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Nutritional Assessment and Health Status of Patients Undergoing Dialysis

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ABSTRACT

Objectives: The main aim of the study was to compare the nutritional status of subjects undergoing dialysis in a private hospital and government hospital.

Methods: A cross sectional study was conducted in 100 subjects. A questionnaire was used to collect information regarding demographic profile, lifestyle pattern,medical history, biochemical parameters, food frequency questionnaire and 24 hours,3 days diet recall. Anthropometric measurements were taken and BMI was calculated.SGA questionnaire was used to assess the malnutrition of the subjects.Statistical analysis was performed using SPSS software. Paired T test and Chi square test was carried out. P-value < 0.05 was considered to be statistically significant.

Results: The average intake of energy, quality protein and calcium among private(government) hospital was 1694 kcal (1307kcal), 4.25gm (4.37gm), 700mg (1062mg) respectively,this showed the intake of energy and quality protein was higher among private hospital subjects,whereas intake of calcium was higher in government hospital subjects. The anthropometric measurement was seen to be higher in private hospital subjects.The SGPT and uric acid was seen to be normal in government hospitals whereas calcium and platelets were seen to be higher in private hospitals. The Subjective Global Assessment showed that the subjects from private hospital were well nourished by 48% whereas Government hospital subjects were severely malnourished by 36% and most of the subjects from both the hospitals were mild to moderately malnourished.

Conclusion: Statistical difference was seen in private and government hospital subjects with regards to Nutritional and health status.Efforts need to be undertaken to improve food intake,nutrition knowledge and prevention of malnutrition of the population undergoing dialysis.

Key words: *Chronic Kidney Disease,Subjective Global Assessment,Qualityprotein,Malnutrition, Dialysis.*

INTRODUCTION

Chronic diseases have become a major cause of global morbidity and mortality even in developing countries. The approximate prevalence of CKD is 800 per million populations (pmp), and the incidence of end-stage renal disease (ESRD) is 150-200 pmp[1]. Chronic kidney disease is a general term for heterogeneous disorders affecting kidney structure and function[4]. Kidney failure may occur from an acute situation that injures the kidneys or from chronic diseases that gradually cause the kidneys to stop functioning[13]. Patients with chronic kidney disease (CKD) often experience a decline in their nutrient intake starting at early stages of CKD. This reduction in intake can affect both energy-producing nutrients, such as carbohydrates, proteins, and fats, as well as vitamins, minerals, and trace elements[2].

In view of the limited ability of dialysis patients to cope with excess fluid and other metabolic wastes, it is vital that nutrient content of foods consumed by such patients is given special considerations. Nutrient intakes of patients receiving maintenance dialysis are often inadequate, and several lines of evidence suggest that toxins that accumulate with renal failure Suppress appetite and contribute to nutritional decline[3]. Malnutrition, a predictor of increased mortality in dialysis patients, can be estimated using the subjective global assessment (SGA), a semi quantitative scale with three severity levels[7]. The proper measures for assessing quality of life (QOL) in patients with chronic kidney disease (CKD) remain unclear. Factors such as age, ethnic or national background, stage of CKD, modality of dialytic therapy, exercise interventions, sleep disturbances, pain, erectile dysfunction, patient satisfaction with care, depressive affect, symptom burden, and perception of intrusiveness of illness may be associated with differential perception of QOL. Recent studies showed an association between assessment of QOL and morbidity and mortality in end-stage renal disease patients[9]. Current National Kidney Foundation Kidney Disease Outcomes Quality Initiative staging criteria for chronic kidney disease (CKD) are intended to apply to all age groups. However, it is unclear whether different levels of estimated GFR (eGFR) have the same prognostic significance in older and younger patients[15].

