Original Article

Assessment of Nutritional Status of Chronic Kidney Disease Patients Attending a Dialysis Centre in a Tertiary Care Hospital

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Abstract

Background: Malnutrition is frequent in chronic kidney disease patients receiving hemodialysis and contributes to impaired functional status, reduced treatment tolerance and poorer clinical outcomes. Routine bedside nutritional assessment is therefore important in dialysis units. The objective is to describe the sociodemographic and clinical profile of CKD patients undergoing hemodialysis, identify common comorbidities, and assess nutritional status using the Patient-Generated Subjective Global Assessment tool. **Material and Methods:** This hospital-based cross-sectional study was conducted at the dialysis centre attached to Government General Hospital, Srikakulam, during March and April 2023. Fifty-six CKD patients registered for hemodialysis were included. Data on sociodemographic variables, comorbidities, disease duration, dialysis frequency, personal history and nutritional status were collected using a pretested semi-structured questionnaire. PG-SGA scoring, activity status and physical examination findings were used for nutritional classification. Descriptive statistics and Chi-square test were applied. **Results:** The mean age was 53.5 years, and most patients were males. Hypertension was the predominant comorbidity. Most patients had been undergoing dialysis for less than one year and received dialysis twice weekly. PG-SGA global assessment showed that 12.50% were well nourished, 83.92% had moderate malnutrition and 3.57% had severe malnutrition. Nutritional triage showed that 44.64% required nutritional intervention, while 41.07% required urgent intervention. Age above 50 years, occupational status and comorbidity burden were significantly associated with malnutrition. **Conclusion:** Malnutrition was highly prevalent among CKD patients undergoing hemodialysis. PG-SGA is a practical tool for early identification of nutritional risk in dialysis settings and supports timely nutrition-focused intervention.

Keywords: Chronic kidney disease; Hemodialysis; Malnutrition; Nutritional status; Patient-Generated Subjective Global Assessment; Protein-energy wasting.

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Introduction

Chronic kidney disease (CKD) is a progressive disorder characterized by persistent abnormalities in kidney structure or function and is associated with a wide spectrum of metabolic, cardiovascular and nutritional consequences[1] As renal function declines, patients experience altered protein and energy metabolism, reduced appetite, dietary restrictions, inflammation and hormonal disturbances that together increase vulnerability to undernutrition and protein-energy wasting. International guidelines emphasize that CKD requires systematic evaluation, risk stratification and continuous clinical monitoring because complications accumulate well before the initiation of renal replacement therapy.[1] In patients receiving maintenance hemodialysis, nutritional assessment has particular importance because the dialysis procedure itself can promote catabolism and nutrient losses, while frequent symptoms such as anorexia, nausea, early satiety and fatigue further reduce dietary intake.[2]

Malnutrition in CKD is not merely a low body weight state. It represents a complex interaction between inadequate intake, inflammation, comorbidity, metabolic acidosis, endocrine changes and loss of lean body mass. The International Society of Renal Nutrition and Metabolism proposed the term protein-energy wasting to describe the loss of body protein stores and energy reserves occurring in kidney disease.[3] Contemporary evidence indicates that protein-energy wasting occurs across the CKD spectrum, with a substantial burden among dialysis patients.[4] The clinical importance of this condition lies in its association with hospitalization, poor quality of life, infection risk, cardiovascular events and mortality.[5] Therefore, nutritional evaluation should be regarded as a routine component of dialysis care rather than an optional supportive measure.

Several methods are available to evaluate nutritional status in

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CKD, including anthropometry, biochemical markers, dietary assessment, body composition analysis, Subjective Global Assessment (SGA), Malnutrition-Inflammation Score and Patient-Generated Subjective Global Assessment (PG-SGA). Each method has strengths and limitations. Serum albumin, for example, is affected by inflammation and hydration status and cannot independently define malnutrition. Composite clinical tools are useful because they combine dietary intake, weight change, symptoms, functional capacity and physical examination findings. PG-SGA is attractive in busy dialysis centres because it captures patient-reported symptoms and clinician-assessed nutritional deficits in a structured format.[6-9]

The nutritional status of hemodialysis patients also varies according to age, socioeconomic background, education, occupation, comorbidity burden and dialysis-related factors. Indian dialysis populations often include patients with delayed referral, limited dietetic support, financial strain and multiple comorbidities. These factors intensify the need for locally generated evidence to guide screening and nutrition intervention. The present study was conducted with the objectives of assessing the sociodemographic profile of CKD patients undergoing hemodialysis, describing their comorbidity pattern, and evaluating nutritional status using the PG-SGA tool among patients attending the dialysis centre attached to Government General Hospital, Srikakulam.

