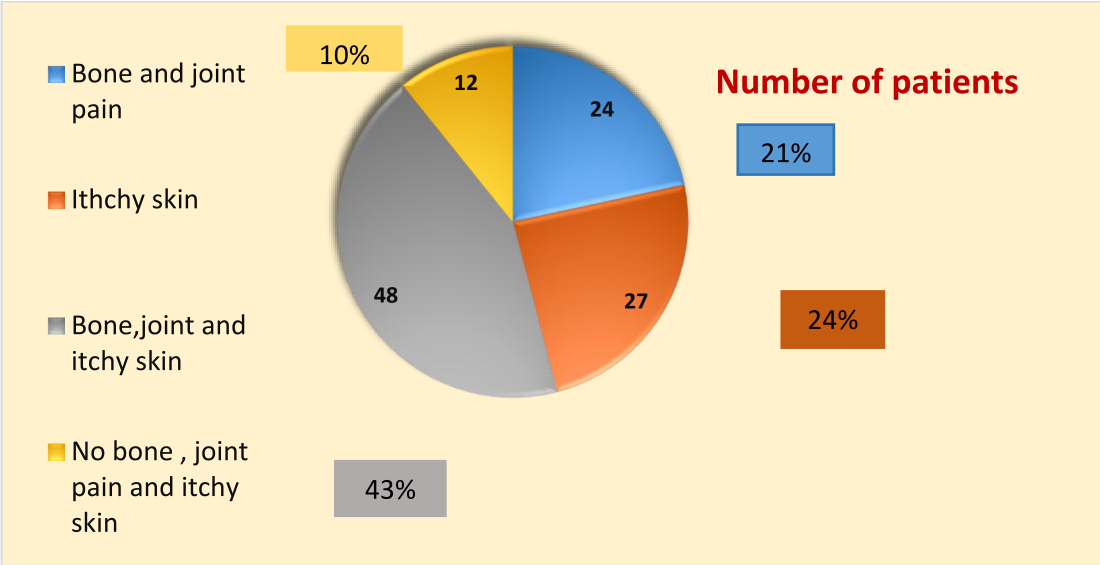

Figure 7. Short-term hyperphosphatemia symptoms.

Discussion

Protein-energy wasting and high phosphor levels can have a significant impact on the health of patients undergoing maintenance hemodialysis, leading to higher rates of hospitalization and increased mortality rates. This study's results showed that 5% of patients suffered from anorexia and PEW.

According to the results, most HD patients knew their dietary requirements and how to manage their intake. However, most of them experienced loss of appetite and sudden weight loss after dialysis and experienced protein-energy wasting due to insufficient protein consumption. In addition, this study's results indicated that 89% of HD patients suffer from short-term hyperphosphatemia because they did not follow the designed diet correctly and consumed large amounts of phosphorus-rich foods such as meat, poultry, sardine, tuna, salmon, cheese, milk, and legumes. These findings proved the hypothesis of the effect of diet management during dialysis on patients' health status and the expansion in their lifetime. These results are consistent with research conducted in 2023 by Moroșan that restricted processed food intake containing phosphorus additives through personalized diets adapted to each CKD patient, encouraging ESRD patients to use phosphate binders, effectively reducing phosphorus levels [44]. Another study conducted in 2017 by Wang revealed that high-protein meals during dialysis, combined with a phosphorus binder, are safe and effective in increasing serum albumin levels while controlling phosphorus levels in hypoalbuminemic hemodialysis patients [45].

A study conducted in 2007 by Lamb found that phosphorus binders improved serum phosphate levels in 71% of peritoneal dialysis patients and 63% of hemodialysis patients, though 10% of hemodialysis patients did not experience short-term hyperphosphatemia symptoms as they decreased their phosphorus-rich food consumption or did not eat much phosphorus due to loss of appetite after dialysis, as illustrated in Figure 8 [46].

Conclusion

Following a specific diet for CKD patients undergoing dialysis is a crucial matter that will make a difference in their lifetime and the severity of symptoms during their treatment period. Unfortunately, in Libyan dialysis centers the medical team, and patients do not give enough attention to the effect of the patient's diet on their recovery, the success of the treatment, and on avoiding some unfavorable symptoms accompanying the dialysis which may help to fasten the treatment and end up with better results for the total heat status for patients. In addition, most patients are ignorant about the effect of their food on their health status before, during, and after the treatment. Therefore. Educational sessions for the medical team, the patients, and their family members should take place in all dialysis centers in Libya to avoid making the dialysis operation the worst experience for CKD patients and help them increase the period between the stages of CKD and keep good health status, and extend their lives in some cases.

