

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## Effect Of Dietary Counselling On Nutritional Parameters In End - Stage Renal Disease Patients.

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### ABSTRACT

End Stage Renal Disease (ESRD) is an irreversible loss of renal function affecting 5 to 10% of the world population. In this study, the effect of Dietary counseling on nutritional parameters in End stage renal Disease Patients attending a tertiary care hospital was assessed. About 87 End Stage Renal Disease patients of the age group 30-60 who came for dialysis were included as subjects in our study after obtaining written informed consent. The Nutritional parameters like Height, Weight, Body mass Index (BMI), Mid Upper Arm Circumference (MUAC), Haemoglobin (Hb), serum Electrolytes, Albumin and Total Cholesterol for 87 patient's undergoing regular Hemodialysis was documented during initial phase. Dietary counseling was given once in a week for 3months through PowerPoint, direct method through telephone and by using charts. The Nutritional parameters were assessed again, 3 months after counseling and analysed. The nutritional parameters like Hb, Serum Albumin and Total Cholesterol showed significant 'p' values of < 0.005 after nutritional counselling. In our study, dietary counselling was very effective in improving the nutritional parameters in dialysis patients. In this study we observed that dietary counselling played a vital role in improving not only the nutritional parameters but also the psychological status and well-being of the patients.

**Key words:** Body mass Index (BMI), Dietary counselling, End Stage Renal Disease (ESRD), Haemodialysis, Mid Upper Arm Circumference (MUAC).

<https://doi.org/10.33887/rjpbcs/2024.15.4.45>

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## INTRODUCTION

Kidney is a vital human organ which is responsible for the filtration of nitrogenous and other metabolic waste products from the body through the urinary system and maintains the blood levels of biochemical substances, fluid, electrolyte balance, and also produces erythropoietin in the human body [1].

Chronic Kidney Disease (CKD) is associated with a number of serious complications, including increased incidence of cardiovascular disease, hyperlipidemia, anemia, and metabolic bone disease [2]. ESRD is a major public health problem that affects 5 to 10% of the world population [3] and its management is focused on reducing the progression and treating its complication [4]. End – Stage Renal Disease (ESRD) is an irreversible condition due to loss of renal function leading to excretory, metabolic and synthetic failure culminating in accumulation of non-protein nitrogenous substance [5] ESRD is a non- communicable disease with high cardiovascular morbidity and mortality. Hence various management programs and nutritional intervention have been shown to reduce the incidence of ESRF. Diet is one of the most modifiable risk factors for adverse health outcomes. Numerous randomized controlled trials have evaluated single nutrient targets (Fe, protein or sodium intake) [6]. Cardiovascular disease is the leading cause of the death in dialysis patients. Arteriovenous fistulas (AVFs) are associated with lower mortality and are viewed as the desired access option in most patients with advanced kidney disease needing dialysis [7].

The most common cause of ESRD is Kidney damage induced by HTN and Diabetic nephropathy. Diet is an important factor for Kidney health, others such as physical activity and avoidance of tobacco, may also be important contributors [8]. A decline in GFR and an increase in uremic symptoms (fatigue, weakness, anorexia and muscular cramps) is associated with a reduced functional status and quality of life [9]. GI symptoms are also frequently seen in this patient population, which leads to decreased intake of food and malnutrition [10, 11]. This disease causes severe and irreversible malfunctioning of the kidneys that result in inability to balance body fluids, electrolytes, and metabolism [12, 13]. Non-traditional risk factors, including persistent low-grade inflammation, are critical in the pathogenesis of atherosclerosis, vascular calcification, and other causes of CVD and may also contribute to protein-energy wasting and other complications in chronic kidney disease (CKD) patients. Inflammatory biomarkers, such as high sensitivity C-reactive protein and interleukin-6, independently predict mortality in these patients [14]. In dialysis patients, the decrease in food intake increases mortality [15, 16]. CHD patients often struggle to follow the dietary recommendations as Nutritional counselling aims to achieve a dietary intake of 1.2g protein and 30–35kcal/kg body weight/day in patients at risk of malnutrition [17]. Anthropometric measurements provide a quick, noninvasive means of quantitating protein and energy compartments to facilitate identification of patients who are malnourished and in need of nutritional rehabilitation, patients with limited energy or protein reserves who may be at risk, and patients with adequate stores and reserves [18].