Materials and Methods

Study design and setting: This hospital-based cross-sectional study was conducted in the dialysis centre attached to Government General Hospital, Srikakulam. The study was carried out over two months, from March 2023 to April 2023. The cross-sectional design was selected to estimate the burden of malnutrition and examine its association with selected demographic, clinical and dialysis-related variables among CKD patients receiving hemodialysis.

Study population: The study population included 56 diagnosed CKD patients registered for hemodialysis during the study period. Patients with CKD undergoing maintenance hemodialysis and able to communicate with the study team were included after obtaining informed consent. Patients who were critically ill, unconscious or unwilling to participate were excluded. Eligible patients were enrolled consecutively until the required sample was completed.

Data collection procedure: Data were collected using a pretested semi-structured questionnaire administered through face-to-face interview in the dialysis unit. Sociodemographic details included age, gender, education, occupation, income, socioeconomic status and marital status. Clinical information included comorbidities, family history of CKD, smoking and alcohol history, duration of CKD, duration of dialysis and number of dialysis sessions per week. Anthropometric measurements were recorded using standard methods. Weight and height were measured using calibrated instruments, and relevant clinical details were verified from patient records when available. The same data collection format was used for all participants to maintain uniformity.

Nutritional assessment: Nutritional status was assessed using the Patient-Generated Subjective Global Assessment. PG-SGA includes weight change, food intake, nutrition-impact symptoms, activities and function, metabolic demand and physical examination findings. Patients were classified as well nourished, moderately malnourished or severely malnourished based on global assessment. Nutritional triage scores were categorized as 0-1, 2-3, 4-8 and 9 or above to indicate increasing need for nutrition intervention. PG-SGA and SGA-based approaches are clinically useful in CKD and dialysis populations because they integrate symptoms, intake, function and physical findings.[8-10]

Statistical analysis: Data were entered into Microsoft Excel and analysed using appropriate descriptive and inferential statistical methods. Qualitative variables were expressed as frequencies and percentages. Quantitative variables were summarized as mean and standard deviation, wherever applicable. The association between nutritional status and selected sociodemographic and clinical variables was assessed using the Chi-square test. Yates correction was applied wherever required. A p-value of less than 0.05 was considered statistically significant.

Ethical considerations: Institutional ethical approval was obtained before data collection. Written informed consent was obtained from all participants. Confidentiality was maintained throughout the study, and no patient-identifying information was included in the manuscript. Participation did not alter dialysis scheduling, medications, dietary advice or routine clinical management.

Results

A total of 56 CKD patients undergoing hemodialysis were included. The age of participants ranged from 21 to 75 years, with a mean age of 53.5 years. Most patients were above 40 years of age, and the highest proportion belonged to the 61-70 years age group. Male predominance was observed, and most participants were married, as shown in [Table 1].

Table 1: Sociodemographic profile of the study population

Variable	Category	Frequency (n=56)	Percentage (%)
Age group, years	21-30	2	3.57
	31-40	5	8.92
	41-50	16	28.57
	51-60	14	25.00
	61-70	17	30.35
	>70	2	3.57
Gender	Male	47	83.92
	Female	9	16.07
Marital status	Married	54	96.42
	Unmarried	2	3.57

The educational and socioeconomic profile showed that illiteracy was common among the study population. A large proportion of patients were unemployed. More than half of the patients belonged to the upper-lower socioeconomic class, and most families had monthly income between Rs. 9,226 and Rs. 27,648, as presented in [Table 2].

