
**ISSN Print:** 2394-7500
**ISSN Online:** 2394-5869
**Impact Factor:** 5.2
IJAR 2020; 6(2): 328-332
www.allresearchjournal.com
Received: 01-12-2019
Accepted: 03-01-2020

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# Assessment of nutritional status of the patients undergoing haemodialysis (Using SGA) and effectiveness of nutritional counselling on the knowledge of dietary practices to be adopted during haemodialysis

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**Abstract**
A study was conducted for assessment of nutritional status of the patients undergoing haemodialysis (using SGA) and effectiveness of nutritional counselling on the knowledge of dietary practices to be adopted during haemodialysis. A total of 100 subjects undergoing maintenance haemodialysis were enrolled in the study. Anthropometric measurements and biochemical parameters are assessed under nutrition status. Dietary information was obtained using 24hr dietary recall along with food frequency. The results indicated that with increasing age, prevalence of CKD was more (42%) and it was more in males (63%) than in females (37%). According to SGA it was found that 63% were well nourished and 37% were mild-moderately malnourished. The results indicated a significant variance ($p$<0.05) in the knowledge aspect of experimental group (n=50) from pre to post counselling session. It was also observed that nutritional knowledge of experimental group differed significantly ($p$<0.05) with that of control group but the knowledge on fluid restrictions was observed in the sample irrespective of nutritional counselling. Thus, it was concluded from the study that nutritional counselling can enhance patient's knowledge about wide food choices and empower them to lead a healthy life style.

**Keywords:** Haemodialysis, SGA, malnutrition, nutritional counselling

## Introduction
Chronic kidney disease, also known as chronic renal insufficiency, progressive kidney disease (a decline in the number of functioning nephrons), or nephropathy, is defined as the presence of kidney damage or decreased glomerular filtration rate for 3 months or more. Generally, CKD occurs over a period of several months to years [1]. Chronic diseases have become a major cause of global morbidity and mortality. Earlier considered to be a health problem only in developed countries, 4 out of 5 chronic disease deaths now occur in low- and middle-income countries. In India the projected number of deaths due to chronic diseases will rise from 3.78 million in 1990 (40.4% of all deaths) to an expected 7.63 million in 2020 (66.7% of all deaths) [2].
Dialysis is typically needed when approximately 90% or more of kidney function is lost [3]. Individuals undergoing dialysis have a significant prevalence of malnutrition, which is classified as mild, moderate, and severe [4].
Malnutrition is considered a marker of poor prognosis in CKD [5, 6]. The patients' nutritional status is inversely associated with increased risk of hospitalization and mortality; thus, constituting an important risk factor for the outcome of these patients [7]. Therefore, assessing the nutritional status of patients is essential both to prevent malnutrition and to indicate appropriate intervention in malnourished patients [4, 8]. The success of dialysis is dependent on adequate nutrition [6].
Poor nutritional status is a well-documented consequence of chronic kidney disease, even before dialysis became widely available. Nutritional assessment is an essential clinical procedure in the management of these patients; it is now recognized as an important predictor of the prognosis for patients starting dialysis. An alteration in anthropometric parameters is found in 70% and severe malnutrition in 25% of dialysis patients.

Because the availability of kidney transplants is limited, most patients are put on MHD, usually performed at a dialysis centre [9].

Several methods are used to evaluate the nutritional status of haemodialysis patients. Among these nutritional assessment tools, the widely used are subjective global assessment (SGA), modified quantitative subjective global assessment (MQSGA), and malnutrition score (MS) [10, 11].

The subjective global assessment of nutritional status (SGA) is a relatively inexpensive, easy, and rapidly conducted tool used by nurses, dietitians, or physicians to assess Protein Energy Wasting (PEW) in chronic dialysis patients [10]. The SGA is based on the clinical judgment of 4 subscales representing the patients' recent weight change, dietary intake and gastrointestinal symptoms, loss of subcutaneous fat, and signs of muscle wasting [12]. A single SGA assessment has been shown to be associated with morbidity, hospitalization and mortality in several clinical studies [11]. Therefore, since 2000 the National Kidney Foundation Kidney Disease/Dialysis Outcomes and Quality Initiative (K/DOQI) has recommended the use of the SGA for assessing the nutritional status of dialysis patients [13].

