Nutritional Assessment of Patients on Maintenance Haemodialysis

Pages with reference to book, From 277 To 279

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Abstract

Nutritional assessment was carried out on fifty haemodialyzed patients by demographic, anthropometric, biochemical and dietary indices. The mean age of the patients was 49 years with a male to female ratio of 2.3:1. The duration of dialysis ranged from 6 to 40 months with a mean of 25 months. Fifty percent of the patients were moderately nourished based on their body weight 44%, body mass index 40% and mid-arm circumference 66%. Seventy percent patients had albumin and total proteins within the normal range. Blood urea nitrogen, creatinine, cholesterol, potassium and phosphorus did not significantly change from the previous reports. The calorie and protein intake in 60-70% cases was less than recommended. Overall there was a tendency to calorie and to a lesser degree protein malnutrition in our patients. It is suggested that preventing malnutrition by economical, aggressive and ongoing dietary intervention may minimize malnutrition in haemodialyzed patients JPMA 44:277,1994).

Introduction

Long term maintenance haemodialysis has revolutionalized the care of terminally ill renal failure patients. Presently the emphasis is onim proving the quality of life and rehabilitation[1]. Malnutrition is one of the major risk factors contributing to morbidity and mortality[2]. Most studies on haemodialyzed patients show decreased body weight, skin fold thickness, mid-arm circumference and serum protein concentration[3,4]. Malnutrition in these patients may be attributed to anorexia due to uremic toxins, inter current illnesses, psychological and social factors and due to inadequacy of dialysis procedure it self[5-7]. A nutritional assessment of maintenance haemodialyzed patients was done at The Kidney Centre, Karachi as a part of survey to identify factors contributing to malnutrition.

Patients and Methods

After informed consent fifty patients of end stage renal disease (ESRD), who were on maintenance haemodialysis for more than 6 months duration at The Kidney Centre were studied, They were on twice a week schedule, each of 4 hours duration on Baxter SPS 450+550 haemodialysis machine using hollow fiber dialyzer. The acetate dialysate in the ratio of 1:34 was prepared from reverse osmosis water treatment plant. The demographic and disease related data was collected through a pretested questionnaire. The impact of financial status on dietary requirements and the degree of compliance was evaluated by socio-economic history and education levels. The type of job and number of working hours of the subjects were determined to find out their quality of life on maintenance haemodialysis. The nutritional assessment was carried out through anthropometric measurements including height, weight and mid-aim circumference (MAC). These parameters were matched with metropolitan height and weight tables for adults; MAC was checked against the international standards, Body Mass Index (BMI) was calculated by the standard formula. BMI of each patient was matched with the acceptable range for males and females[8]. Dietary assessment was done by 24 hours diet recall and food frequency

chart. Daily calorie and protein intake once calculated were compared with recommendation of "American Dietetic Association" [9]. Biochemical Analyses were performed by standard methods for total proteins, albumin, blood urea nitrogen (BUN), potassium, creatinine, cholesterol and phosphorus. The results were matched with the standards set by Mosby and Demy[8].

Results

Fifty patients (31 males, 19 females) age range 20-78 years,(mean 49 years) were studied. The duration of dialysis ranged from 6 to 40 months with the mean of 25 months. Majority (98%) were married. The socio-economic, educational and work related details of the subjects are shown in Table I.

Table I. Socioeconomic educational and work related details.

Characteristics	Distribution	Percentage
Economic status		
Rs.2000-3500	27	54
Rs.3501-5000	9	18
Rs.5001-6500	4	8
Rs.6501-8000	4	8
Above 8000	6	12
Educational levels		
No education	14	28
Below Matric	12	24
Matric	8	16
Intermediate	3	6
Graduates	13	26
No. of working hours		
<6 Hrs.	18	36
Between 6-8 Hrs.	25	50
>8 Hrs.	7	14
Type of Job		
Housewife	18	36
Service	11	22
Business	15	30
Retired	6	12

Main causes of ESRD were chronic glomerulonephrius (58%), diabetic nephropathy (20%) polycystic

kidney (12%) and calculus diseases (10%). Majority (80%) of the patients reported some life irregularities like change in the dietary habits (30%), physical activity (30%), loss of job (10%) or all above complications (10%). Anthropometric data showed that less than 50% cases had their body weight with in the range of 85-110 percentile of ideal body weight (Figure).

