

DETERMINATION OF THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND QUALITY OF LIFE AMONG HEMODIALYSIS PATIENTS AT CIVIL HOSPITAL, SANGHAR

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Abstract

Background: Chronic Kidney Disease (CKD) can significantly influence a patient's nutritional status, leading to malnutrition. Malnutrition is associated with an increase in morbidity and hospitalizations, as well as a decrease in functional status. All these factors contribute to compromised physical, emotional, and psychological health, leading to a lower quality of life among End-Stage Renal Disease (ESRD) patients.

Objectives: This study focuses on assessing the nutritional status and quality of life in patients with chronic kidney disease on hemodialysis, to determine what factors influence the nutritional status and quality of life in the patient population at the dialysis unit of Civil Hospital, Sanghar.

Methods: This study used an observational, analytical, cross-sectional design. The study was conducted from January 2026 to April 2026. A sample size of n=66 patients receiving dialysis in the

hospital was included. Participants were between the ages of 20 and 80 years and had been receiving dialysis for a minimum of three months. Individuals under the age of 20 and those on dialysis for less than three months were excluded from the research study. Data were collected at a single point in time from CKD patients attending the dialysis unit at Civil Hospital, Sanghar.

Results: The study explored the relationship between nutritional status and quality of life among hemodialysis patients. Analytical analysis using linear regression on SPSS version 27.0 found that $R^2 = 0.278$, $\beta = 0.247$, and $p = 0.021$, significantly showing that both genders experience sleep disturbances. For patients who experienced weight loss over the last three to six months and exhibited symptoms after eating, the results were highly significant ($R^2 = 0.766$, $\beta = 0.400$, $p < 0.001$), with nausea being a prominent symptom in ESRD patients undergoing hemodialysis (HD). Furthermore, regression analysis on the nutritional dependent variable, Body Mass Index (BMI), showed a highly significant relationship between a normal BMI and consuming a high-protein diet during hemodialysis ($R^2 = 4.32$, $\beta = 0.513$, $p = 0.006$). After analytical analysis comparing the dependent variable 'engaging in physical activity' with the independent variable 'patients returning to physical activity after HD,' a poor correlation was observed ($R^2 = 0.44$, $\beta = 0.341$, $p < 0.001$), though it remained highly statistically significant.

Conclusion: This study demonstrates that poor nutritional status is common among hemodialysis patients and is significantly associated with a decreased quality of life. Addressing nutritional deficiencies and providing comprehensive care can improve both physical health and overall well-being in this population.

INTRODUCTION

The renal system consists of the kidneys, ureters, and urethra. The renal system filters around 200 liters of fluid every day from renal blood flow to maintain electrolytes and excrete waste products through urine. The kidneys control plasma osmolality and generate erythropoietin, which promotes the synthesis of red blood cells. One of the main causes of death and morbidity globally is End-Stage Renal Disease (ESRD). Kidney function gradually declines over time in Chronic Kidney Disease (CKD), which is a degenerative illness. Furthermore, CKD can worsen if treatment is limited, eventually progressing to ESRD. CKD is usually identified when renal impairment results in decreased renal function, as demonstrated by a persistent glomerular filtration rate (GFR) of less than 60 mL/min/1.73m² for a minimum of three months.

Patients with chronic renal failure are advised to follow a low-protein diet; however, prolonged limitations may result in increased muscle wasting and nutritional deficits. Studies show that hemodialysis (HD) patients frequently suffer from malnutrition, which has a detrimental effect on their prognosis and is associated with higher rates of morbidity and death, as well as a lower quality of life (QOL). The number of CKD patients receiving dialysis has been steadily rising over the past few decades. However, few studies address how this aging process affects the clinical state, nutritional status, and quality of life of patients with end-stage renal disease.

