

Prevalence of Malnutrition in Hemodialysis Patients: A Single Center Study.

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Abstract

Objective: This study was conducted to determine the prevalence of malnutrition in hemodialysis patients.

STUDY DESIGN: Cross sectional study.

Place and Duration Of Study: Hemodialysis Unit of Sheikh Zayed Hospital (SZH), Lahore, from April 2017 to 31st July 2018.

Methodology: This cross sectional study was conducted on all patients of end stage renal disease (ESRD) on maintenance hemodialysis (MHD) at dialysis center of Shaikh Zayed Hospital Lahore (SZH). Patients who were being dialyzed for more than three months were included in the study. Patients with acute renal failure and those, who switched to other modalities of renal replacement like transplant or peritoneal dialysis were also excluded from study group. At start of study demographic data was entered on a pro forma. Laboratory parameters (Hemoglobin, serum albumin, sodium, potassium, calcium, phosphate and uric acid), viral markers (HBsAg & Anti HCV) were measured and BMI was calculated.

Results: One hundred and fifty-eight patients were enrolled. Six patients were excluded because they underwent renal transplant. One hundred and fifty-two patients completed study. There were 81(53.3%) males and rest of the patients were females. Mean age of patients was 47.26 ± 15.14 years and half of the patients 76 (50%) were in middle age (40-60 years) group. Unemployed patients were 99 (65.1%). Ninety-three (62.2%) patients were illiterate or having less than tenth grade of education. Most of the patients 122 (80.3%) were hypoalbuminemic and anemic 126(82.9%). Eighty-seven (57.9%) patients were underweight having BMI less than 20 i.e. malnourished. Ninety-three (61.2%) patients were getting thrice weekly dialysis and rest of them were dialyzed twice weekly. Ninety-four (61.8%) patients were hepatitis C positive.

Conclusion: In this study we found that majority of hemodialysis patients were malnourished, hypoalbuminemic and anemic. Continuous nutritional assessment and care must be considered mandatory for dialysis patients to reverse the situation.

Keywords: *Malnutrition, dialysis, ESRD, anemic, hypoalbuminemia.*

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Introduction:

Malnutrition is defined as a disorder of body composition in which nutritional intake is less than required which results in reduced organ function, abnormalities in blood chemistry, reduced body mass and worsened clinical outcomes. ⁽¹⁾ Malnutrition in MHD patients have been an issue since commencement of dialysis. Prevalence of malnutrition in these patients varies from 10-60% ⁽²⁾ showing the varying intensity of this well versed issue. It is associated with adverse clinical outcomes, more frequent hospitalization and higher morbidity and mortality rates. ⁽³⁻⁶⁾ There are many factors which contribute to malnutrition e.g. anorexia due to uremia, gastrointestinal disorders, psychological factors, social problems, comorbidities, depression, inflammatory processes and hyper catabolism due to nutrient losses during dialysis. ^(7,8) Other factors responsible for malnutrition are restrictive food recommendations and drug-related factors. ⁽⁹⁾ All these in turn badly influence the quality of life of HD patients. ⁽¹⁰⁾ As there is very limited data on this important segment in Pakistan so this study was conducted to find out the prevalence of malnutrition.

Methodology:

Patients of ESRD on MHD for more than 3 months were enrolled in study. Patients with acute renal failure and who switched to other modalities of renal replacement like transplant or peritoneal dialysis were excluded. Informed consent was taken from patients. Study approval was taken from the Institutional review board. Demographic data (name, age, gender, monthly income, education etc.) and dialysis related data (frequency of dialysis) was entered in a pro forma. Nutritional status of patient was assessed by hematological (hemoglobin), biochemical (sodium, potassium, calcium, phosphate & uric acid) and anthropometric measures (BMI). Viral markers (Anti HCV, HBsAg) were sent to the lab. SPSS software 21.0 was used for data entry. Kidney Diseases Outcome Quality Initiative (K/DOQI) guidelines were used for defining normal and abnormal laboratory parameters.