Table 2: Educational, occupational and socioeconomic characteristics

Variable	Category	Frequency (n=56)	Percentage (%)
Education	Illiterate	36	64.28
	Primary school	7	12.50
	Middle school	2	3.57
	High school	5	8.92
	Intermediate/Diploma	4	7.14
	Graduate	2	3.57
Occupation	Unemployed	44	78.57
	Unskilled worker	2	3.57
	Semi-skilled worker	2	3.57
	Farmer/Shop owner	8	14.28
Socioeconomic status	Lower middle	7	12.50
	Upper lower	29	51.78
	Lower	20	35.71
Family income, Rs.	<9,226	10	17.85
	9,226-27,648	45	80.35
	>27,648	1	1.78

Hypertension was the most common comorbidity, present in nearly three-fourths of the patients. A family history of CKD was reported in 12.50% of patients. Smoking history was present in 30.35%, whereas alcohol consumption was reported by 51.78% of the study participants, as summarized in [Table 3].

Table 3: Clinical profile and personal history of CKD patients

Variable	Category	Frequency (n=56)	Percentage (%)
Comorbidities	Hypertension	41	73.21
	Diabetes mellitus	2	3.57
	Hypertension and diabetes	1	1.78
	Hypertension and others	2	3.57
	No comorbidity	10	17.85
Family history of CKD	Yes	7	12.50
	No	49	87.50
Smoking history	Yes	17	30.35
	No	39	69.64
Alcohol history	Yes	29	51.78
	No	27	48.21

Regarding disease duration, 26.78% of patients had CKD for less than one year. Half of the patients had been undergoing hemodialysis for less than one year. Most patients received dialysis twice weekly, while nearly one-third received dialysis thrice weekly, as shown in [Table 4].

Table 4: CKD duration and dialysis-related characteristics

Variable	Category	Frequency (n=56)	Percentage (%)
Duration of CKD, years	<1	15	26.78
	1-3	13	23.21
	3-5	13	23.21
	5-7	6	10.71
	>7	9	16.07
Duration of dialysis, years	<1	28	50.00
	1-3	13	23.21
	3-5	11	19.64
	5-7	2	3.57
	>7	2	3.57
Dialysis sessions per week	Twice weekly	39	69.64
	Thrice weekly	17	30.35

Nutritional assessment using PG-SGA showed that only 12.50% of patients were well nourished. Moderate malnutrition was observed in 83.92% of patients, while severe malnutrition was found in 3.57%. Based on PG-SGA triage score, 44.64% of patients required nutritional intervention and 41.07% required urgent nutritional intervention, as shown in [Table 5].

Table 5: Nutritional assessment based on PG-SGA

Variable	Category	Frequency (n=56)	Percentage (%)
Overall global assessment	Stage A: Well nourished	7	12.50
	Stage B: Moderately malnourished	47	83.92
	Stage C: Severely malnourished	2	3.57
Nutritional triage score	0-1	2	3.57
	2-3	6	10.71
	4-8	25	44.64
	>=9	23	41.07
Activities and function	Normal with no limitation	9	16.07
	Fairly normal activity	15	26.78
	At rest less than half the day	14	25.00
	At rest most of the day	18	32.14
Physical examination findings	Mild deficit	47	83.92
	Moderate deficit	9	16.07
	Severe deficit	0	0.00

On bivariate analysis, age, occupation and comorbidity status showed statistically significant associations with malnutrition. Patients aged above 50 years had higher proportions of moderate and severe malnutrition. Gender, educational status and dialysis frequency were not significantly associated with nutritional status, as presented in [Table 6].

Table 6: Factors associated with malnutrition among CKD patients

Variable	Category	Well nourished	Moderate malnutrition	Severe malnutrition	p-value
Age, years	<=50	6	17	0	0.02
	>50	1	30	2	
Gender	Male	6	39	2	0.87
	Female	1	8	0	
Education	Illiterate	5	30	1	0.94
	Literate	2	17	1	
Occupation	Unemployed	6	38	0	0.02
	Employed	1	9	2	
Comorbidity status	One comorbidity	4	38	1	0.02
	Two comorbidities	0	2	1	
	No comorbidity	3	7	0	
Dialysis sessions per week	Twice weekly	5	33	1	0.93
	Thrice weekly	2	14	1	

Overall, 49 out of 56 patients were classified as malnourished by PG-SGA global assessment. The findings indicate a high burden of malnutrition among CKD patients undergoing hemodialysis, with moderate malnutrition forming the major nutritional category.