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Conflicts of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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References

1. Webster AC, Nagler EV, Morton RL, Masson P. Chronic kidney disease. The Lancet. 2017;389(10075):1238-1252.
2. Ku E, Lee BJ, Wei J, Weir MR. Hypertension in CKD: Core curriculum 2019. Am J Kidney Dis. 2019;74(1):120-131.
3. Bansal N, Katz R, Robinson-Cohen C, Odden MC, Dalrymple L, Shlipak MG, de Boer IH. Absolute rates of heart failure, coronary heart disease, and stroke in chronic kidney disease: an analysis of 3 community-based cohort studies. JAMA Cardiol. 2017;2(3):314-318.
4. Mohammed N, Mohammed T, Farag N. Alteration of Blood Parameters in Non-Dialyzed Patients of Chronic Kidney Disease. AlQalam Journal of Medical and Applied Sciences. 2025 Jan 27:177-81.
5. Footman K, Mitrio S, Zanon D, Glonti K, Risso-Gill I, McKee M, Knai C. Dialysis services for tourists to the Veneto Region: a qualitative study. J Ren Care. 2015;41(1):19-27.
6. Kovesdy CP, Kopple JD, Kalantar-Zadeh K. Management of protein-energy wasting in non-dialysis-dependent chronic kidney disease: reconciling low protein intake with nutritional therapy. Am J Clin Nutr. 2013;97(6):1163-1177.
7. Garcia-Torres R, Young L, Murray DP, Kheda M, Nahman Jr NS. Dietary protein source and phosphate levels in patients on hemodialysis. J Ren Nutr. 2020;30(5):423–429.
8. Chertow GM, Burdick E, Honour M, Bonventre JV, Bates DW. Acute kidney injury, mortality, length of stay, and hospital patient costs. J Am Soc Nephrol. 2005;16(11):3365–3370.
9. Ramirez JA, Emmett M, White MG, Fathi N, Santa Ana CA, Morawski SG, Fordtran JS. The absorption of dietary phosphorus and calcium in hemodialysis patients. Kidney Int. 1986;30(5):753–759.
10. Nouri N, Sims JJ, Kopple JD, Shah A, Colman S, Shinaberger CS, Kalantar-Zadeh K. Organic and inorganic dietary phosphorus and its management in chronic kidney disease. Iran J Kidney Dis. 2010;4(2):89–100.
11. Campbell K, Rossi M, Carrero JJ. Nutrition management in hemodialysis. Core Concepts in Dialysis and Continuous Therapies. 2016:53–70.
12. Sen D, Prakash J. Nutrition in dialysis patients. J Assoc Physicians India. 2000;48(7):724–730.
13. Fouque D, Kalantar-Zadeh K, Kopple J, Cano N, Chauveau P, Cuppari L, Wanner C. A proposed nomenclature and diagnostic criteria for protein-energy wasting in acute and chronic kidney disease. Kidney Int. 2008;73(4):391-398.
14. Raj DS, Welbourne T, Dominic EA, Waters D, Wolfe R, Ferrando A. Glutamine kinetics and protein turnover in end-stage renal disease. Am J Physiol Endocrinol Metab. 2005;288(1):E37-E46.
15. Sahathevan S, Khor BH, Ng HM, Abdul Gafor AH, Mat Daud ZA, Mafra D, Karupaiah T. Understanding development of malnutrition in hemodialysis patients: a narrative review. Nutrients. 2020;12(10):3147.
16. Ikizler TA, Flakoll PJ, Parker RA, Hakim RM. Amino acid and albumin losses during hemodialysis. Kidney Int. 1994;46(3):830-837.
17. Block GA, Klassen PS, Lazarus JM, Ofsthun N, Lowrie EG, Chertow GM. Mineral metabolism, mortality, and morbidity in maintenance hemodialysis. J Am Soc Nephrol. 2004;15(8):2208–2218.
18. Tonelli M, Pannu N, Manns B. Oral phosphate binders in patients with kidney failure. N Engl J Med. 2010;362(14):1312-1324.
19. National Heart, Lung, and Blood Institute. Clinical guidelines on identifying, evaluating, and treating overweight and obesity in adults. The evidence reports. Bethesda: National Institutes of Health; 1998:1-228.
20. Benini O, D'Alessandro C, Gianfaldoni D, Cupisti A. Extra-phosphate load from food additives in commonly eaten foods: an accurate and insidious danger for renal patients. J Ren Nutr. 2011;21(4):303-308.
21. Wang J, Yue P, Huang J, Xie X, Ling Y, Jia L, Sun F. Nursing intervention on the compliance of hemodialysis patients with end-stage renal disease: a meta-analysis. Blood Purif. 2018;45(1-3):102-109.
22. Chazot C, Wabel P, Chamney P, Moissl U, Wieskotten S, Wizemann V. Importance of normohydration for the long-term survival of hemodialysis patients. Nephrol Dial Transplant. 2012;27(6):2404-2410.
23. Hung SC, Lai YS, Kuo KL, Tarng DC. Volume overload and adverse outcomes in chronic kidney disease: clinical observational and animal studies. J Am Heart Assoc. 2015;4(5):e001918.
24. Zhao D, Qi Y, Zheng Z, Wang Y, Zhang XY, Li HJ, Liu J. Dietary factors associated with hypertension. Nat Rev Cardiol. 2011;8(8):456-465.
25. Caldeira D, Vaz-Carneiro A, Costa J. What is the benefit of salt reduction on blood pressure? Assessment of the Cochrane Review: Effect of longer-term modest salt reduction on blood pressure. Acta Med Port. 2013;26(5):490-2.
26. Kovesdy CP, Lott EH, Lu JL, Malakauskas SM, Ma JZ, Molnar MZ, Kalantar-Zadeh K. Hyponatremia, hypernatremia, and mortality in patients with chronic kidney disease with and without congestive heart failure. Circulation. 2012;125(5):677-684.
27. Eknoyan G, Lameire N, Eckardt K, Kasiske B, Wheeler D, Levin A, Coresh J. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int Suppl. 2013;3(1):5-14.
28. Bi SH, Wang X, Tang W, Wang T, Li B, Su C. Longitudinal association between dietary protein intake and survival in peritoneal dialysis patients. Ren Fail. 2023;45(1):2182605.
29. Moroșan E, Popovici V, Elian V, Dărăban AM, Rusu AI, Licu M, Karampelas O. The impact of medical nutrition intervention on the management of hyperphosphatemia in hemodialysis patients with stage 5 chronic kidney disease: A case series. Int J Environ Res Public Health. 2023;20(6):5049.
30. Jha V, Chaturvedi S, et al. The demographics of patients on hemodialysis in India: a prospective observational study. Hemodial Int. 2023;27(1):1-10.
31. Maduell F, Cholbi E, Morantes L, Escudero-Saiz VJ, Ollé J, Martínez-Chillarón M, Broseta JJ. Results of salt intake restriction monitored with the new sodium control biosensor. Am J Nephrol. 2023;1-1.