Malnutrition is a common problem for patients with chronic renal disease, especially those undergoing maintenance dialysis. It is one of the primary factors affecting the survival and mortality of dialysis patients, as well as lowering their immunity and exercise tolerance. Among the several interconnected risk factors for malnutrition are decreased nutritional intake, elevated energy expenditure, and hormonal imbalances. Significantly higher hospital admissions are linked to severe malnutrition, which is also independently linked to worse physical function. Patients on hemodialysis frequently experience malnutrition, with documented prevalence rates ranging from 18% to 75%.

Previous studies have demonstrated that hemodialysis is the replacement therapy most routinely administered. Hemodialysis is a therapy option available to people with renal insufficiency where a machine performs kidney functions such as filtering the blood and excreting waste materials. Another study mentioned that compared to the general population, hemodialysis patients have a lower QOL, which is becoming a more significant outcome measure for ESRD. Globally, CKD is a serious progressive condition affecting approximately 700 to 800 million individuals, with a worldwide prevalence estimated at 8% to 14%. Moreover, as a global public health concern, CKD affects roughly 10% of the world's population. A study reported that in Asia, the prevalence of CKD is estimated to be around 10%. In South Asia, the prevalence of CKD is considered to be between 4.7% and 17.4%. Another study conducted in Pakistan reported that after HD, the physical domains of 38.2% of patients had a major impact on their quality of life.

Malnutrition is a serious issue, and hemodialysis patients experience a lower quality of life. Research on the connection between a worse quality of life and nutrition in hemodialysis patients is crucial. It is logical to assume that modifiable conditions and behaviors could have a significant impact on the outcomes of dialysis patients when focusing on their quality of life. However, little research has been done on the direct relationship between nutritional status and quality of life among hemodialysis patients. Thus, the aim of this study was to investigate the relationship between health-related quality of life and nutritional status as determined by normalized protein intake, body mass index, percent body fat, and self-reported dietary protein intake in patients with end-stage renal disease receiving maintenance hemodialysis.

Aim:

To determine the correlation between nutritional status and quality of life among hemodialysis patients.

Objectives:

- To measure anthropometric parameters including body weight, height, and Body Mass Index (BMI).
- To assess dietary intake using a validated dietary assessment tool (Food Frequency Questionnaire).
- To calculate the Subjective Global Assessment (SGA) score to classify patients as well-nourished, mildly malnourished, or severely malnourished.

Rationale of the Study:

This study focuses on how nutritional status affects the quality of life among end-stage renal disease patients. Thus, the present study aims to determine the relationship between nutritional status and quality of life in End-Stage Renal Disease patients on hemodialysis to further explore which nutritional variables influence the quality of life of CKD patients at the dialysis unit of Civil Hospital, Sanghar.

Research Questions:

1. What interventions improve the quality of life in hemodialysis patients?
2. How does appetite impact the quality of life in hemodialysis patients?
3. What is the impact of comorbidities on a hemodialysis patient's nutrition.

Hypothesis:

* Null Hypothesis (H_0): There is no relationship between nutritional status and quality of life among hemodialysis patients.

* Alternative Hypothesis (H_1): There is a relationship between nutritional status and quality of life among hemodialysis patients.

Operational Definitions:

Hemodialysis: A life-sustaining advanced treatment for end-stage renal failure or CKD patients that filters waste materials, toxins, urea, creatinine, and excessive fluid from the blood using an external dialysis machine.

Nutritional Status:

The physiological state of health resulting from food consumption, nutrient absorption, and utilization, serving as a crucial indicator of general health and well-being.

Quality of Life:

A multidimensional, subjective assessment of an individual's well-being encompassing physical health, mental state, social relationships, and environment within their cultural context.

Literature Review

A worldwide study showed that nutritional status affected the quality of life in 71.43% of hemodialysis patients. Another line of evidence from Turkey indicated that malnutrition was present in 75% of hemodialysis patients. Furthermore, an article reported that hemodialysis effectiveness accounts for a 43.5% impact on quality of life. Conversely, low nutrition compromises quality of life in up to 70% of hemodialysis patients. Moreover, an author from New York, USA, noted that malnutrition is commonly seen among hemodialysis patients, affecting up to 80% of the quality of life in people with CKD.

