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Nutritional Status of Patients on Maintenance Hemodialysis as Assessed by Mini Nutritional Assessment Survey- Short Form and Anthropometric Measurements.

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Abstract

Introduction

Protein calorie malnutrition is common in chronic kidney disease patients especially on maintenance hemodialysis (MHD). Multiple factors including mainly frequency and adequacy of dialysis and dietary habits may result in malnutrition besides other comorbidities. Different tools have been designed to analyze the nutritional status of dialysis patients including subjective global assessment, malnutrition inflammation score, Mini Nutritional Assessment – Short Form (MNA-SF) and several others. We assessed the nutritional status of our MHD patients using Mini Nutritional Assessment – Short Form (MNA-SF)

Methods

Total of 44 patients aged between 13 to 64 years, undergoing MHD for at least 6 months were included in the study.

Results

Out of 44 patients 63% patients were malnourished, 34% were at risk of malnutrition and 3% were having normal nutritional status according to MNA-SF. The mean of mid-arm circumference was low even in the presence of mean albumin and BMI within the normal range.

Conclusion

Nutrition is a neglected aspect of the dialysis patients. Multiple factors including poor socioeconomic status, lack of knowledge and poor dietary compliance lead to significant malnutrition among MHD patients.

Key words: *Chronic kidney disease (CKD), Nutrition, Malnourished, hemodialysis.*

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Introduction

Protein-calorie malnutrition is common in maintenance hemodialysis (HD) patients and 25-30% of patients are malnourished according to a recent study.[1] Malnutrition is mild to moderate in approximately 33% of maintenance dialysis patients and severe in approximately 6% to 8%. Enia C et al. concluded that malnutrition is a major negative prognostic factor in dialysis patients.[2] Efforts, therefore, should be focused on the most efficient ways to maintain nutritional status in these patients.[3]

Multiple reasons can lead to malnutrition in dialysis patients including anorexia, metabolic acidosis, infection and inflammation. Various factors have been studied including age, sex, cause of end-stage renal disease (ESRD), time on dialysis, body mass index (BMI), mid-arm circumference, blood levels of midweek pre-dialysis albumin and bicarbonate. Adequacy and frequency of dialysis are the established tools to correctly assess the nutritional status. The severity of malnutrition increases with decreasing frequency of dialysis.[3]
Different tools include subjective global assessment (SGA), malnutrition inflammation score (MIS), Mini Nutritional Assessment – Short Form (MNA-SF), nutrition risk score (NRS), Malnutrition Universal Screening Tool (MUST), Malnutrition Screening Tool (MST) , and geriatric nutritional risk index (GNRI).[4-8]Among them, the subjective global assessment (SGA) is a validated clinical tool for screening nutrition at risk [9,10]. MNA-SF was developed to reduce the survey time and has been validated in studies.[11]?

We therefore intended to assess the nutritional status of our MHD patients using the basic anthropometry, laboratory parameters, and MNA-SF.

Methods:

Total 44 patients aged between 13 to 64 years undergoing MHD for at least 6 months were included in the study. Their weight and height were recorded for calculation of BMI. BMI <18.5 Kg/m^2 was considered malnourishment, 18.5-24.5 Kg/m^2 as normal and >24.5 Kg/m^2 as overweight.

Mid upper arm circumference was measured on the nonvascular access arm with the help of a measuring tape before the start of dialysis session. It was calculated as
MAMC (cm)= mid-arm circumference (cm) - (3.14 x triceps skinfold(cm)).[12]

Nutritional assessment was done using MNA-SF form comprising of 6 questions.[7]
The MNA-SF comprises of six items:

1. Decrease in food intake over the past 3 months (severe, moderate, and no decrease in food intake)
2. Weight loss over the past 3 months (does not know, weight loss greater than 3 kg, weight loss between 1 and 3 kg, and no weight loss)
3. Mobility (bed- or chair-bound, able to get out of bed/chair but does not go out, and goes out).
4. Acute disease or psychological stress over the past 3 months (yes or no)
5. Neuropsychological problems (severe dementia or depression, mild dementia, and no psychological problems)
6. BMI (less than 19, 19 to less than 21, 21 to less than 23, and 23 or greater).

Total scores for the MNA®-SF range from 0 to 14 points, with higher scores indicative of a better nutritional state. Patients were categorized into three main categories:
1.Normal nutritional status: score 12-14
2.At risk of malnutrition: score 8-11
3.Malnourished: score <8

Statistical Analysis: Data was entered in the SPSS format (IBM, Armonk, New York, USA). All data was described as mean with standard deviation. The scoring for MNA-SF was done according to the assessment tool and actual number and percentage calculated to categorize each patient. Pearson correlation between different variables was performed to observe significant association among variables. Value of $p<0.05$ was taken as statistically significant.