MATERIALS AND METHODS

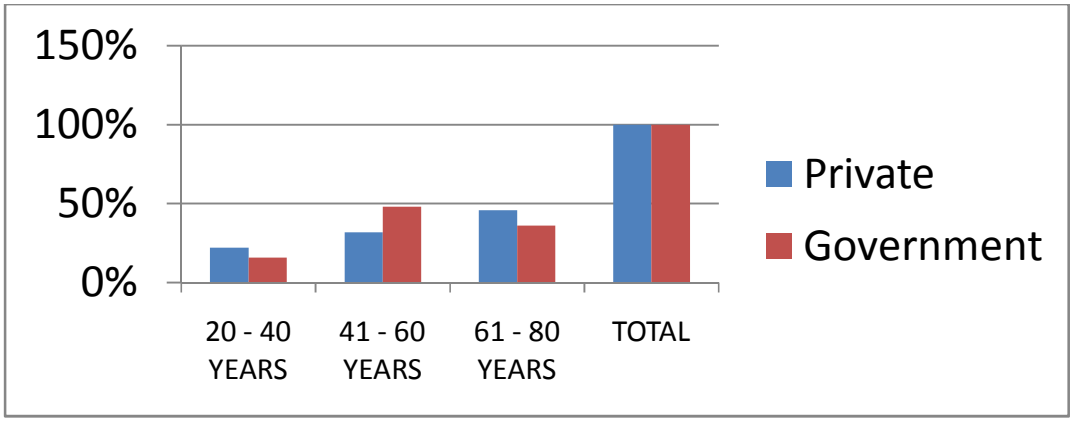
A cross sectional study was conducted in 100 (50 subjects from Private and 50 from government hospital). A questionnaire was used to collect information regarding demographic profile, lifestyle pattern, medical history, and biochemical parameters of the study group. The medications was checked to assess the pre existing conditions of the subjects. The subjects were asked to maintain a diet record of 24 hours, 3 days (2 weekdays and 1 weekend).Energy, carbohydrates, protein, fats, and calcium, iron, phosphorous, sodium and potassium was calculated for the diet records. Food frequency questionnaire was used to understand the consumption of foods such as dairy products, meat and poultry, grain products, pulses and legumes, roots and tubers, other vegetables, fruits, fats and oils, and miscellaneous. Anthropometric measurements such as height, weight, and pre dialysis and post dialysis weight were taken and Body Mass Index was calculated. Subjective Global Assessment questionnaire was used to assess the malnutrition of the subjects. Analysis was performed using SPSS software for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL). Data are presented as Mean ± SD. Paired T test and Chi square test was carried out for all parameters. P-value < 0.05 was considered to be statistically significant.

RESULTS

The results of the study includes the age, education qualification, anthropometric measurements, body mass index, biochemical parameters, medication and supplements, nutrient intake, subjective global assessment and food frequency questionnaire of the subjects from both the private and government hospital. Both the subject groups were compared for the level of significance in relation to the above mentioned characteristics.

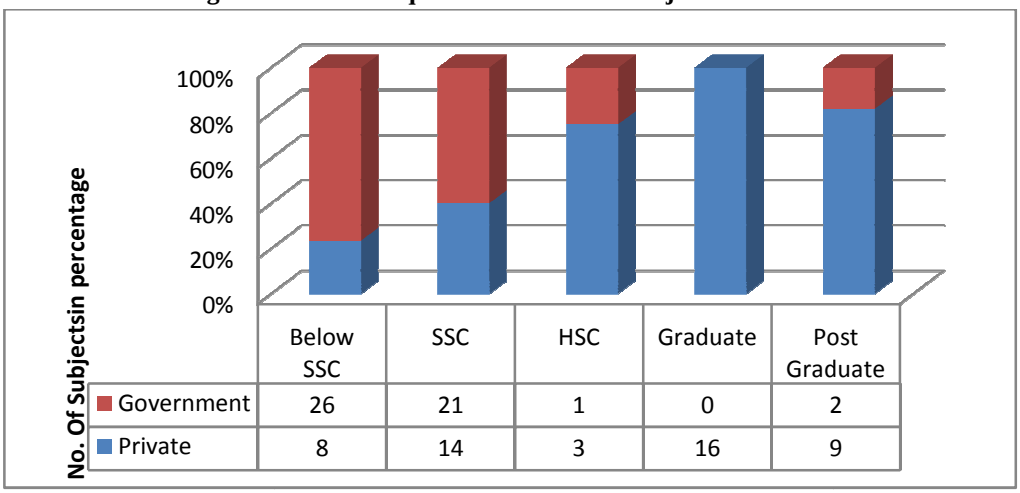
Demographic Profile

Fig.1: Number of subjects per range of age



As shown in figure 1, out of 100 subjects, 50 subjects were from Private Hospital and 50 subjects were from government hospital. It was seen that subjects from both the hospitals were less in the age group of 20 to 40 years, government hospital subjects being higher in the age group of 41 to 60 years and private hospital subjects being higher in 61 to 80 years of age. This shows that subjects under the age group of 20-40 years suffer from less of kidney related diseases in both private and government hospital.

Fig. 2: Educational qualifications of the subjects



In figure 2, the subjects from the private hospital were seen to be Graduate with 16 subjects in that category whereas none of the subjects from the Government hospital were graduates. Majority of the subjects from the Govt. hospital were below SSC, followed by majority in between SSC and HSC. Post graduates were also higher in private hospital subjects (85%) as compared to government hospital subjects (25%).