Discussion

The present study demonstrated a high burden of malnutrition among CKD patients undergoing hemodialysis, with 87.50% of participants classified as malnourished by PG-SGA global assessment. Moderate malnutrition was the dominant category, while severe malnutrition was less frequent. This pattern is clinically relevant because nutritional depletion in dialysis patients develops gradually and often remains underrecognized until functional decline, recurrent symptoms or biochemical derangements become evident. The high prevalence observed in this study is consistent with the established concept that dialysis patients are vulnerable to protein-energy wasting due to reduced intake, inflammatory activity, metabolic stress and dialysis-related nutrient loss.[7]

The male predominance and older age distribution in this study reflect the usual demographic profile encountered in many dialysis units. Age showed a statistically significant association with malnutrition, with patients above 50 years having a greater burden of moderate and severe malnutrition. Age-related anorexia, sarcopenia, reduced physical activity, comorbidity accumulation and limited dietary adaptability can contribute to this association. Earlier work has also shown that nutritional assessment scores predict adverse outcomes among dialysis patients and that progressive nutritional decline is linked to mortality.[10-12] These findings support routine nutritional screening, especially among older hemodialysis patients.

Hypertension was the most common comorbidity in the present study. Comorbidity status was significantly associated with malnutrition, indicating that patients with coexisting chronic conditions experience greater nutritional stress. This relationship is biologically plausible because comorbid diseases increase inflammation, medication burden, dietary restrictions and hospital visits. Malnutrition-inflammation complex has been strongly associated with morbidity and mortality in maintenance hemodialysis populations.[11] In addition, occupational status was significantly associated with malnutrition. Unemployment and reduced earning capacity can limit access to protein-rich food, transport, regular follow-up and dietetic counselling, particularly in resource-constrained settings.

PG-SGA triage scores showed that a large proportion of patients required active or urgent nutritional intervention. This observation is important because PG-SGA does not merely classify nutritional status; it also guides the intensity of nutritional management. The tool captures symptoms such as poor appetite, early satiety, fatigue, dry mouth, nausea and gastrointestinal problems, all of which directly interfere with nutrient intake. Desbrow et al. reported that PG-SGA can rapidly identify malnutrition in hemodialysis patients.[9] Indian evidence has also shown that dietician-led counselling improves nutritional status in hemodialysis patients, supporting the practical value of early screening followed by structured intervention.[14]

Gender, education and dialysis frequency were not significantly associated with nutritional status in this study. These findings should be interpreted in view of the small sample size and the unequal distribution of some categories. Nevertheless, the overall results reinforce the need for nutrition surveillance in all dialysis patients rather than selective screening of only visibly wasted individuals. Regular PG-SGA assessment, individualized renal diet counselling, symptom control, monitoring of dry weight and timely nutritional supplementation can improve the clinical care pathway. Dialysis units in tertiary hospitals should integrate nutritional assessment into routine patient review, with referral to renal dieticians when PG-SGA scores indicate intervention.

Limitations: This study was conducted in a single tertiary care dialysis centre with a modest sample size, limiting wider generalization. The cross-sectional design captured nutritional status at one point and did not measure longitudinal nutritional change. Biochemical markers, detailed dietary intake, inflammatory markers and dialysis adequacy indicators were not comprehensively analysed, which restricted deeper exploration of determinants and outcome prediction. Patient-reported symptoms introduced recall dependency.

Conclusion

Malnutrition was highly prevalent among CKD patients undergoing hemodialysis at the study centre. PG-SGA identified that nearly nine out of ten patients had some degree of malnutrition, predominantly moderate malnutrition. Older age, occupational status and comorbidity burden showed significant associations with nutritional status. These findings highlight the need for routine nutritional screening in dialysis units. Early identification through PG-SGA, regular symptom assessment, dietician-led counselling and timely nutritional intervention can improve patient care and preserve functional capacity. Nutritional assessment should become an integral part of hemodialysis follow-up, particularly in resource-limited tertiary care settings where undernutrition is frequently overlooked during routine clinical review until advanced clinical deterioration develops and preventable complications increase.

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Conflicts of interest

There are no conflicts of interest.