Results:

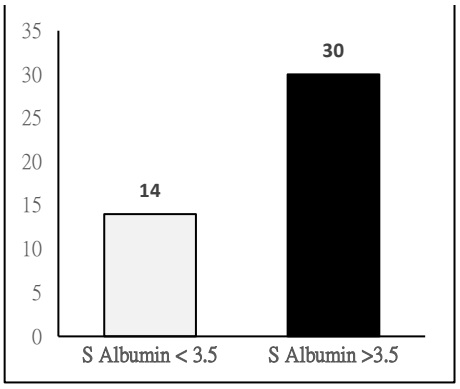
Mean age of our MHD patients was 43.9±13.9 years (18-65). Our study revealed that mean MUAC was low, indicating malnutrition, Table 1. Although mean serum albumin was within normal range however a third of patients had low serum albumin Figure 1. Mean BMI and mean hemoglobin was normal in our patients, Table 1 Figure 2 and Figure 3.

Table 1. Baseline characteristics and nutritional parameters in 44 patients on maintenance hemodialysis.

Parameters	Mean	Standard Deviation
Age (years)	43.9	13.9
Weight (Kg)	58.02	13.4
Height (cm)	164.29	6.7
Albumin g/dl	4.3	0.83
Hb	10.1	1.44
MUAC (cm)	26.53	3.42
BMI Kg/m^2	21.5	4.43

MNA-SF scores revealed that majority n=28 (63%) patients were malnourished out of which 10(35.7%) malnourished patients were female and rest males, Figure 4. The individual components of MNA-SF studied in our population revealed that almost 80% of patients had moderate decrease in food intake. Weight loss was difficult to access because of varying dry weights nevertheless, more than 50% of patients had weight loss (decrease in dry weight) between 1- 3 kg during the previous six months.

Figure 1: Number of patients categorized according to the level of serum Albumin levels among 44 maintenance hemodialysis patients.



Majority of the patients had limited mobility and were confined to their homes and only one patient (3%) had a job. Acute stress was observed in >90% of patients and depression was prevalent.

Food frequency questionnaire showed that around 80% of patients had low protein intake with only one serving of protein per day that was less than 0.6g/kg/day.

Using the MUAC criteria alone, majority were malnourished n=24/44 (54%) of our patients had MUAC $\leq$ 25.4 cm and all these patients had MNA-SF scoring also suggesting malnourished state Table 1 and Figure 5.

Pearson correlation revealed a significant positive correlation of MUAC with Serum Albumin and BMI ($p<0.001$). A weaker though statistically significant negative correlation among of MUAC and MNA-SF scoring was observed, ($r=-0.45$, $p<0.001$) suggesting lower MUAC with higher risk of malnutrition.

Figure 2: Number of patients categorized according to the level of serum Hemoglobin levels among 44 maintenance hemodialysis patients.

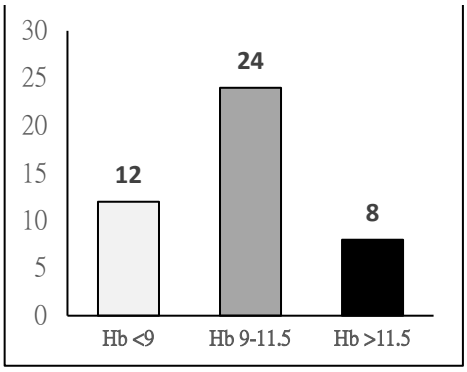
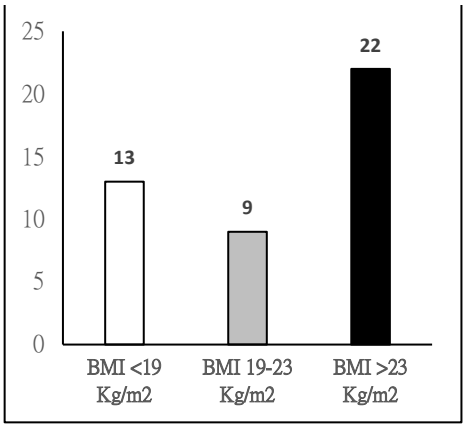


Figure 3: Number of patients categorized by Body Mass Index (BMI) according to the Mini Nutritional -Short Form questionnaire.