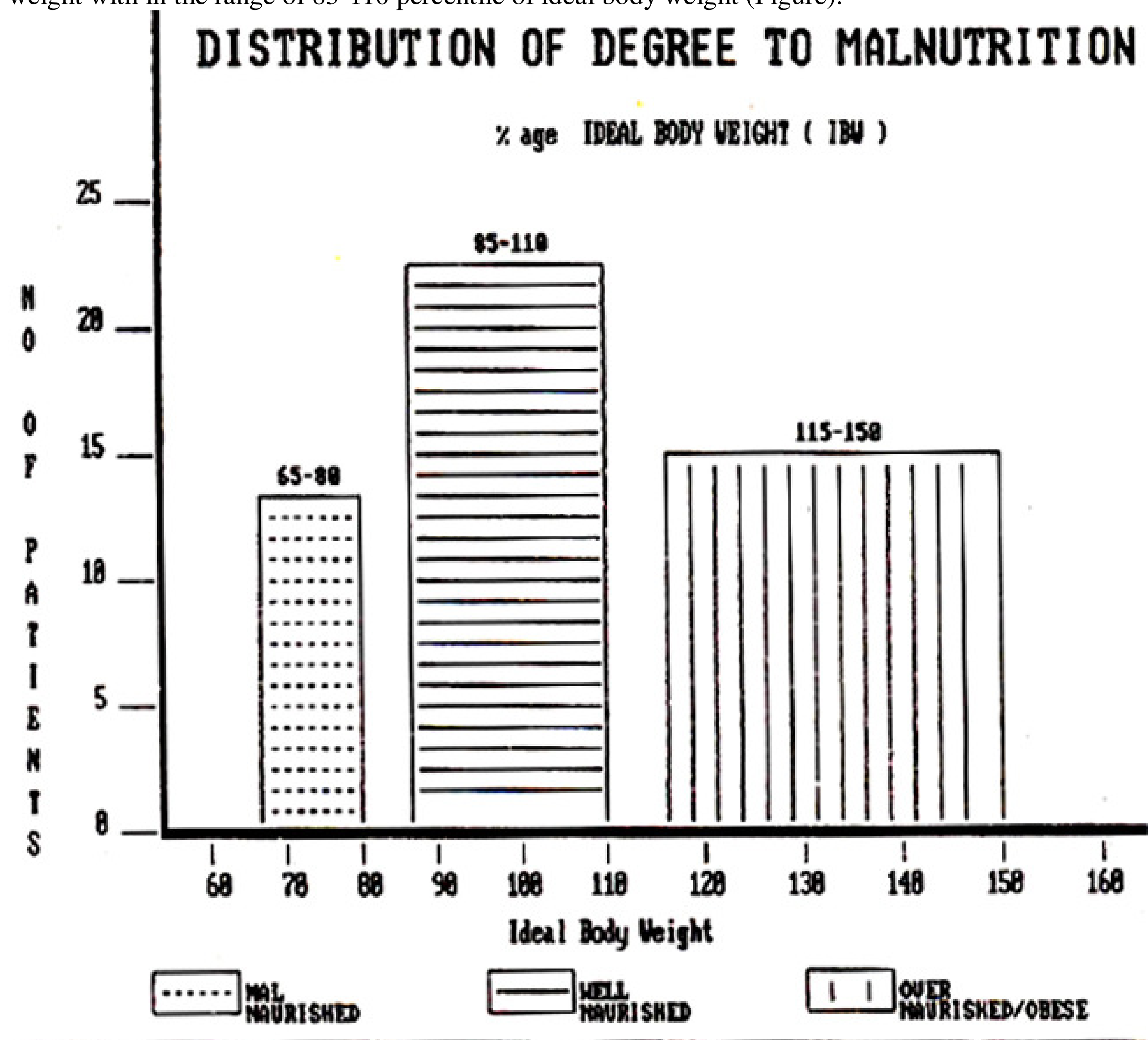

Figure. Percentile of IBW.