Table 1 Anthropometric Measurements of the subjects

HOSPITAL	GENDER	WEIGHT (Kg)	HEIGHT (cm)	PRE DIALYSIS WEIGHT (Kg)	POST DIALYSIS WEIGHT (Kg)
PRIVATE	MALE	66.30± 13.06	163.77 ± 6.97	69.27 ± 13.41	66.45 ± 12.79
	FEMALE	58.68± 11.42	154.38± 6.80	60.71± 11.73	58.32 ± 11.37
	TOTAL	62.64± 12.77	159.26± 8.30	65.16± 13.23	62.55± 12.69
GOVERNMENT	MALE	61.48± 11.24	158± 8.06	65.24±10.81	63.19±10.81
	FEMALE	53.70± 11.03	155.54± 9.29	54.27± 11.18	51.90±10.84
	TOTAL	57.44± 11.69	156.72± 8.72	59.12± 12.20	56.89±12.11
P value		0.036	0.139	0.025	0.031

As shown in table1, there was a significant difference between the subjects from the two groups with the anthropometric measurements of the private subjects being higher than that of the government hospital subjects ($p<0.05$). There was significant difference among males and females in private and government hospital, both genders anthropometric measurements being higher in private hospital subjects.

Fig. 3.a BMI of subjects

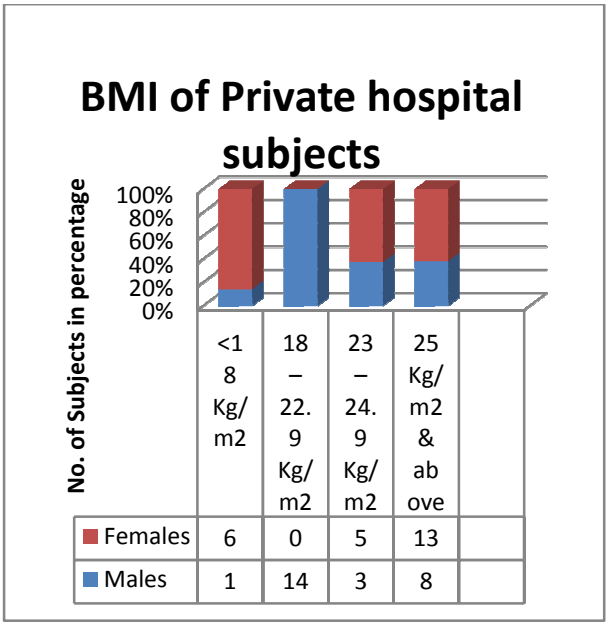
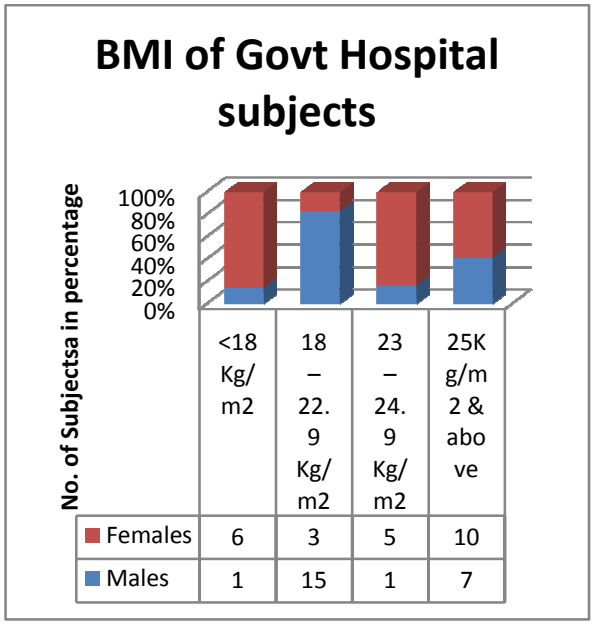


Fig. 3.b BMI of subjects



In figure No. 3.a and 3.b, it was found that the BMI of the subjects from private hospital was higher as compared to that of the government hospital. The private hospital subjects were overweight as compared to Government Hospital subjects. It was seen that the government hospital subjects had normal BMI as compared to private hospital subjects.

In a study it was found that malnutrition was very common amongst hemodialysis patients and BMI, MUAC were found to be effective markers for assessing nutritional status[6].