Nutritional status has been shown to impact quality of life in hemodialysis patients; a malnutrition evaluation carried out on ESRD participants on HD found that 55% were malnourished. In addition, a 29.6% rate of undernutrition was found among ESRD patients on HD. Another study explored that undernourishment led to 33% muscle wasting among patients on maintenance hemodialysis. Guidelines refer to a study showing that 39% of dialysis patients suffer from severe malnutrition.

Furthermore, a study from Malaysia showed that nutrition affected the quality of life in 56.3% of patients undergoing hemodialysis treatment. Another Asian study showed that 32.3% of malnourished HD patients reported a poor quality of life. A regional article added that 63% of patients were malnourished due to dialysis in end-stage renal disease. Another study found that nutrition was affected in 15.5% of patients who switched to hemodialysis due to the inability of their kidneys to perform normal functions. More studies indicate that hemodialysis corresponds to a 25% lower quality of life score in chronic kidney disease. Only a limited number of studies have explicitly examined the relationship between nutritional status and quality of life among hemodialysis patients.

Methodology

Study Design:

This study employed an observational, analytical, cross-sectional study design. The study was conducted from January 2026 to April 2026. A total of 100 patients receiving dialysis at the hospital were screened; patients between the ages of 20 and 80 years who had been receiving dialysis for a minimum of three months were included. Individuals under the age of 20 and those on dialysis for less than three months were excluded from the research study. Data were collected at a single point in time from CKD patients attending the dialysis unit at Civil Hospital, Sanghar.

Study Setting:

The study was conducted at the single-point dialysis unit of Civil Hospital, Sanghar. Patients who consented in written form to participate were informed about the purpose of the study, as well as their right to participate or withdraw from the study at any stage.

Study Duration:

The timeline of this study was four months, which included the approval of the topic, obtaining permission from the university, collecting data from the hospital, and performing analysis and interpretation of the raw data using SPSS version 27.0 to organize and obtain the results.

Study Population:

Participants in this study included both male and female patients aged between 20 and 80 years who had been receiving hemodialysis for at least the last three months, randomly selected from the hemodialysis unit at Civil Hospital, Sanghar.

Sample Size:

The sample size formula used was:

$$n = (N * Z^2 * p * (1 - p)) / (d^2 * (N - 1) + Z^2 * p * (1 - p))$$

Where:

- * n = Required sample size
- * N = Population size = 100 enrolled patients
- * Z = Z-score for the confidence level (1.96 for 95% confidence)
- * p = Estimated proportion (using 0.5 as it is unknown)
- * d = Margin of error (0.05)

Manual Sample Size Calculation:

Using N = 100, Z = 1.96, p = 0.5, and d = 0.05, the calculation yields n = 66 hemodialysis patients out of 100 for a 95% confidence level and a 5% margin of error. After factoring in a 5% inflation rate, the final targeted sample size was determined to be 69.

Sampling Technique:

A non-probability purposive sampling technique was used to collect data from ESRD patients on hemodialysis at Civil Hospital, Sanghar.

Data Collection Procedure:

Data collected from eligible patients included Name, Sex, Age, Body Mass Index, Education, Occupation, Duration of Dialysis, History of Smoking, and Alcohol Consumption. Height and weight measurements were taken to calculate the Body Mass Index (BMI) of the participants. The computed BMI values were compared with standard values: a BMI between 18.5 and 24.5 kg/m² was considered normal, less than 18.5 was classified as undernourished, and more than 24.5 was considered over-nourished.

Study Variables:

The study was approved by the Medical Superintendent of Civil Hospital, Sanghar, and the Ethics Committee of the Peoples Nursing School at Liaquat University of Medical and Health Sciences, Jamshoro. Hemodialysis patients attending the dialysis unit of Civil Hospital, Sanghar, who had a working knowledge of English, Urdu, or Sindhi, participated in the study. All participants provided written informed consent.