Reducing protein intake has definite positive outcome on renal function over time [19]. The Prevalence of ESRD is highly variable in different parts of the world due to environmental, ethnic, socio economic, rural and urban differences [20]. ESRD significantly reduces the lifespan of a person and the quality of life by increasing the risk of CVD mortality and its progression to ESRD. There are numerous reasons to consider nutrition related intervention in patients with ESRD as it results in altered metabolism of various nutrient and their excretory rate [21]. ESRD requires long term treatment, healthy life style interventions, including diet, medication and exercise [22]. As ESRD progresses the recommended dietary changes should be feasible and sustainable pertaining to the patient's food preferences. Nutritional guidelines suggest daily energy and protein intake of 30-35 kcal/kg and 1.1 -1.2 g/kg ideal body weight to maintain nutritional status [23]. Dietary counselling and nutrition education are recommended in the prevention and management of chronic kidney disease (CKD) and end-stage renal disease (ESRD) (22). The diet prescription identified the type, amount and frequency of suggested foods and included any restriction and limitation or increased individual dietary components [24]. Education is a process in which individuals receive practical, cognitive, and emotional awareness [25]. Educating the patients about the disorder can save time and energy and encourages the patient to have a diet that prevents the frequent hospitalizations [26].

The overall management of ESRD focuses on medication, dialysis, nutrition and transplant. Better management of ESRD, slows progression of renal dysfunction; prevent metabolic complication and reduce cardiovascular related outcomes [27].

**MATERIALS AND METHODS**

The present study has been conducted in the Department of Nephrology and Biochemistry, Mahatma Gandhi Medical College Research Institute, Pillayarkuppam, Puducherry, after obtaining Institutional Human Ethics Committee clearance. Patients who were already diagnosed with ESRD and who are undergoing Hemodialysis were screened for the study. Informed consent was obtained from all participants. Totally 87 patients were enrolled as study subjects from a tertiary health care hospital, and their detailed history and demographic characteristics was obtained. Height was measured by using stadiometer, Weight by using weighing machine, Body Mass Index (BMI) was calculated as body weight by squared height using formula. Mid-Upper Arm Circumference (MUAC) was measured using a non-stretchable insertion tape. It is used to assess the nutritional status and are color coded (red indicates acute malnutrition) yellow – intermediate, green – well malnourished. About 5ml of venous blood was collected in vacutainers and the nutritional parameters like Hemoglobin by Sahli’s method, Total Protein by Biuret method, Albumin by Bromocresol Green method, Serum Cholesterol by Cholesterol Oxidase method, Sodium, Potassium, Chloride by Ion Selective Electrode method was done and the results were documented. Nutritional intervention programme was conducted for the study subjects. Dietary Counselling was given on one-to-one interaction using Tamil language, by issuing pamphlets and by giving detailed explanation about the intake of fruits, vegetables, sodium, potassium low foods & fluid intake for the dialysis patients. Each counselling session involved the use of pamphlets and nutritional messages and printed materials with all messages distributed at the end of each counselling to the patients. A telephone follows - up was also conducted for the individual patients. After completion of nutritional intervention, the patients were assessed for changes in the dietary habits and nutritional parameters were assessed post intervention by drawing 5ml of venous blood. Their nutritional parameters pre & post intervention was tabulated and analyzed statistically using Mean, Standard deviation and paired ‘t’ test.