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32. Ku E, Lee BJ, Weir MR. Hypertension in CKD patients: a clinical perspective. Am J Kidney Dis. 2019;73(3):358-369.
33. Khor BH, Sualeheen A, Sahathevan S, Chinna K, Gafor AHA, Bavanandan S, PaTCH Investigators. Association of dietary patterns with serum phosphorus in maintenance hemodialysis patients: A cross-sectional study. Sci Rep. 2020;10(1):12278.
34. Inoue A, Ishikawa E, Shirai Y, Murata T, Miki C, Hamada Y. Effects of Protein-Energy Wasting and hyperphosphatemia on the prognosis in Japanese maintenance hemodialysis patients: A five-year follow-up observational study. Clin Nutr ESPEN. 2020;
35. Rhee CM, You AS, Koontz Parsons T, Tortorici AR, Bross R, St-Jules DE, Jing J, Lee ML, Benner D, Kovesdy CP, Mehrotra R. Effect of high-protein meals during hemodialysis combined with lanthanum carbonate in hypoalbuminemic dialysis patients: findings from the FrEDI randomized controlled trial. Nephrology Dialysis Transplantation. 2017 Jul 1;32(7):1233-43.
36. Hecking M, Riesinger C, Schmitt CP, et al. Sex differences in the prevalence and characteristics of patients receiving hemodialysis. Clin J Am Soc Nephrol. 2014;9(4):681-688.
37. Iseki K. Chronic kidney disease in Japan. Internal Medicine. 2008;47(8):681-9.
38. Jolly S, Chatatalsingh C, Bargman J, Vas S, Chu M, Oreopoulos DG. Excessive weight gain during peritoneal dialysis. Int J Artif Organs. 2001 Apr;24(4):197-202. PMID: 11394699.
39. Igarashi P, Somlo S. Genetics and pathogenesis of polycystic kidney disease. Journal of the American Society of Nephrology. 2002 Sep 1;13(9):2384-98.
40. Eknoyan G. Obesity and chronic kidney disease. Nefrología (English Edition). 2011 Jul 1;31(4):397-403.
41. Maduell F, Escudero-Saiz VJ, Rodas LM, Cuadrado E, Morantes L, Arias-Guillen M, Fontseré N, Rico N, Broseta JJ. An Observational Study of the First 100 Patients Undergoing Nocturnal Every-Other-Day Online Hemodiafiltration: Clinical Outcomes and Patient and Technique Survival. Journal of Clinical Medicine. 2025 Jan 3;14(1):251.
42. Khor BH, Sahathevan S, Sualeheen A, Ali MS, Narayanan SS, Chinna K, Gafor AH, Goh BL, Ahmad G, Morad Z, Daud ZA. Circulating fatty acid profiles are associated with protein energy wasting in maintenance hemodialysis patients: a cross-sectional study. Scientific Reports. 2021 Jan 14;11(1):1416.
43. Streja E, Lau WL, Goldstein L, Sim JJ, Molnar MZ, Nissenson AR, Kovesdy CP, Kalantar-Zadeh K. Hyperphosphatemia is a combined function of high serum PTH and high dietary protein intake in dialysis patients. Kidney international supplements. 2013 Dec 2;3(5):462-8.
44. Moroşan E, Popovici V, Elian V, Dărăban AM, Rusu AI, Licu M, Mititelu M, Karampelas O. The Impact of Medical Nutrition Intervention on the Management of Hyperphosphatemia in Hemodialysis Patients with Stage 5 chronic kidney disease: A Case Series. International Journal of Environmental Research and Public Health. 2023 Mar 13;20(6):5049.
45. Wang M, Obi Y, Streja E, Rhee CM, Lau WL, Chen J, Hao C, Hamano T, Kovesdy CP, Kalantar-Zadeh K. Association of parameters of mineral bone disorder with mortality in patients on hemodialysis according to level of residual kidney function. Clinical Journal of the American Society of Nephrology. 2017 Jul 1;12(7):1118-27
46. Lamb EJ, Hodsman A, van Schalkwyk D, Ansell D, Warwick G. Serum calcium, phosphate, parathyroid hormone, albumin, aluminium and cholesterol achievement on replacement therapy (chapter 9). Nephrology Dialysis Transplantation. 2007 Aug 1;22(suppl_7):vii105-18.
47. Francis A, Harhay MN, Ong A, Tummalapalli SL, Ortiz A, Fogo AB, Fliser D, Roy-Chaudhury P, Fontana M, Nangaku M, Wanner C. Chronic kidney disease and the global public health agenda: an international consensus. Nature Reviews Nephrology. 2024 Apr 3:1-3.