* Section A (Baseline Demographics & Socioeconomics): Age, Gender, Height, Weight, Body Mass Index, Educational Status, Employment Status, and Total Household Income.

* Section B (Health & Nutrition Information): Chronic health conditions, general health status, difficulty performing regular activities after hemodialysis, reductions in physical activity due to HD, and current health compared to three months ago.

* Nutritional Assessment Variables: Skipping meals, meals consumed per day, daily servings of fruits and vegetables, high-protein foods, snacks between meals, adherence to specific diets (vegan or keto), daily water intake, usage of supplements, weight loss in the last three to six months, and symptoms appearing after eating.

* Quality of Life Questionnaire Variables: Feeling tired or weak after dialysis, engagement in physical activity, sleep trouble, anxiety or worry about CKD, impacts on social mobilization, restrictions on performing work, family or friend support, and overall satisfaction with life.

Statistical Analyses:

The collected data were recorded, coded, and tabulated. Analysis was performed using the Statistical Package for Social Sciences (SPSS) version 27.0 for Windows. Qualitative variables were described as percentages and numbers. After testing for normality using the Kolmogorov-Smirnov test, normally distributed quantitative variables were described as means $\pm$ SD, while non-parametric variables were reported as medians (interquartile range; IQR). For comparing groups, Mann-Whitney and t-tests were used for non-normally and normally distributed variables, respectively.

Results

Among the participants affected by ESRD on HD in the dialysis unit, 29 (42%) fell into the age group between 35 and 50 years. The percentage of males (68.1%) was higher than females (31.9%). The majority (92.8%) resided in rural areas, while the remaining 7.2% lived in urban areas. Regarding educational status, 44 (63.8%) were literate and 36.2% were illiterate; 44 (63.8%) completed schooling up to primary school, and only six participants held a higher degree. On employment status, the majority relied on their families, with 61 (88.4%) patients being unemployed, 4.3% working full-time, and 4.3% working part-time. Regarding income, 61 (88.4%) of the sample reported no independent income, 5 earned less than 20,000 PKR, 2 earned between 20,000 and 49,000 PKR, and only one participant earned more than 100,000 PKR. Furthermore, the majority of the participants had a healthy weight (42.0%), while 26.1% were overweight and 31.9% were underweight (presented in Table 1).

The present study assessed the quality of life among patients undergoing HD across all subscales of the short-form 36-item Health Survey of KDQOL. The highest item score was for 'dialysis limits your physical activity' (3.17 ± 0.64), followed by 'dialysis affected your social activities' (2.72 ± 0.51), 'in general, how would you rate your health' (2.43 ± 0.65), 'worried about your illness' (2.30 ± 0.57), 'do you feel tired or weak most of the time' (2.23 ± 0.57), and 'do you have trouble sleeping' (2.01 ± 0.52). Lower scores were observed for health compared to 3 months ago, satisfaction with life, returning to activity after HD, performing daily activities, and engaging in physical activity ($1.91 \pm$

1.15, 1.88 ± 0.58 , 1.79 ± 0.81 , 1.72 ± 0.72 , and 1.63 ± 1.05 , respectively), with regular activities scoring 1.49 ± 0.75 (shown in Table 2).

The study explored the relationship between nutritional status and quality of life using linear regression analysis. It was found that gender compared with having sleep turbulence showed a significant relationship ($R^2 = 0.278$, $\beta = 0.247$, $p = 0.021$). Patients who experienced weight loss in the last three to six months and developed symptoms after eating showed a highly significant result ($R^2 = 0.766$, $\beta = 0.400$, $p < 0.001$), with nausea being a prominent symptom. Regular intake of fruits was significantly linked to better progress in performing regular activities ($R^2 = 0.23$, $\beta = -0.61$, $p = 0.048$).