Statistical analysis:

Continuous variables were expressed as mean $\pm$ SD. Categorical variables were expressed in the form of frequency and percentages. p value less than 0.05 was taken as statistically significance. Analysis was done using software SPSS 21.0.

Results:

One hundred and fifty-eight patients were enrolled. Six patients were excluded because they underwent renal transplant. One hundred and fifty-two patients completed study. There were 81(53.3%) males rest of the patients were females. Mean age of patients was 47.26 ± 15.14 years and half of the patients 76 (50%) were in middle age (40-60 years) group. Unemployed patients were 99 (65.1%) and illiterate or having less than tenth grade of education were 93 (62.2%). Most of the patients 80.3% (122) were hypoalbuminemia (as shown in figure 3) and anemia in 126(82.9%) (as shown in figure 2). Ninety-three (61.2%) patients were getting thrice weekly dialysis and rest of them were dialyzed twice weekly.

Table No. 1 Mean value of different parameters of hemodialysis patients.

S. no	Factors	Mean $\pm$ SD
1	Height (cm)	163.5 ± 9.80
2	Weight (kg)	63.85 ± 14.93
3	BMI (kg/m^2)	24.77 ± 4.71
4	Hb (g/dl)	9.52 ± 1.85
5	S.Albumin (g/dl)	3.55 ± 0.49
6	S.Sodium (mmol/L)	140.4 ± 5.77
7	S.Potassium (mmol/L)	5.2 ± 0.87
8	S. PO_4 (mmol/L)	5.8 ± 1.95
9	S.Calcium (mmol/L)	8.6 ± 1.32
10	S.Ca x PO_4	50.4 ± 19.06
11	S.Uric Acid (mg/dl)	7.61 ± 2.02

Ninety-four (61.8%) patients were hepatitis C positive. Eighty-seven (57.9%) patients were underweight having BMI less than 20. Mean values of different parameters of all patients are shown in table number 1. Frequency and p value of different factors is shown in table 2. Malnutrition was observed in eighty-seven (57.2%) patients (as shown in figure 1).

Discussion:

Different measures are used to check the nutritional status of dialysis patients. Nutritional assessment of a patient is done by dietary assessment (history taking about dietary intake and habits), clinical assessment (Mid Upper Arm Circumference (MUAC), sub cutaneous fat measurement, DEXA scan), laboratory parameters (serum albumin, hemoglobin, creatinine, transferrin, urea) and anthropometric measures (Body Mass Index (BMI)).