Body Mass Index (BMI) was within the normal range (same sex/age) at 100th percentile, in 40% cases, 22% were undernourished (<20 BMI) and the rest were mild to moderately over weight (BMI >27). Mid-arm circumference (MAC) was within the normal range in 66%, 8% were <5% of normal range (severely malnourished) and 26% were >95 pcrcentile of the norms. Nutritional assessment by biochemical analysis is summarized in Table II.

Table II. Nutritional assessment by biochemical analysis.

Parameter	Albumin	Total Protein	BUN	Creatinine	K	Pho	Cholesterol
Possible reference range	3.5-5.0 g/dl	6-8.4 g/dl	60-80 mg/dl	4-15 mg/dl	3.5-5 mg/dl	4.5-6.5 mg/dl	130-350 mg/dl
No. of patients	70%	74%	40%	54%	74%	46%	62%
Possible risk for malnutrition	<3.5	<6	<60	<5 >15	>5	>6.5	<130
No. of patients	16%	18%	44%	45%	26%	44%	36%

Although the recommended calorie intake is 35 Kcal/kg of ideal body weight (IBW) but in the present study 60% patients were consuming 25-27 Kcal/kg; 26% were consuming <25 Kcal/kg and only 14% ivere eating 35 or >35 Kcal/kg of IBW. Seventy percent patients were taking 0.8-1.0 gm/dl/kg of JEW protein, 15% <0.8 gm/kg and 15% more than 1.0 gm/kg of IBW.

Discussion

Although haemodialysis is efficacious in treatment for ESRD, instances of malnutrition and wasting in dialyzed individuals have been reported since as early as I 968[4]. Serial anthropometric, nutritional, biochemical profile, diet history along with demographic details can provide the clinician with reliable information regarding the nutritional status of dialysis patients. Patients in the present study were middle aged, uneducated, married males with a family to support and having an income of not more than Rs.5000 a month. This is different from West where 50% of the dialysis population is above 65 years of age, is educated, living alone or in a geriatric home and is being financed by Medicare, Medicaid or private insurances[10,11]. Present anthropometric results showed that less than 50% of the patients were “moderately” nourished. Other studies have also reported a definite decrease in anthropomettic indices[2,4,12]. The sensitivity of these measures, to detect early malnutrition, their applicability to dialysis patients who may not be at their estimated dry weight or the relationship of these parameters to morbidity and mortality, has not been well documented[5]. In the present study when albuminand total protein were used as an index of nutritional status the results were relatively good. Seventy present patients had both albumin and total protein within the normal reference range[8]. However albumin is a late index of malnutrition and a decrease in albumin may follow the onset of malnutrition by several months. Pre-albuminis a more useful index but is exçensive and not used as a routine test in haemodialysis centre[13].When BUN, creatinine, cholesterol, potassium and phosphorus were analyzed our results were similar to others[4,13,14]. Low predialysis BUN is an index of malnutrition rather than of dialysis adequacy[13]. This is true in Pakistan where majority of patients are dialyzed eight hours a week; therefore, the measurement of low predialysis BUN should always be interpreted in the context of the dose of dialysis and intra-dialytic changes in BUN concentration as well as the clinical status of the patient. On the other hand creatinine concentration which reflects muscle mass is inversely conelated with morbidity[5,13]. A very low predialysis serum potassium and phosphorus can also be taken as an index of protein calorie malnutrition5. However, hyperkalaemia and hyper phosphotaemia can jeopardize the health of haernodialysis patient and is a sign of dietary indiscretion[15]. Sixty to seventy percent patients reported a mean calorie intake of 25 Kcal/kg/IBW, and a dietary protein intake of 0.8-1.0 gm/kg/IBW. These results are similar to those reported by others[3,13]. This shows that the usual recommendations for protein and calorie in take by National Kidney Foundation may be slightly higher than what is needed or can be taken, because the reduced activity of hemodialyzed patients decreases the need for calorie and protein. The ESRD patients undergoing haemodialysis in Pakistan have multiple reasons for displaying symptoms of malnutrition measured by

various parameters. Furthermore, renal clinicians in our setting lack the experience and expertise of fully assessing the nutritional status of these patients; therefore, early aggressive, economical and ongoing dietary and nutritional interventions are being suggested as the optimal approach in the management of malnutrition in the maintenance haemodialyzed patients.

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