Furthermore, regression on the nutritional dependent variable BMI showed a highly significant relationship between a normal BMI and the consumption of a high-protein diet during hemodialysis ($R^2 = 4.32$, $\beta = 0.513$, $p = 0.006$). Comparing water intake per day with body weight showed a weak relationship ($R^2 = 0.26$, $\beta = 0.36$, $p = 0.027$). Regression analysis also demonstrated a significant relationship showing that patients who frequently feel tired or weak after dialysis are highly dissatisfied with their quality of life ($R^2 = 0.302$, $\beta = 0.297$, $p = 0.012$). Lastly, comparing the dependent variable 'engage in physical activity' with the independent variable 'patients back on physical activity after HD' revealed a poor correlation but a highly significant statistical relationship ($R^2 = 0.44$, $\beta = 0.341$, $p < 0.001$), as detailed in Table 3. Other analyzed variables did not show significance in this study.

Table 1: Distribution of Patients on HD According to Demographic Variables

S.No	Demographic Variables	Study Group n=69 (%)
1	Age in Years: 20 to 35	15 (21.7%)
	36 to 50	29 (42.0%)
	51 to 80	25 (36.2%)
2	Gender: Male	47 (68.1%)
	Female	22 (31.9%)
3	Residence: Rural	64 (92.8%)
	Urban	05 (7.3%)
4	Educational Status: Illiterate	25 (36.2%)
	Primary school	26 (37.7%)
	Higher secondary	12 (17.4%)
	Graduate	6 (8.7%)
	Master's Degree	0 (0%)
5	Employment Status: Full Time	3 (4.3%)
	Part Time	3 (4.3%)
	Unemployed	61 (88.4%)

6	Income in Rupees: Less than 20,000	5 (7.2%)
	20 to 49 thousand	2 (2.9%)
	More than one Lac	1 (1.4%)
	No Income	61 (88.4%)
7	Weight Category (BMI): Underweight	22 (31.9%)
	Normal Weight	29 (42.0%)
	Overweight	18 (26.1%)

Table 2: Assessment of QOL Among Patients Undergoing HD

Item	Mean $\pm$ SD	Median
Do you have any chronic health conditions?	1.28 $\pm$ 0.45	1.00
In general, how would you rate your health?	2.43 $\pm$ 0.65	2.00
Performing your regular activities	1.49 $\pm$ 0.75	1.00
After HD back in activities	1.79 $\pm$ 0.81	2.00
Compared to 03 months ago health	1.91 $\pm$ 1.15	1.00
How would you describe your appetite?	2.01 $\pm$ 0.45	2.00
Do you feel tired or weak most of the time?	2.23 $\pm$ 0.57	2.00
Do you engage in physical activity?	1.63 $\pm$ 1.05	1.00
Does dialysis limit your physical activities?	3.17 $\pm$ 0.64	3.00
Do you have trouble sleeping?	2.01 $\pm$ 0.52	2.00
Worried about your illness	2.30 $\pm$ 0.57	2.00
Dialysis affected your social activities?	2.72 $\pm$ 0.51	3.00
Are you able to work or perform daily activities?	1.72 $\pm$ 0.72	2.00
Do you receive support from family or friends?	1.04 $\pm$ 0.26	1.00

How satisfied are you with your quality of life?	1.88 ± 0.58	2.00
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Table 3: Nutritional Status Related to QOL Among HD Patients

Variables Compared	R ² / β Metrics	P-value
Gender compared with having trouble in sleeping	R ² =0.278, β =0.247	0.021
Weight loss last 3 to 6 months appearing as symptoms	R ² =0.766, β =0.400	<0.001
Fruits progress on performing regular activities	R ² =0.23, β =-0.61	0.048
BMI compared with high protein diet	R ² =4.32, β =0.513	0.006
Intake of water compared with weight	R ² =0.26, β =0.36	0.027
Tired/weak feeling compared to life satisfaction	R ² =0.302, β =0.297	0.012
Engage in physical activity after HD	R ² =0.44, β =0.341	<0.001

Study Outcome:

The primary finding of this study is the high frequency of malnutrition among HD patients. The secondary result establishes a significant direct correlation between nutritional status and health-related quality of life.