**RESULTS**

**Table 1: Baseline Anthropometric measurements, BMI, MUAC, Systolic Blood Pressure and Diastolic Blood Pressure.**

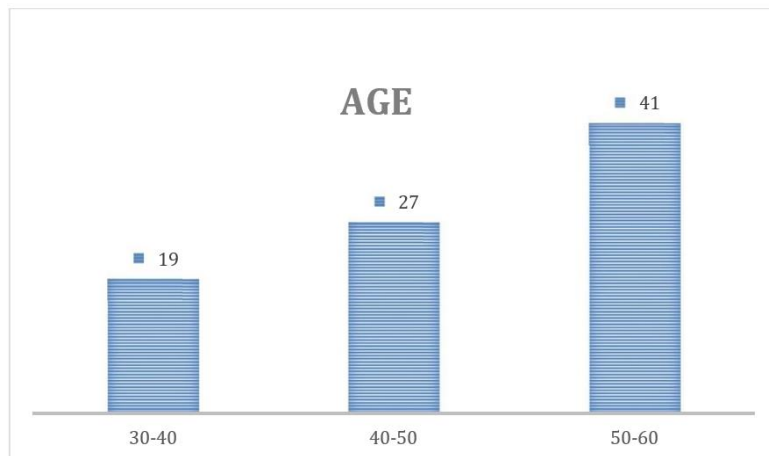
Variables	Mean	Standard Deviation
AGE	49.920	9.67
BMI	21.73	3.41
MUAC	27.586	3.2833
SBP	156.207	25.1619
DBP	82.529	14.9587

**Table 2: Baseline and post intervention ranges of Biochemical and nutritional parameters expressed as Mean standard deviation.**

Parameters	Baseline	After Intervention	P Values
Na	137.24 ± 3.74	137.39 ± 3.38	0.756
K	5.11 ± 0.65	5.35 ± 0.84	0.18
Cl	107.67 ± 10.42	107.77 ± 6.02	0.939
Urea	110.95 ± 28.19	106.66 ± 24.05	0.198
Creatinine	8.65 ± 1.99	5.20 ± 4.76	0.319
Hb	8.12 ± 1.73	8.61 ± 1.58	0 *
S. Albumin	4.30 ± 0.79	4.55 ± 0.55	0 *
T. Protein	6.78 ± 0.87	6.98 ± 0.53	0.009 *
T. Cholesterol	177.75 ± 32.58	168.05 ± 20.87	0 *

‘p’ value is significant for nutritional parameters after the dietary counseling.

**Figure 1: Represents Age group which varies from 30-60 years. 19 subjects are in the age group of (30-40), 27 subjects in the age group of (40-50) and 41 subjects are in the age group of (50-60).**



In figure 1 patients of older age group (50-60 years) are more likely to have increased risk for End - Stage Renal Disease.

**Figure 2: Represents the percentage of Male and female subjects.**

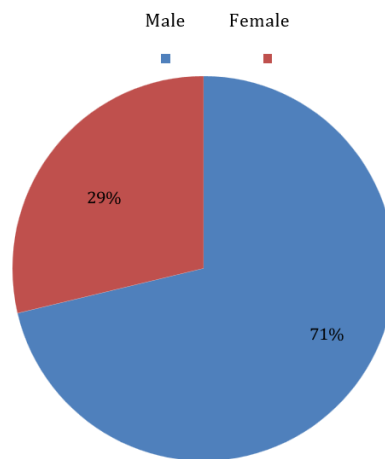
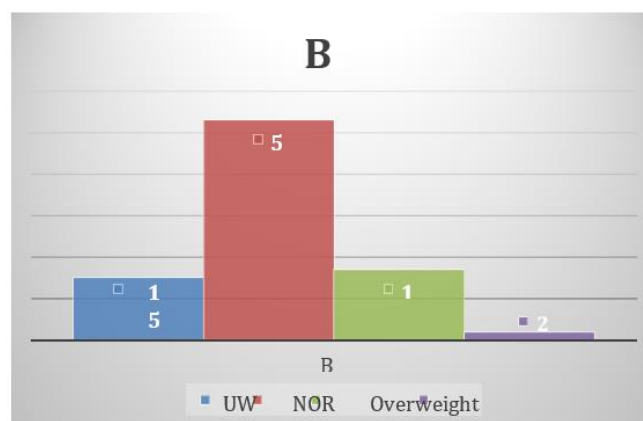


Figure 2, Out of 87 subjects 71% are Male and 29% are Female patients.

