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ASSESSMENT OF THE ANTHROPOMETRY AND NUTRITIONAL STATUS OF SUBJECTS WITH CHRONIC KIDNEY DISEASE

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ABSTRACT

Background: To prevent a decline in nutritional status and promptly address any nutritional deficiencies, all patients with chronic kidney disease and those receiving dialysis should regularly assess their nutritional status.

Aim: The purpose of this study was to evaluate the nutritional status and anthropometry of individuals with chronic kidney disease (CKD) in India.

Methods: During the specified study period, 200 CKD patients receiving maintenance hemodialysis at the Institute were evaluated. To obtain pertinent biochemical and anthropometric data, each participant's file was evaluated. A pre-made proforma was used to collect the data, which were then statistically evaluated.

Methods: There were more men than women. The CKD subjects' mean protein and calorie values were 71.73±77.163 and 1657.58±240.177, respectively. The BMI, weight, and mean MUAC were 23.84±1.707, 57.369±6.20, and 21.54±1.703, respectively. The study participants' mean MUAC, BMI, and weight increased after three months. The mean RBS, VLDL, HDL, triglycerides, and cholesterol levels in CKD subjects were 117.63±21.44, 28.486±7.112, 49.44±6.27, 139.74±6.27, and 163.88±29.73, respectively. RBS levels dropped after three months, while mean cholesterol, VLDL, HDL, and triglycerides all rose.

Conclusion: Body weight, BMI, and biochemical markers are all impacted by a nutritious diet. Subjects with chronic kidney disease (CKD) often consume low amounts of protein and energy, so it's critical to inform subjects, their families, and co-patients about important foods that meet recommended intake levels. When compared to the initial assessment, follow-up subjects exhibit better nutritional knowledge.

Keywords: Chronic kidney disease, CKD, dialysis, morbidity, nutrition

INTRODUCTION

Chronic kidney disease (CKD) is a pathophysiological process with multiple etiologies that reduces nephron function and quantity, ultimately leading to end-stage renal disease (ESRD). According to reports, approximately 7.85 million Indians have chronic kidney disease. With a population of 1 billion and an ESRD prevalence of 1000 per million, approximately 100,000 people in India develop ESRD each year. Ninety percent of subjects begin with renal replacement therapy, nearly ten percent cannot afford treatment, and ninety percent never see a nephrologist. Dialysis and renal replacement therapy, such as transplantation, have increased the survival rate of CKD patients worldwide.[1]

Among ESRD patients receiving hemodialysis, malnutrition is quite common. Insulin resistance and the mobilization of fuel stores result from the release of catecholamines, cortisol, glucagon, and growth hormones during an inflammatory response.

IL-6 increases the production of acute phase proteins in the liver, while TNF-α and interleukins promote the breakdown of muscle proteins. Dialysis is required to remove waste, excess water, and salt from the body while maintaining the proper levels of certain chemicals in the blood and helping to control blood pressure when the kidneys have lost 85–90% of their ability to function. In ESRD patients, dialysis is administered on a regular basis until renal replacement.[2]

The patient chooses two dialysis options that adhere to specific dietary recommendations.2 In hemodialysis patients, malnutrition is a prevalent and potent predictor of morbidity. Although there has been recent progress in identifying the pathophysiology and cause of malnutrition in hemodialysis patients as well as the connection between malnutrition and mortality and morbidity, the available data regarding management is conflicting.[3]

Anti-inflammatory medications, androgenic anabolic steroids, growth hormones, and stimulant use have all been evaluated as part of conventional management as therapeutic strategies, intradialytic parenteral nutrition, oral nutritional supplements, and nutritional counseling. The results have been inconclusive and inconsistent.[4]

In India, where malnutrition is already very common, CKD patients frequently experience PEM (protein energy malnutrition). Endocrine disorders of uremia, accumulation of uremic toxins or endogenous toxin ingestion, conditions associated with chronic kidney disease (CKD) that cause inflammation, anorexia, hypercatabolism, blood loss from blood sequestration, blood sampling, frequent gastrointestinal bleeding, catabolic response to superimposed illnesses, dialysis itself, which may promote catabolism from biocompatibility, and insufficient food intake due to anorexia are the main causes of malnutrition. Dietary status was found to be a significant predictor of the fate of CKD subjects in the literature.[5]