Ethical Considerations:

This study met both national and international ethical standards. There were no financial, legal, physical, psychological, or social risks for the research subjects. The goals, risks, and benefits of the study were described in detail to all participants, and written informed consent was obtained from each subject.

Discussion

In this cross-sectional study, we observed that the presence of malnutrition was the most consistent independent determinant of decreased health-related QOL in HD patients, as assessed by KDQOL-SF36, the Subjective Global Assessment (SGA), and the Malnutrition Inflammation Score (MIS). This study aimed to determine the nutritional status and quality of life among hemodialysis patients. The findings indicate that a significant proportion of patients undergoing hemodialysis experience poor nutritional status, which is closely associated with a reduced quality of life. Malnutrition was prevalent among the study participants, likely due to factors such as decreased appetite, dietary

restrictions, inflammation, and metabolic alterations associated with chronic kidney disease. These findings are consistent with previous studies, which report that protein-energy malnutrition is common in hemodialysis patients and contributes to increased morbidity and mortality.

In terms of quality of life, many patients reported limitations in physical functioning, emotional well-being, and social activities. Fatigue, weakness, and frequent hospital visits negatively affect daily living. The study found a strong relationship between poor nutritional status and lower quality of life scores, suggesting that malnourished patients are more likely to experience physical and psychological distress. Furthermore, factors such as age, duration of dialysis, comorbid conditions, and socioeconomic status may also influence both nutritional status and quality of life. Patients with longer durations of hemodialysis and multiple comorbidities tended to have worse outcomes.

The findings highlight the importance of regular nutritional assessment and early intervention in hemodialysis patients. Nutritional counseling, individualized diet plans, and supplementation can play a vital role in improving patient outcomes. Additionally, psychological and social support should be integrated into patient care to enhance overall quality of life. Malnutrition and impaired QOL are prevalent conditions among HD patients. Recommendations and guidelines have been issued for the inclusion of nutritional management in the comprehensive approach to this disease. Thus, it is important to evaluate patients' nutritional status regularly, although a universal gold standard screening technique for detecting malnutrition in HD patients has not yet been firmly established.

Several nutritional status indicators, along with demographic and socioeconomic details (including age, gender, height, weight, BMI, education, employment, and household income), were shown to link directly with the participant health information in section B (such as chronic conditions, difficulty performing regular activities after HD, and cutbacks in physical activity). Nutritional assessment variables like skipped meals, fruit/vegetable servings, high-protein food intake, and symptoms like nausea after eating heavily dictate the quality of life survey outcomes. Most of these evaluated metrics showed significant correlations, with only a few showing non-significant paths.

Conclusion, Strengths, and Limitations

Conclusion:

In conclusion, this study demonstrates that poor nutritional status is common among hemodialysis patients and is significantly associated with a decreased quality of life. Addressing nutritional deficiencies and providing comprehensive care can improve both physical health and overall well-being in this population.

Strengths and Limitations:

This study is the first conducted at Civil Hospital, Sanghar, to examine the prevalence of malnutrition among hemodialysis patients and its specific relationship with quality of life in this demographic.

However, this study has several limitations, including its cross-sectional design, which limits the

capacity to establish causal relationships between variables. Another limitation is that the study was conducted within a single hemodialysis unit at Civil Hospital, Sanghar, which may prevent its conclusions from being automatically applicable to all hemodialysis patients across the wider province of Pakistan. Furthermore, our study did not account for certain clinical conditions that could have independently affected the patients' nutritional status. The sample size is relatively small, pointing to a need to increase patient numbers in future research. Patients from other major cities should be added to expand geographic representation. There is also a distinct need to incorporate biochemical clinical parameters like hemoglobin levels, hyperparathyroidism markers, and dialysis adequacy calculations (Kt/V), which heavily influence the QOL of dialysis patients.

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