Discussion

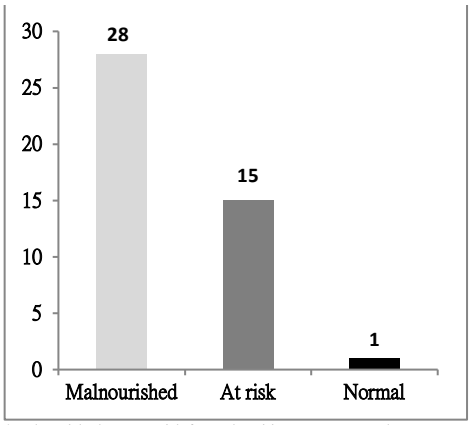
Our study revealed mean BMI within normal range in majority of our MHD patients whereas, in contrast 63% patients were actually found to be malnourished by nutritional assessment with MNA-SF. It was noted by Janiain A et al in a study that BMI is not a true indicator of nutritional status in dialysis patients.[13] They compared the conventional dry weight with bioimpedance analysis for dry weight and fluid status. The study revealed that dry weight by bioimpedance analysis was significantly lower than conventional method and thus the BMI may be influenced by extra fluid pre dialysis. A recent study by Polinder-Bos et.al also did find a high risk of mortality among elderly individuals initiating hemodialysis, however after one year the association was lost.[14] Therefore BMI alone cannot be taken as a sole indicator of nutritional status among dialysis patients.

These results are alarming since our population of patients is younger compared to the reported in the western literature ------ yet majority of the patients 97% were either malnourished or at risk of malnutrition Figure 4.[15-18] Mean MUAC measurement in our patients was low similar to other reports from Pakistan and inversely correlated with nutritional status.[19,20] In a recent study by Noori N et.al. showed a strong association of MUAC with quality of life health survey.[21] In their large cohort of 792 MHD patients MUAC tended to be associated

with better short form 36 measured mental health score at baseline. It was also associated with greater 5-year survival even after adjustment for other factors.

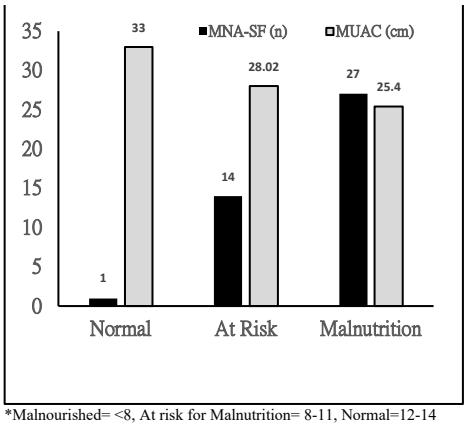
The malnutrition status of our MHD patients was further complemented by the 24-hour dietary recall showing that most patients had poor dietary habits and their day meal did not have the nutritional value that is desired for dialysis patients. Protein content of most patients, almost 80%, was even less than 0.6g/kg/day. Majority of the patients had reduced appetite, lethargy, nausea and lack of urge to eat as the main reasons of low intake. These findings could be attributed to possible gastroparesis since 40% of our patients were diabetics. [22]

Figure 4: Mini Nutritional Assessment-SF scoring* for nutritional assessment among 44 maintenance hemodialysis patients.



*Malnourished= <8, At risk for Malnutrition= 8-11, Normal=12-14

Figure 5: Number of patients by Mini Nutritional Assessment -Short Form (MNA-SF) scores revealing nutrional staus as normal, at risk for malnutrition and malnutrition among 44 maintenance hemodialysis patients. Mean value of mid upper arm circumference (MUAC) measurement is shown within each group.



*Malnourished= <8, At risk for Malnutrition= 8-11, Normal=12-14

de Oliveira GTC et.al. assessed the nutritional status of patients undergoing hemodialysis at dialysis centers using the SGA, and associated it with socioeconomic, demographic and clinical variables among a total of 575 patients.[23] Their study showed that Malnutrition was significantly prevalent (19.5%) among maintenance hemodialysis patients. Although we did not apply the SGA tool still the MNA-SF questionnaire was able to indicate significant indicators of socioeconomic and psychosomatic state of our patients. Socioeconomic status among our patients was low with only single person who could maintain a job even though majority were in their productive younger age group. It will be interested to observe how many patients in our sociocultural setting are actually a useful member of society. Being dependent on others might make such individuals prone to depression. This socioeconomic status was also possibly responsible for the lower protein intake among our patients.

We also found that cause of poor diet choices was due to lack the proper knowledge about the dietary needs of the dialysis patients. Nutritional information and counselling are regularly provided to our MHD patients however, most of our patients were still using their protein restricted diet probably due to local cultural myths and influences. Similar issues were also recently reported in dialysis patients by Imtiaz M et.al where 57 % patients were malnourished and 65 % were unemployed.[15]

A larger multicenter study to evaluate the actual prevalence of socioeconomic indicators as well as nutritional state of our MHD is in need to clearly identify the factors and devise plan for further improvements.

Conclusion:

Malnutrition is a significant problem among MHD patients from low socioeconomic status. Lack of knowledge and perceived ideas about dietary needs are probably the main reasons and need to be further evaluated in a larger multicenter study of MHD patients.

Conflict of Interest: none declared.

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