Medical therapy and nutritional management are equally important. There are currently guidelines for managing optical CKD subjects with regard to dietary status. The DOQI (Dialysis Outcome Quality Initiative) is a set of standards created by the American NKF (National Kidney Foundation). Guidelines have been modified to accommodate Indian conditions due to the unique eating habits of Indian subjects. Malnutrition and mortality can be reduced with nutritional interventions. Intestinal nutritional counseling, enteral tube feedings, appetite stimulation, and oral nutritional supplements are the next steps after a thorough evaluation of protein-energy status. According to the 2005 Nutrition Management Guidelines, nutritional status should be evaluated using a combination of complementary and trustworthy indicators rather than just one measure.[6]

Anthropometry, urea nitrogen appearance for protein intake assessment, dietary interviews and diaries, and biochemical parameters like cholesterol, albumin, bicarbonate, and creatinine can all be used to evaluate nutritional status. Every dialysis patient should have regular nutritional status checks because any loss of nutritional status can be promptly treated. Anthropometry should be performed every six months, and serum proteins may be measured every three months. The current study sought to evaluate the nutritional status and anthropometry of participants with chronic kidney disease (CKD) in India.

MATERIALS AND METHODS

The goal of the current observational clinical study was to evaluate the nutritional status and anthropometry of participants in India who presented with chronic kidney disease (CKD). The Institute's Department of Medicine provided the study participants. Prior to their involvement in the study, all participants provided written and verbal informed consent.

200 CKD patients who were admitted to the Institute during the specified study period were included in the study. The study's inclusion criteria included participants who had been receiving hemodialysis for at least three months, those who were anuric, those who did not have any acute illnesses, such as pneumonia, acute myocardial infarction, or septicemia, and those who were willing to take part. Subjects who did not consent to participate in the study met the exclusion criteria. Every participant received the questionnaire in either Hindi or English, which they could understand.

In order to obtain pertinent biochemical and anthropometric data, such as serum albumin, weight, and height, the subjects' files were examined. After one, two, and three months, the subjects were encouraged to follow a diet based on their body mass index (BMI), and the impact of the change was evaluated. Pre-made proforma were used to collect the data. The questionnaire was broken up into five sections: general data, biochemical evaluation, anthropometric evaluation, and statistical tools. The number of people residing in the home, socioeconomic status, employment, education level, nationality, residence, ownership of the residence, marital status, age, and gender were all evaluated. To assess MAMC (middle-arm muscle circumference), BMI, and interdialytic weight gain, anthropometric measurements of height, weight, TSF (tricipital skin fold thickness), and MAC (mid-arm circumference) were taken before and after dialysis.

Since albumin is a useful indicator for haemodialysis patients to evaluate nutritional conditions, it was evaluated in the biochemical assessment. Serum albumin ≥4g/dL is the outcome target for haemodialysis patients after NKF. Every participant had their serum albumin levels measured.

All meals and drinks consumed during the previous 24 hours were evaluated in the diet assessment, along with self-reported gastrointestinal symptoms like nausea, vomiting, and diarrhoea, in order to assess nutritional intake. The majority of GI symptoms were deemed severe when they persisted for at least two weeks. Short-term or intermittent symptoms were deemed unimportant. Subjects were asked to describe their physical abilities in order to gauge their physical functional status. Changes in functional ability over the past six months were associated with changes in nutritional status, including anaemia and poor food intake.

The third aspect of history is comorbid illnesses connected to dietary needs as diabetes and hypertension. Ten questions about dialysis therapy and diet—potassium, sodium, and protein—were posed to participants as part of a knowledge assessment. The collected data was statistically examined using the Chi-square test, ANOVA (analysis of variance), Student t-test, and assessment of descriptive measures. The mean, standard deviation, frequency, and percentages were used to express the results. A p-value of less than 0.05 was deemed statistically significant.

RESULTS

The goal of the current observational clinical study was to evaluate the nutritional status and anthropometry of participants in India who presented with chronic kidney disease (CKD). During the specified study period, 200 CKD patients receiving maintenance haemodialysis at the Institute were evaluated.

Each participant's file was evaluated to obtain pertinent anthropometric and biochemical data. The study participants consumed an average of 71.73±77.163 grams of protein and 1657.58±240.177 calories of calories. 21% (n=42) of the study participants were between the ages of 31-40 and 41-50, followed by 20% (n=40) of those between the ages of 20-30 and >60, and 18% (n=36) of those between the ages of 51-60 (Table 1).