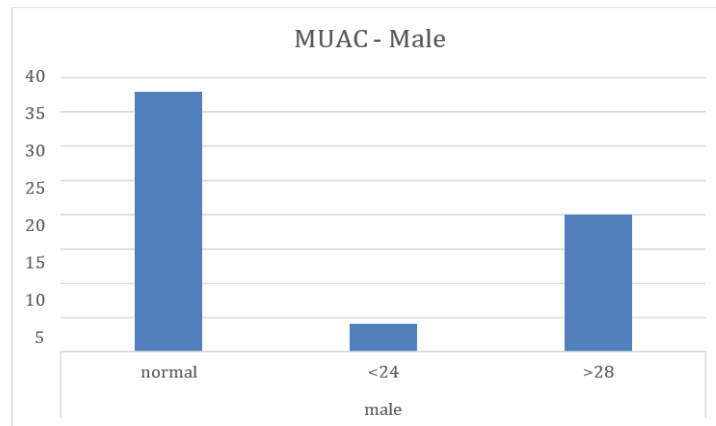
**Figure 3: Represents the Body Mass Index (BMI) with reference to the subjects who are under nourished or malnourished. UW- Underweight, Nor- Normal, Overweight and obese.**





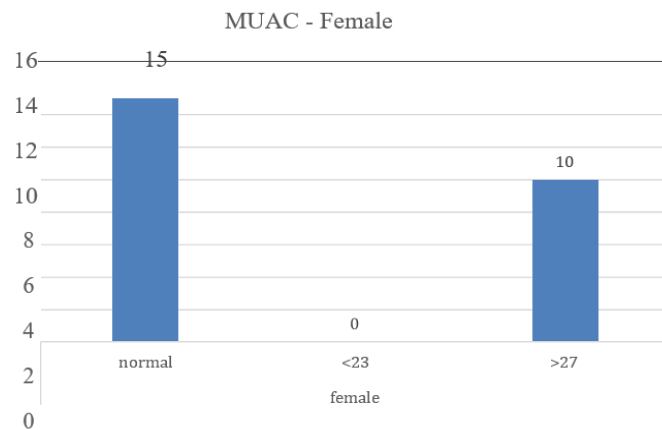
Out of 87 subjects, 15 subjects were underweighting or malnourished, 53 subjects were normal, 17 subjects were overweight and only 2 subjects were in the obese range.

**Figure 4.1: Represents the Mid-Upper Arm Circumference (MUAC) in Male subjects.**



Out of 62 subjects in male, 38 subjects are in the normal range which is (24-28cm), 4 subjects are in the range < 24cm and 20 subjects are in the range >28cm.

**Figure 4.2: Represents the Mid-Upper Arm Circumference (MUAC) in Female subjects.**



Out of 25 female subjects, 15 subjects are in normal range (23-27cm), no subjects in the range (<23cm) and 10 subjects are in the range (>27cm).

**Figure 5**

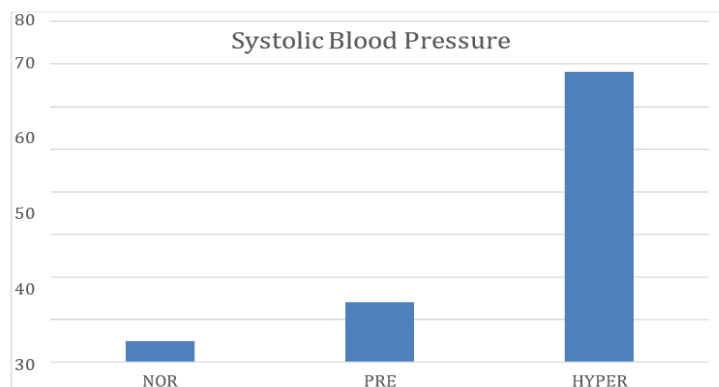
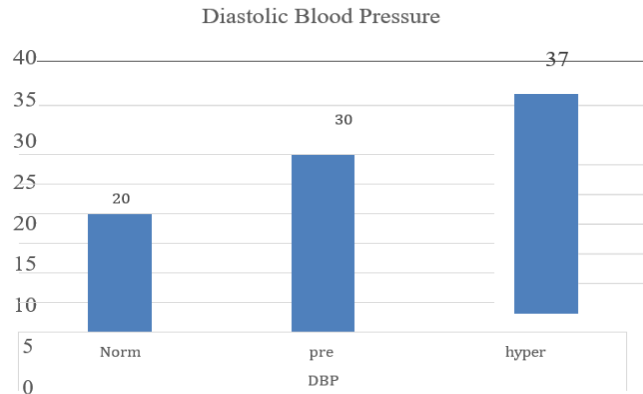