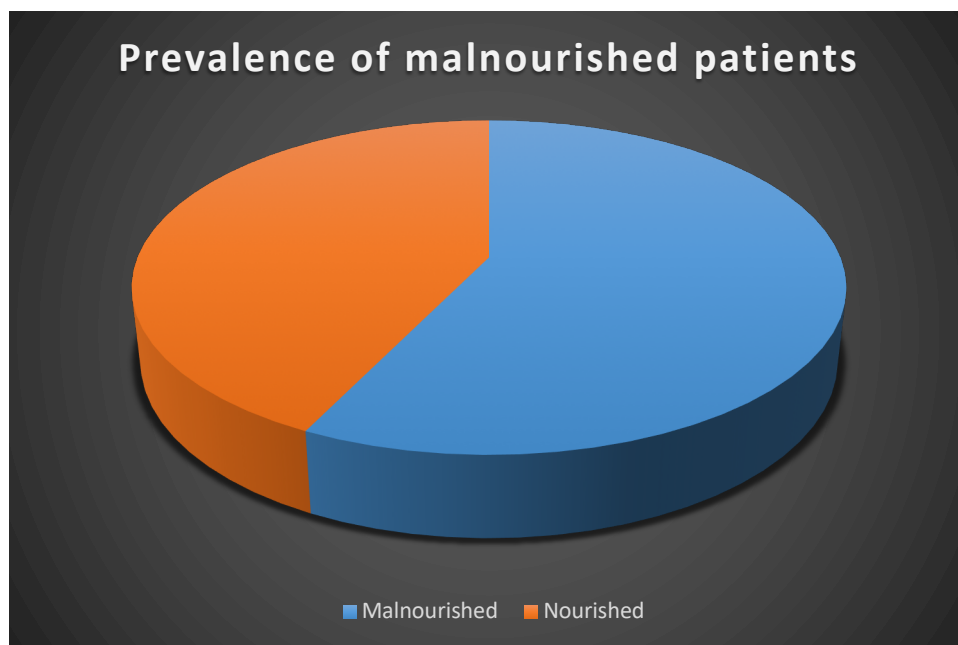


Figure No. 1 Prevalence of malnourished patients

In our study hypoalbuminemia was observed as a significant factor of malnutrition. Albumin is an important parameter for measuring nutritional status of a patient because of its easy availability and strong association with outcome in ESRD patients. K/DOQI Nutritional Guidelines recommend

Table No. 2. Parameters showing malnutrition in hemodialysis patients

S. no.	Factors		Frequency (%)	p value
1	Hb (g/dl)	<10.9 >11	82.9 17.1	0.03*
2	Albumin (g/dl)	<3.9 >4	80.3 19.7	0.04*
3	Potassium (mmol/L)	<3.5 3.5-5.5 >5.5	0.7 67.1 32.2	0.5
4	Calcium (mmol/L)	<10.4 >10.5	95.4 4.6	0.39
5	Ca x PO ₄	<55 >55	67.8 32.2	0.34
6	Uric Acid (mg/dl)	<6.9 >7.0	37.5 62.5	0.47

* shows statistically significant values

measurement of serum albumin as part of the routine assessment of nutritional status in maintenance dialysis patients. Dialysis patients lose proteins, amino acids, nutrients and as they undergo regular dialysis treatments in a standard dialysis treatment. There is a loss of almost 4-10 gm of amino acids during dialysis. ^(11,12) Hypoalbuminemia not only shows malnutrition of patient but also it is a strong predictor of morbidity and mortality. The factors responsible for causing hypoalbuminemia are restrictions in taking protein, metabolic acidosis, gastrointestinal issues ⁽¹³⁾, co-morbidities, inadequate

dialysis ⁽¹⁴⁾ and underlying inflammation or infection. ⁽¹⁵⁾ It has been observed that most of the CKD patients before coming to nephrologist are severely malnourished due to unnecessary protein restrictions by the non-renal physicians. These physicians think that restricting proteins in diet will result in improvement in kidney functions. But restricting proteins intake will lead to decreased serum urea level in blood which is wrongly interpreted as improved kidney function.

In this study majority of the patients were anemic. Similar observation is noted by other local studies as well. It has been observed that ESRD patients are anemic even before the commencement of dialysis because of lack of erythropoietin production. As most of the patients belong to poor socioeconomic class and cannot afford expensive treatment for maintaining hemoglobin in the form of iron and EPO. Even the patients who are getting EPO, the dose given to them is not up to the mark. Thus for maintaining hemoglobin, these patients have to undergo blood transfusions. ⁽¹⁶⁾ Multiple blood transfusions in these patients makes them susceptible to infections and seroconversion of hepatitis in these patients. ⁽¹⁷⁾ Chronic infection leads to unresponsiveness of the bone marrow to the effects of EPO.

In this study, it has been observed that majority of the patients are having low BMI, an important