المستخلص

مرض الكلى المزمن هو مرض منتشر على نطاق واسع في العالم، وهو يؤدي إلى خلل دائم في وظائف الكلى وخاصة في مراحل المرض المتقدمة، مما يستلزم تدخلات مثل غسيل الكلى أو زرع الكلى. في الآونة الأخيرة، أوضحت نتائج البحوث العلمية أن التدخلات الغذائية لمريض الكلى تعتبر إلزامية لمواجهة الآثار السلبية لهذا المرض، وخاصة بالنسبة للمرضى الذين يخضعون لغسيل الكلى. تهدف هذه الدراسة إلى تقييم وعي مرضى الكلى المزمن بالعلاقة بين تناول النظام الغذائي المناسب ومضاعفات المرض، مع التركيز علي تأثير تناول الفوسفور والصوديوم على معدل الإصابة والوفيات لدى مرضى الكلى المزمن. أجرت الدراسة مقابلات مع 111 مريضًا يخضعون لغسيل الكلى في مركزين لغسيل الكلى في طرابلس، ليبيا. استخدمت الدراسة استبيانًا مكونًا من 35 سؤالاً يغطي المعلومات الشخصية والتاريخ الطبي وتقييمات للمستوى التغذوي للمرضى، ومدي وعي المرضى بتأثير الغذاء على حالتهم الصحية. كشفت النتائج أن 31٪ فقط من مرضى ما قبل غسيل الكلى لديهم معرفة كافية بأنظمة إدارة الأغذية لتعزيز غسيل الكلى وبروتوكولات العلاج، في حين أن 69٪ من مرضى غسيل الكلى يفهمون احتياجاتهم الغذائية ولكنهم لم يتبعوا نظامًا غذائيًا سليمًا. ومن بين مرضى غسيل الكلى، عانى 63% من فقدان الشهية وفقدان الوزن المفاجئ، ولم يتمكن 16% من استعادة وزنهم الأساسي ويواجهون إهدار البروتين والطاقة. وأبلغ 99% عن أعراض فرط فوسفات الدم قصير المدى، حيث استخدم 55% حبوب Reangle لتخفيف الأعراض، بينما لم يفعل 44% ذلك لأسباب مالية أو قلة الوعي. أثر ارتفاع ضغط الدم على 40% من مرضى ما بعد غسيل الكلى، و38% عانوا من الوذمة وضيق التنفس، مما يؤكد على تنظيم السوائل بشكل أفضل. وفي الختام، بينما كان غالبية مرضى الفشل الكلوي المزمن على دراية باحتياجاتهم الغذائية، عانى الكثيرون من فقدان الشهية ومشاكل الوزن، مما أدى إلى نقص كبير في العناصر الغذائية وحدوث مضاعفات للمرض.

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