MUAC (mid-upper arm circumference) was 23.84±1.707 at one month, which significantly decreased to 21.8±1.4141 with a mean change of 7.78% and p=0.007 when the subjects' weight and BMI were evaluated after diet restriction. After one month, the study subjects' mean BMI was 21.54±1.703 kg/m2, but after three months, it had significantly increased to 25.366±24.688 with a mean change of -17.64% with p<0.001. The subjects' mean weight at one month was 57.369±6.20, and after three months, it significantly increased to 65.36±70.266 with a mean change of -13.96% and p<0.001 (Table 2).

RBS was 117.63±21.44 at one month following the nutritional plan, which dramatically dropped to 111.70±17.544 after three months with a mean change of 5.03% and a p-value of 0.02. After three months, VLDL also increased significantly, with a mean change of -9.54% and p<0.001. After three months, HDL increased non-significantly, with a mean change of -3.50% and p=0.08. Additionally, there was a significant increase in triglycerides from 139.74±35.70 to 149.48±40.31, with a mean change of -6.95% and p=0.005. Additionally, there was a significant increase in cholesterol levels from 163.88±29.73 to 181.11±32.324 mg/dl, with a mean change of -10.49% and p<0.001 (Table 3).

Serum albumin at one month was 3.283±0.529, which significantly increased to 4.054±5.6387 after three months with a mean change of -23.45% and p<0.001, according to the study results for changes in serum albumin and serum creatinine levels in study subjects following nutrition assessment. Serum creatinine was 9.95±3.451 at one month and increased non-significantly to 10.4229±3.418 with a mean change of -4.53% and p=0.114 (Table 4).

DISCUSSION

200 CKD patients receiving maintenance haemodialysis at the Institute during the specified study period were evaluated for this study. Each participant's file was evaluated to obtain pertinent anthropometric and biochemical data. The study participants consumed an average of 71.73±77.163 grams of protein and 1657.58±240.177 calories.

21% (n=42) of the study participants were in the 31–40 and 41–50 age groups, followed by 20% (n=40) in the 20–30 and >60 age groups, and 18% (n=36) in the 51–60 age group. These results were similar to those of studies conducted in 2005 by Bossola M et al.7 and by Anjankar AP et al.8, in which the authors evaluated subjects whose demographic information was similar to that of the current study.

MUAC (mid-upper arm circumference) was 23.84±1.707 at one month, which significantly decreased to 21.8±1.4141 with a mean change of 7.78% and p=0.007 when the subjects' BMI and weight were evaluated after diet restriction.

The study subjects' mean BMI at one month was 21.54±1.703 kg/m2, and after three months, it significantly increased to 25.366±24.688 with a mean change of -17.64% and $p<0.001$. The subjects' mean weight at one month was 57.369±6.20, and after three months, it had significantly increased to 65.36±70.266 with a mean change of -13.96% and $p<0.001$. These findings were in line with those of Saini M et al. (2008) and Manandhar DN et al. (2008), whose parameters were similar to those of the current study.

According to the study's findings, RBS was 117.63±21.44 at one month following the nutritional plan, and it significantly dropped to 111.70±17.544 after three months, with a mean change of 5.03% and a p-value of 0.02.

After three months, VLDL also significantly increased, with a mean change of -9.54% and $p<0.001$. After three months, HDL increased non-significantly, with a mean change of -3.50% and $p=0.08$. Additionally, there was a significant increase in triglycerides from 139.74±35.70 to 149.48±40.31, with a mean change of -6.95% and $p=0.005$. Additionally, there was a significant increase in cholesterol levels from 163.88±29.73 to 181.11±32.324 mg/dl, with a mean change of -10.49% and $p<0.001$. These results were consistent with those of Visiedo L et al and Guligowska A et al, who reported similar changes in biochemical markers following the nutritional plan.

Additionally, it was observed that following a nutrition assessment, study participants' serum albumin and serum creatinine levels changed serum albumin at 1 month was 3.283±0.529 which significantly increased to 4.054±5.6387 after 3 months with the mean change of -23.45% and $p<0.001$. For serum creatinine, it was 9.95±3.451 at 1 month and non-significantly increased to 10.4229±3.418 with a mean change of -4.53% and $p=0.114$. These findings were consistent with those of Ikizler TA13 and Panichi V et al., who reported similar changes in serum albumin and serum creatinine levels.

CONCLUSION

Taking into account its limitations, the current study concludes that body weight, BMI, and biochemical indicators are influenced by nutritional diet. Subjects with chronic kidney disease (CKD) often consume low amounts of protein and energy, so it's critical to inform subjects, their families, and co-patients about important foods that meet recommended intake levels. Compared to the initial assessment, follow-up subjects exhibit improved nutritional knowledge.