Table 2. Biochemical parameters of the subjects

Biochemical Parameters	Private Hospital			Government Hospital			P value
	Below	Normal	Above	Below	Normal	Above	
SGPT (U/L)	46	4	0	25	18*	0	0.000
SGOT (U/L)	38	12	0	0	1	2	0.000
Albumin (g/dl)	20	30	0	14	31	1	0.384
Sodium (mmol/l)	24	26	0	15	31	0	0.092
Potassium (mmol/l)	0	20	30	0	27	21	0.079
Calcium (mg/dl)	13	28*	7	29	3	0	0.000
Bun pre dialysis (mg/dl)	0	2	48*	0	6	39	0.103
Uric acid (mg/dl)	0	29	19*	0	37	9	0.028
Hemoglobin (g/dl)	40	10*	0	47	0	0	0.001
Platelets (thou/ul)	10	38	0	4	29	0	0.238

According to table 2, there was a significant difference observed in the biochemical parameters specially SGOT, SGPT, CALCIUM, BUN PRE DIALYSIS, and HEMOGLOBIN AND PLATELETS. Normal ranges of SGPT levels were higher in Government hospital subjects whereas platelets were seen to be in normal range in private hospital subjects. Normal range of calcium and hemoglobin levels was found to be higher in private hospital subjects as compared to government hospital subjects. Above normal range of BUN and uric acid levels were found to be higher in private hospital subjects.

In the study it was shown that the patients on hemodialysis therapy have better Hemoglobin level response when treated with IV iron. For patients with CKD, this effect was small[10].

Fig. 4.a. Medication in private hospital

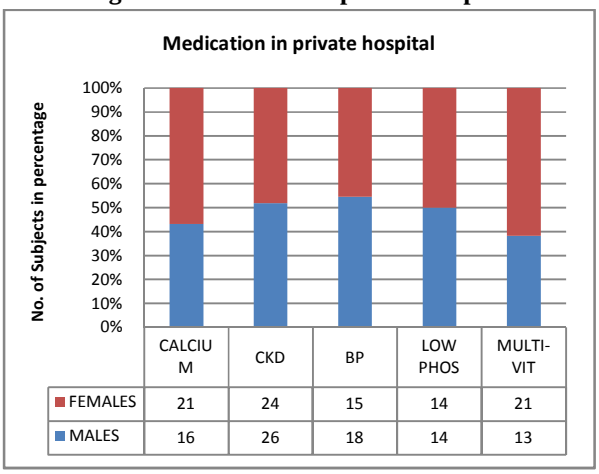
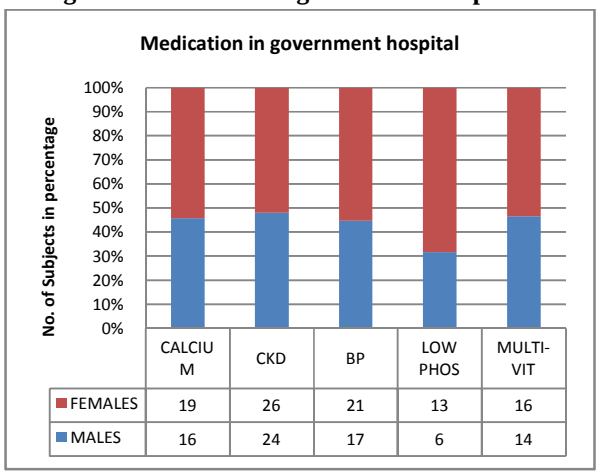


Fig. 4.b. Medication in government hospital



According to figure 4.a and 4.b, there was no significant difference observed in the medication consumed for CKD, BP and calcium supplement of the subjects. But, the subjects from the private hospital were seen to consume more multivitamin supplement.

In a cohort study, it was found that the greatest risk of mortality was found for calcium or CaAlb levels greater than 10.0 mg/dl, phosphorus levels greater than 7.0 mg/dl, and PTH levels greater than 600 pg/ml and in patients with combinations of high-risk categories of calcium, phosphorus, and PTH[12].

In another study a randomized clinical trial with two hundred subjects undergoing maintenance hemodialysis were randomly assigned to receive either sevelamer or calcium-based phosphorus binders. It was concluded that sevelamer and calcium-based phosphate binders, treatment with sevelamer was associated with a significant reduction in serum uric acid concentrations[5].