Nutritional education and counselling for patients with renal disease plays a major role in the preservation of renal function and the overall wellbeing of the renal patient [14]. Innovations in nutrition education to patients have included a variety of approaches to deliver the message: one-to-one counselling, group counselling, involvement in patient and family support groups, cookery classes, recipes with food samples, posters, videos, quizzes, competitions, newsletters and report cards. Nutrition tips are another effective way of providing a practical nutrition education message in a simple format, where patients can make one small change at a time in their food choices [15].

Nutrition program on patients with chronic renal failure on dialysis plays an important role in the process of treatment [16, 17]. The purposes of medical nutrition therapy in dialysis patients are to promote the nutrition to correct patients' appetite, to correct systemic complications composed by the loss of nephrons in progress, to reduce of protein catabolism to the lowest level, to relieve or prevent the cardiovascular, cerebrovascular diseases formation, to prevent increasing fluid and electrolyte disorders, to reduce uremic symptoms such as itching, nausea, vomiting, loss of appetite and to ensure optimum nutrition [9].

Therefore, assessing and counselling the patient is essential both to prevent malnutrition and to indicate appropriate intervention in malnourished patients [4, 8]. The success of dialysis is dependent on adequate nutrition [6]. The present work aims to elicit the information on effectiveness of nutritional counselling program in patients undergoing maintenance haemodialysis.

## Materials and Methods

**Study design and sample:** This intervention study was conducted at the haemodialysis units of Yashoda hospitals, Secunderabad, Hyderabad. Among the 130 chronic renal failure patients who were on HD, 100 (63 male and 37 female) fulfilled the inclusion criteria and were enrolled in the study. From 100 samples counselling was given only to 50 samples.

### Tools of data collection

Questionnaire: this consisted of the following parts

- Demographic name, age, gender, marital status, number of family members, place of stay, socio-economic status, educational qualification, occupation, physical activity and lifestyle factors like smoking and drinking.
- Family and medical history along with onset, duration and frequency of dialysis.
- Anthropometric Information: Height and body weight were measured with light clothing. Body mass index (BMI) was calculated as the ratio of end dialysis body weight in kg and square of height in meters (kg/m2). Measurement of skin fold triceps muscle (TSF) was done using Skinfold calliper to estimate body fat. Measurement of mid-arm circumference (MAC) was done using inelastic measuring tape of length 150cm on the nonaccess arm to measure muscle mass. MAC signifies the thickness of subcutaneous fat and muscle Mid-arm muscle circumference (MAMC), which reflects the protein stores in the body, was calculated using the following formula.

  MAMC = MAC (mm) – (3.1415 x TSF (mm))

  Intra dialytic weight gain (IDWG) is measured by end dialysis body weight of previous dialysis session minus pre-dialysis weight of present session. IDWG is a marker for sodium and water overload in the body [15].
- Subjective Global Assessment: The nutritional level of patients was measured with help of 7-point SGA. SGA is relied on seven components- weight change in past 6 months, dietary intake, gastrointestinal symptoms, functional capacity, comorbidities, subcutaneous fat and signs of muscle wasting. Each component was given a score of 1 (normal) to 5 (very severe). Thus, malnutrition score (MS), sum of all components, range from 7 (normal) to 35(severely malnourished). Depending on MS, patients were classified into three groups: well nourished (score of 7-10), mild-to-moderate malnourishment (score of 11-22) and severe malnutrition (score of 23-35) [11].
- Biochemical parameters: The biochemical parameters included in the questionnaire were haemoglobin, Total leukocyte count (TLC), urea, serum creatinine, Blood Pressure, sodium (Na+), potassium (K+), albumin and Total iron binding capacity (TIBC).
- Diet history was calculated using 24 hr dietary recall and food frequency questionnaire.
- Pre-intervention: at the beginning of the study patients' knowledge of importance of protein and restriction of sodium, potassium, phosphorous and fluid was assessed by a pre- intervention questionnaire.
- Intervention: patients were educated about the importance od diet management with the help of one-one counselling and pamphlets which were made for them.
- Post-intervention: post-intervention data was compared with pre-intervention to assess the impact of dietary counselling in patients.