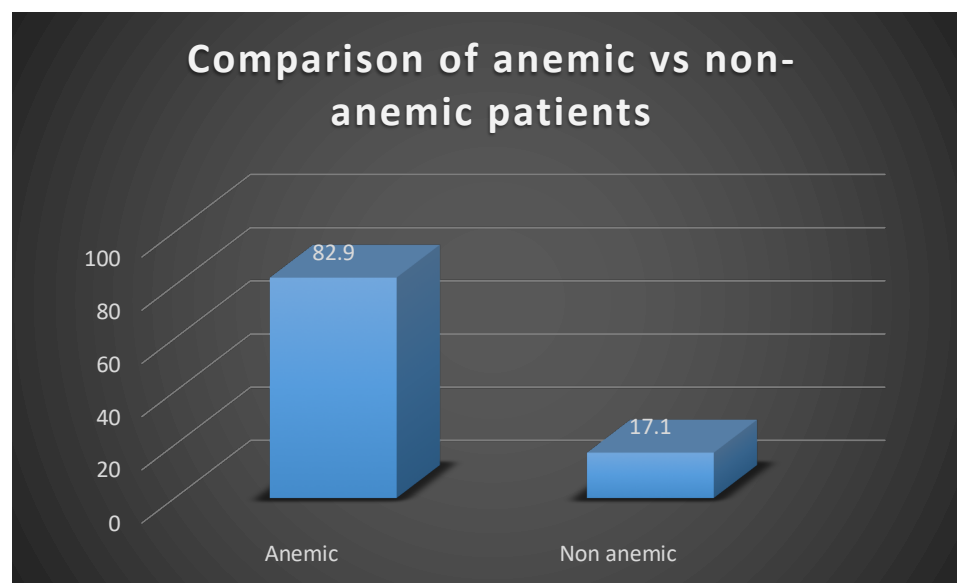


Figure no. 2 Comparison between anemic and non-anemic patients

parameter of the malnutrition. As Pakistan is a developing country, most of the people are living below

the poverty line. Low socioeconomic factor not only affects their living in poor hygienic conditions but also cause provision of unbalanced diet having low protein intake. Living in poor hygienic surrounding prone these patients to get repeated infection. The infections and inflammation, through a complex mechanism, increase muscle protein catabolism and decrease muscle protein anabolism, thus causing a net muscle protein loss in ESRD patients on dialysis.

⁽¹⁸⁾ A decrease in normal appetite and hyper-catabolic state leads to malnutrition-inflammation complex syndrome (MICS) in these patients and thus worsening the already present complexities and leading to further increased low dietary intake. ⁽¹⁹⁾

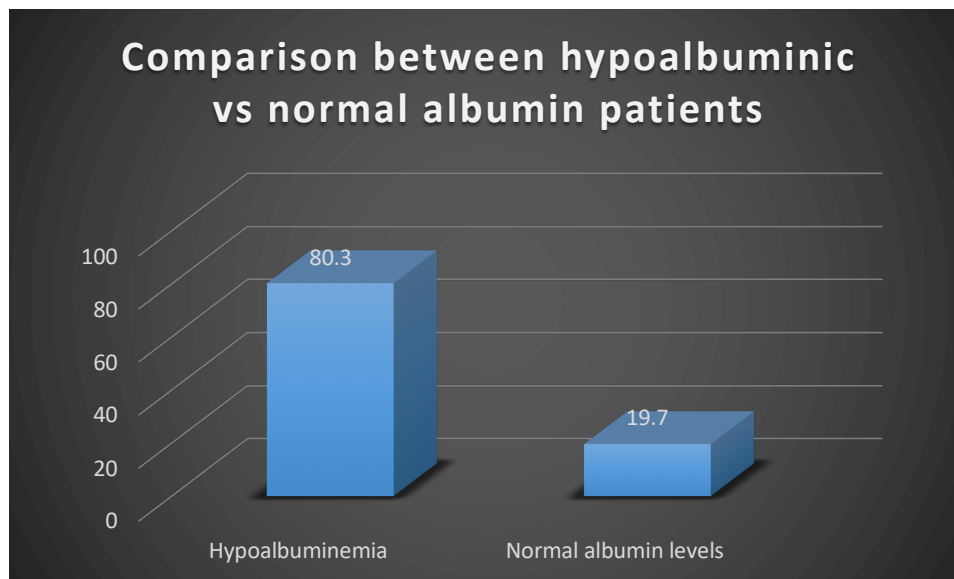


Figure 3: Comparison between hypoalbuminemic and normal albumin patients

Conclusion:

In our study we found that majority of dialysis patients were malnourished, hypoalbuminemic and anemic. Continuous nutritional assessment and care must be considered mandatory for dialysis patients to address the status of malnutrition among hemodialysis patients.

Conflict of interest:

None declared

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