Table 3. Nutrient intake of the subjects

Nutrient	Private Hospital	Government Hospital	P value
Energy (Kcal)	1694.16 ± 163.209	1307.52±168.526	0.000
Protein (gm)	27.14±4.6	20.19±4.1	0.812
Quality Protein (gm)	4.25±1.866	4..37±1.449	0.000
Carbohydrate (gm)	355.42±86	356.16±87	0.966
Fat (gm)	36.30±7.3	35.56±6.9	0.607
Sodium (mg)	1185.50±218	1187.00±214	0.972
Potassium (mg)	1460.60±197	1422.24±199	0.37
Calcium (mg)	700.06±368	1062.88±439	0.000
Iron (mg)	28.16±8.23	26.96±7.8	0.459
Phosphorus (mg)	139.32±85	129.74±83	0.572

There was a significant difference in private (government) hospital subjects in the consumption of energy 1694 Kcal (1307), protein 27 gm (20) and calcium 700 mg (1062) among the subjects ($p<0.05$). The subjects from the government hospital were seen to be deficient in energy and protein whereas the subjects from the private hospital were seen to be deficient in calcium.

In a study, it was said that Dietary intake of phosphorus is derived largely from protein sources and is a critical determinant of phosphorus balance in patients with chronic kidney disease. It concluded that better reporting of phosphorus content of foods by manufacturers could result in improved dietary phosphorus control without risk of protein malnutrition[11].

A study said that the protein-energy malnutrition occurs commonly in patients with end-stage renal disease undergoing maintenance dialysis treatment. They may also suffer from deficiencies of micronutrients, particularly trace elements and vitamins. Thus, some micronutrient deficiencies in maintenance dialysis patients may contribute to the development of atherosclerotic cardiovascular disease[14].

Table 4. Subjective Global Assessment of the subjects

Subjective Global Assessment	Categories	PRIVATE HOSPITAL				GOVERNMENT HOSPITAL			
		GENDER				GENDER			
		MALES (%)	FEMALES (%)	TOTAL	P VALUE	MALES	FEMALES	TOTAL	P VALUE
SGA	Well Nourished	15 (57.7)	9 (37.5)	24 (48)	0.46	0 (0)	4 (15.4)	4 (8)	0.131
	Mild to Moderate malnourishment	10 (38.5)	8 (33.3)	18 (36)		15 (62.5)	13 (50)	28 (56)	
	Severe malnourishment	1 (3.8)	7 29.2)	8 (16)		9 (37.5)	9 (34.6)	18 (36)	
TOTAL		26	24	50		24	26	50	

As shown in table 4, after the Subjective Global Assessment, it was seen that the subjects from private hospital were well nourished by 48% as compared to subjects from government hospital (4%) whereas subjects from Government hospital were severely malnourished by 36% as compared to Private hospital subjects (16%). Most of the subjects from both the hospitals were mild to moderately malnourished.

In a study, the subjective global assessment of nutritional status (SGA) was used to assess the nutritional status of chronic dialysis patients. It said that PEW at baseline assessment with SGA was associated with a 2-fold increased mortality risk in 7 y of follow-up. Time-dependently, the association indicated that PEW was associated with a remarkably high risk of short-term mortality. The data imply that the 7-point SGA may validly distinguish different degrees of PEW associated with increasing risks of mortality[8].

Food Frequency Questionnaire Data

The data showed that the subjects from the private hospital were seen to consume milk 60% and curd 40% in highest amounts and the subjects from the government hospital were seen to consume only milk 67% everyday on a regular basis. Whereas, the consumption of eggs 50% and chicken 48% was seen to be maximum in the subjects from private hospital whereas the consumption of mutton 32% was seen to be less in the subjects from the government hospital. Seafood was also seen to be consumed more in subjects from the private hospitals. The consumption of dalia, cornflakes, noodles and macroni, chana dal, masoor dal, chauli and urad dal, suran, arbi and beetroot, were seen to be more in the subjects from the private hospital and was seen to be less in the subjects from the government hospital. Apple and orange were the fruits highly consumed by the private hospital subjects on daily basis whereas 30% subjects from the government hospital consumed apple on daily basis. On comparison of fats and oils a significant difference was observed in the consumption of butter only being eaten by private hospital subjects. Among the miscellaneous foods consumption of papad, chutney, kachori and farsan was seen to be higher in private hospital subjects whereas the government hospital subjects were seen to be consuming chutney.

CONCLUSION

It can be stated from the above study that subjects from government hospital are more prone to malnutrition indicating their lack of knowledge towards nutrition and their low socio economic background. Subjects should be educated regarding the healthy eating and importance of different nutrients such as quality protein, carbohydrate and fiber, fat, sodium, potassium, phosphorous, iron and fluids in the management of chronic kidney disease and to those undergoing dialysis. Different methods such as nutrition education presentations can be made and forecasted on television in the dialysis centre so that patients can utilize their valuable time in not just sitting ideal for 3 to4 hours but gaining knowledge which would benefit them in their day to day living. Combating malnutrition of CKD patients even after educating them about healthy lifestyle continues to be a challenge.

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