REFERENCES

1. Espahbodi F, Khoddad T, Esmaeili L. Evaluation of malnutrition and its association with biochemical parameters in patients with end-stage renal disease undergoing hemodialysis using subjective global assessment. *Nephrourol Mon*. 2004;6:3.
2. Vaidya SR, Aeddula NR. *Chronic Renal Failure*. Treasure Island (FL): StatPearls Publishing;
3. Wilcox G. Insulin and insulin resistance. *Clin Biochem Rev*. 2005;22009.6:19.
4. Arikan H, Tuglular S. The growing global burden of end-stage renal disease (ESRD). *Marmara Med J*. 2005;18:143–50.
5. Dash SC, Agarwal SK. Incidence of chronic kidney disease in India. *Nephrol Dial Transplant*. 2006;21:232–3.
6. Carney EF. The impact of chronic kidney disease on global health. *Nat Rev Nephrol*. 2009;16:251.
7. Bossola M, Muscaritoli M, Tazza L, et al. Variables associated with reduced dietary intake in hemodialysis patients. *J Ren Nutr*. 2005;15:244–52.
8. Anjankar AP, Dharme PV, Jambhulkar RK. Role of hemodialysis in management of patients of chronic kidney disease. *Int J Clin Biochem Res*. 2007;4:111–4.
9. Saini M, Vamne A, Kumar V, et al. The study of the pattern of lipid profile in chronic kidney disease patients on conservative management and hemodialysis: A comparative study. *Cureus*. 2009;14:1.
10. Manandhar DN, Chhetri PK, Pahari LR, et al. Nutritional assessment of patients under hemodialysis in Nepal Medical College Teaching Hospital. *Nepal Med Coll J*. 2008;10:164–9.
11. Visiedo L, Rey L, Rivas F, et al. The impact of nutritional status on health-related quality of life in hemodialysis patients. *Sci Rep*. 2010;12:1–8.
12. Guligowska A, Corsonello A, Pigłowska M, et al. Association between kidney function, nutritional status and anthropometric measures in older people. *BMC Geriatr*. 2010;20:1–2.
13. Ikizler TA. A patient with CKD and poor nutritional status. *Clin J Am Soc Nephrol*. 2013;8:2174–82.

14. Panichi V, Cupisti A, Rosati A, et al. Geriatric nutritional risk index is a strong predictor of mortality in hemodialysis patients: data from the Riscavid cohort. *J Nephrol*. 2010;27:193–201.

S. No	**Age range (years)**	**Number (n)**	**Percentage (%)**
1.	**20-30**	40	20
2.	**31-40**	42	21
3.	**41-50**	42	21
4.	**51-60**	36	18
5.	**>60**	40	20
6.	**Total**	200	100
7.	**Mean protein given**	71.73±77.163	
8.	**Mean calorie given**	1657.58±240.177	

Table 1: Distribution of study subjects based on the age range

S. No	**Parameter**	**1 month**	**After 3 months**	**Mean change (%)**	**p-value**
1.	**MUAC**	23.84±1.707	21.8±1.4141	7.78	**0.007**
2.	**Mean BMI (Kg/m2)**	21.54±1.703	25.366±24.688	-17.64	**<0.001**
3.	**Mean weight (kg)**	57.369±6.20	65.36±70.266	-13.96	**<0.001**

Table 2: Change in BMI and weight of the subjects following diet restriction

S. No	**Biochemical parameters**	**1 month**	**After 3 months**	**Mean change (%)**	**p-value**
1.	**RBS**	117.63±21.44	111.70±17.544	5.03	**0.02**
2.	**VLDL**	28.486±7.112	31.210±11.132	-9.54	**<0.001**
3.	**HDL**	49.44±6.288	51.197±5.874	-3.50	0.08
4.	**Triglycerides**	139.74±35.70	149.48±40.31	-6.95	**0.005**
5.	**Cholesterol**	163.88±29.73	181.11±32.324	-10.49	**<0.001**

Table 3: Changes in the biochemical markers after the nutritional plan

S. No	**Biochemical parameters**	**1 month**	**After 3 months**	**Mean change (%)**	**p-value**
1.	**S. albumin**	3.283±0.529	4.054±5.6387	-23.45	**<0.001**
2.	**S. creatinine**	9.95±3.451	10.4229±3.418	-4.53	0.114

Table 4: Changes in serum albumin and serum creatinine levels in study subjects after nutrition assessment