Figure 5 represents the Normal, Pre-hypertensive and Hypertensive ranges of Systolic Blood Pressure of the study subjects. In our study 5 patients are in the Normotensive range, 13 subjects are in the Pre-Hypertensive range (120-139mm/Hg) and 68 subjects in the Hypertensive range (>140mm/Hg).

**Figure 6: Represents the Diastolic Blood Pressure of the subjects**



20 subjects are in normal range (< 80 mm/Hg) 30 subjects are in the Pre- hypertensive range (80-89 mm/Hg) and 37 subjects are in the Hypertensive range (> 90 mm/Hg).

In our study, Dietary counselling was found to be very effective in improving the nutritional parameters like Hb, Ser. Albumin, Tot. Chole sterol in dialysis patients and these parameters showed significant 'p' values < 0.005.

### DISCUSSION

In this study, 97.5% of patients were mild to moderately malnourished at baseline and only 25% were well nourished. A study in Yemen reported that out of 50 patients 70% of them had moderate malnutrition and 20% were severely malnourished [28]. About 51.2% of the patients were not practicing healthy eating habits. Following dietary counselling in the form of personal talk, pamphlets and through phone 58% of the study subjects accepted and followed moderate change in their dietary pattern and this prevented from worsening of malnourishment [22]. Few studies have examined the impact of CKD interventions (including BP control) on post ESRD outcomes and recently concluded that there is no decrease in the progression of kidney disease from treatment with antihypertensive drug therapy to a lower BP. In our study, blood pressure control was much significant following intervention (dietary counselling) and explaining the deleterious effect of Sodium and Potassium and by advising them to avoid the intake of sodium and potassium rich foods. Dietary interventions lowered systolic blood pressure (3studies, 167 people) and diastolic blood pressure compared to a control diet (2studies,95 people) Dietary interventions were associated with a higher estimated GFR (5 study, 219 people) and Serum Albumin levels (6 study, 541 people). A Mediterranean diet lowered serum LDL cholesterol level (1 study, 40 people). In our study Dietary interventions lowered the blood pressure, and caused marginal increase in their nutritional parameters like (Hb, serum Albumin, Protein, serum Cholesterol) and a marginal decrease in the biochemical parameters like (Na, K, Cl, Urea and Creatinine). Eleven studies (39.3%) reported on the prevalence of depressive symptoms and its effect on patient outcomes. Ten studies (35.7%) focused on dietary adherence / non - adherence in patients with ESRD & the remaining seven (25%) articles were descriptive studies on the relationship between depressive symptoms and dietary non adherence in patients with ESRD receiving hemodialysis. The prevalence of depressive symptoms and dietary non adherence ranged as 6-83.49% and from 41.1 - 98.3% respectively. Decreased quality of life & increased morbidity and mortality were positively associated with depressive symptoms. Other factors like increased level of Urea and Creatinine values and decreased level of Hb, Serum Albumin are also associated with depressive symptoms. This symptom is more likely to increase dietary non adherence. In our study before interventions patients were in a depressive state, but after interventions there was a slight improvement in their behavior, dietary pattern, food intake and moderate improvement in nutritional and biochemical parameters.



## CONCLUSION

In this study we observed that nutritional counselling played a vital role in improving not only the nutritional parameters but also the psychological status and well-being of the patients. However, this is a continuous process and ESRD patients need frequent nutritional counselling to help them tide over this chronic disease. It helps to prevent frequent hospitalizations. The overall management of ESRD mainly focuses on dialysis, transplant and nutrition all put together in maintaining patients' wellbeing.

## ACKNOWLEDGEMENT

I would like to thank Sri Balaji Vidyapeetham, for providing the facility to carry out the research.

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