References

1. Stevens PE, Levin A; Kidney Disease: Improving Global Outcomes Chronic Kidney Disease Guideline Development Work Group Members. Evaluation and management of chronic kidney disease: synopsis of the Kidney Disease: Improving Global Outcomes 2012 clinical practice guideline. Ann Intern Med. 2013;158(11):825-830. doi:10.7326/0003-4819-158-11-201306040-00007.
2. Ikizler TA, Burrowes JD, Byham-Gray LD, Campbell KL, Carrero JJ, Chan W, et al. KDOQI clinical practice guideline for nutrition in CKD: 2020 update. Am J Kidney Dis. 2020;76(3 Suppl 1):S1-S107. doi:10.1053/j.ajkd.2020.05.006.
3. Fouque D, Kalantar-Zadeh K, Kopple J, Cano N, Chauveau P, Cuppari L, et al. A proposed nomenclature and diagnostic criteria for protein-energy wasting in acute and chronic kidney disease. Kidney Int. 2008;73(4):391-398. doi:10.1038/sj.ki.5002585.
4. Carrero JJ, Thomas F, Nagy K, Arogundade F, Avesani CM, Chan M, et al. Global prevalence of protein-energy wasting in kidney disease: a meta-analysis of contemporary observational studies from the International Society of Renal Nutrition and Metabolism. J Ren Nutr. 2018;28(6):380-392. doi:10.1053/j.jrn.2018.08.006.
5. Iorember FM. Malnutrition in chronic kidney disease. Front Pediatr. 2018;6:161. doi:10.3389/fped.2018.00161.
6. Carrero JJ, Stenvinkel P, Cuppari L, Ikizler TA, Kalantar-Zadeh K, Kaysen G, et al. Etiology of the protein-energy wasting syndrome in chronic kidney disease: a consensus statement from the International Society of Renal Nutrition and Metabolism. J Ren Nutr. 2013;23(2):77-90. doi:10.1053/j.jrn.2013.01.001.
7. Ikizler TA, Cano NJ, Franch H, Fouque D, Himmelfarb J, Kalantar-Zadeh K, et al. Prevention and treatment of protein energy wasting in chronic kidney disease patients: a consensus statement by the International Society of Renal Nutrition and Metabolism. Kidney Int. 2013;84(6):1096-1107. doi:10.1038/ki.2013.147.
8. Steiber AL, Kalantar-Zadeh K, Secker D, McCarthy M, Sehgal A, McCann L. Subjective Global Assessment in chronic kidney disease: a review. J Ren Nutr. 2004;14(4):191-200. doi:10.1053/j.jrn.2004.08.004.
9. Desbrow B, Bauer J, Blum C, Kandasamy A, McDonald A, Montgomery K. Assessment of nutritional status in hemodialysis patients using Patient-Generated Subjective Global Assessment. J Ren Nutr. 2005;15(2):211-216.
10. Enia G, Sicuso C, Alati G, Zoccali C. Subjective global assessment of nutrition in dialysis patients. Nephrol Dial Transplant. 1993;8(10):1094-1098.
11. Kalantar-Zadeh K, Kopple JD, Block G, Humphreys MH. A malnutrition-inflammation score is correlated with morbidity and mortality in maintenance hemodialysis patients. Am J Kidney Dis. 2001;38(6):1251-1263. doi:10.1053/ajkd.2001.29222.
12. de Mutsert R, Grootendorst DC, Boeschoten EW, Brandts H, van Manen JG, Krediet RT, et al. Subjective global assessment of nutritional status is strongly associated with mortality in chronic dialysis patients. Am J Clin Nutr. 2009;89(3):787-793. doi:10.3945/ajcn.2008.26970.
13. Janardhan V, Soundararajan P, Rani NV, Kannan G, Thennarasu P, Chacko RA, et al. Prediction of malnutrition using modified Subjective Global Assessment-dialysis malnutrition score in patients on hemodialysis. Indian J Pharm Sci. 2011;73(1):38-45. doi:10.4103/0250-474X.89755.
14. Vijaya KL, Aruna M, Narayana Rao SVL, Mohan PR. Dietary counseling by renal dietician improves the nutritional status of hemodialysis patients. Indian J Nephrol. 2019;29(3):179-185. doi:10.4103/ijn.IJN_272_16.