### Statistical analysis

The data obtained from the questionnaire was compiled in the MS excel sheet 2016 and was statistically analysed using mean, standard deviation, percentages, $\chi 2$ (chi square) test and t-test to find out the association between different parameters.

## Results and Discussion

The study sample included 100 patients (63 males and 37 females). The age of the study group ranged from 25-75 years, and the mean age was found to be 55.5 ± 13 in males and 53.3 ± 12.4 in females. Mohan M Rajapurkar (2012) reported that mean age of CKD patients in India is 50.1± 14.6 years and 70% of them were males and 29.7% of them were females. 91% of the study sample were married, 4% were illiterate and 68% of them were not working. 12% of the sample were smokers and 17 % of them were alcoholic. In the study sample, 92% of sample belong to urban population. 56% of the sample do not do any physical activity.

There was a first degree family history in 3% of the sample. The duration of kidney disease was more than 4 years in 37% of them and 1-2 years in 36% of them. 43% of them were on dialysis for more than a year. Edema was seen in 18% of smaples.

The mean height and weight of male respondents was 166.8 ± 5.86 cm and 67.6±11.2 kg and for females it was found to be159.95 ± 5.5 cm and 61.16 ± 13.4 kg respectively. The mean BMI in males and females was 24.2± 3.4 kg/m2 and 24.84± 5.4 kg/m2 respectively. Mean TSF, MAC and MAMC were 10 ± 2.24 mm, 25 ± 2.4 cm and22± 2.1 cm in males and 13 ± 5.1 mm, 24.9 ± 4.3 cm and 21 ± 3.3 cm respectively. Mean intra dialytic weight gain was 2.1 ± 1.2 kg and 2.1 ± 1 kg in males and females respectively.

**Table 1:** Comparison between control and experimental ESRD patients about their nutritional knowledge

| Knowledge | Non-counselling group (n=50) | Counselling group (n=50) | $\chi^2$ value# |
|---|---|---|---|
| 1. Is protein important for hemodialysis patients? | 35 (70%) | 50 (100%) | 15.26* |
| 2. In protein foods, do you think high biological value foods are important? | 9 (18%) | 28 (56%) | 20.54* |
| 3. Are you allowed to take liberal amount of | 43 (86%) | 49 (98%) | 4.89NS |
| 4. Do you think potassium should be restricted for dialysis patients | 30 (60%) | 47 (94%) | 16.4* |
| 5. Is sodium restricted in your diet | 36 (72%) | 50 (100%) | 16.27* |
| 6. Do you think patients on dialysis should avoid foods that contain high phosphorous | 4 (8%) | 17 (34%) | 10.84* |
| 7. How malnutrition affects ESRD patients' health | 18 (36%) | 38 (76%) | 18.94* |
| 8. After dialysis are you advised to practice healthy eating habits? | 30 (60%) | 50 (100%) | 25* |

The results showed that majority of respondents (63%) were well nourished. And 37% of them were mild-moderately malnourished. None of the subjects were severely malnourished. The results were very similar to that of Agboton *et al*., (2017) were 63.7% of subjects were normal, 36.3% of them were moderately malnourished and none of them were severely malnourished according to SGA.

The table 2 shows the biochemical parameters of the sample the mean urea (82 ± 34 mg/dL) and serum creatinine (7.5 ± 2.57 mg/dL) were found to be much higher than normal values while serum sodium, potassium and serum albumin was found to be within normal ranges. In-young jo *et al*., (2017) reported similar values of biochemical parameters, that mean TIBC in their subjects was 215±81 mcg/dL, mean albumin, haemoglobin and potassium were 3.9 ± 0.4 g/dL, 10.45 g/Dl and 5.1± 0.68 mmol/L respectively.

It was seen from the results that majority (68%) of the subjects were non-vegetarian and 59% of them used to consume 3-4 meals per day. 63% of the respondents followed the advice for fluid restriction and consumed 1-1.5 litres of fluid per day.

**Table 2:** Biochemical parameters of study population

| Variables mean ± S.D | |
|---|---|
| Haemoglobin (gm/dL) | 10 ± 1.9 |
| TLC (cells/cumm) | 7792 ± 2453 |
| Urea (mg/dL) | 82 ± 34 |
| Serum creatinine (mg/dL) | 7.5 ± 2.57 |
| Serum sodium (mmol/L) | 136 ± 5.3 |
| Serum potassium (mmol/L) | 5 ± 0.7 |
| Serum albumin (gm/dL) | 3.6 ± 0.6 |
| TIBC (mcg/dL) | 211 ± 36.6 |

Dietary intake of the subjects revealed that the actual mean nutrient intake was significantly lower than the recommended intake of haemodialysis patients. Energy, protein, carbohydrates, sodium and potassium showed a significant difference ($p$<0.05) with the actual RDA. Information collected from the records showed that, there was an initial (3-6 months of start of dialysis) weight loss which could be the reason in difference in nutritional intake. Wheras, after the initial phase, there was weight gain, which was reflected in their mild- moderated malnourishment state using SGA method.

**Table 3:** Comparison between pre and post- intervention responses of ESRD experimental group patients about their nutritional knowledge

| Knowledge | Pre-intervention (n=50) | Post-intervention (n=50) |
|---|---|---|
| 1. Is protein important for hemodialysis patients? | 26 (52%) | 50 (100%) |
| 2. In protein foods, do you think high biological value foods are important? | 7 (14%) | 23 (56%) |
| 3. Are you allowed to take liberal amount of fluids | 42 (84%) | 49 (98%) |
| 4. Do you think potassium should be restricted for dialysis patients? | 23 (46%) | 47 (94%) |
| 5. Is sodium restricted in your diet | 34 (68%) | 50 (100%) |
| 6. Do you think patients on dialysis should avoid foods that contain high phosphorous | 0 (0%) | 17 (34%) |
| 7. How malnutrition affects ESRD patients' health | 19 (38%) | 38 (76%) |
| 8. After dialysis are you advised to practice healthy eating habits? | 29 (58%) | 50 (100%) |

The comparison between knowledge of counselling and non-counselling subjects is shown in the table 1. The results show that 70% and 100% of non-counselling and counselling group know the importance of protein. 18% of non-counselling and 56% of counselling group know the importance of biological value proteins. Both counselling and counselling group (86% and 98% respectively) restrict fluids. 60%, 72% and 8% of non- counselling group restrict sodium, potassium and phosphorous in their diet while 94%, 100% and 34% in counselling group restrict them. 36 % of non-counselling group and 76% of counselling group say that malnutrition effect ESRD patients.

60% of non-counselling and 100% of counselling patients are advised to maintain healthy eating habits. The results indicated that counselling group and non-counselling group differ significantly in terms of their nutritional knowledge of protein, sodium, potassium and phosphorous at 5% level of significance (p=0.05). the knowledge of fluid restriction did not show any statistical significance (p<0.05).

The table 3 represents pre and post-intervention responses of ESRD experimental group patients about their nutritional knowledge. The results show that there was an improvement of knowledge in post-intervention group. The knowledge about protein increased from 52% to 100% from pre- to post intervention phases. The percentage of knowledge of importance of high biological value increased from 14 to 56%. There was not much difference in fluid restriction from pre to post (84% to 98%). Restriction of potassium, sodium and potassium is increased from pre (45%, 68% and 0% respectively) to post (94%, 100% and 34% respectively). Before counselling only 38% know that malnutrition effects ESRD patients which increased to 76% in post-intervention phase. All the patients were advised to practice healthy eating habits, while only 58% were advices in pre-intervention phase.

It was tested significantly, using t-test where the table value is 1.96 and calculated value is 2.92. This shows a significant variance at 5% level in the knowledge aspect of sample from pre to post counselling indicates nutritional Bhupal bania (2016) concluded in their study that poor nutritional intake in terms of total calorie and protein, socioeconomic barrier, low adherence to nutritional advice and diet chart, low physical activity levels were major problems of dialysis patients. Thus, patients should be provided nutritional counselling before starting dialysis so that nutritional challenges can be reduced.

Education helped the sample in creating awareness along with knowledge on the basis of maintaining good health.

## Conclusion

Thus, it was concluded from the study that nutritionists and dietitians play a crucial role in alleviating a small percent of mild malnourished subjects who can slide to malnourishment stage very fast. It can be achieved only through nutritional counselling, with the support of educational material, created specifically for CKD patients under Haemodialysis. Nutritional counselling can enhance patient's knowledge about wide food choices and empower them to lead a healthy life style.

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