NUTRITIONAL STATUS ASSESSMENT THROUGH SUBJECTIVE GLOBAL ASSESSMENT TOOL OF PATIENTS UNDERGOING HEMODIALYSIS

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ABSTRACT

Background: *Lifestyle diseases namely Diabetes Mellitus, Hyperlipidemia, Hypertension, can lead to life threatening condition known as Chronic Kidney Disease (CKD). It is a condition in which the kidneys are no longer able to maintain the normal composition of blood and renal function get completely hampered. Nearly ten percent of India's 1.24 billion people suffer from Chronic Kidney Disease, a disease in which the kidney slowly loses function and fails.* **Objective:** *The present study was conducted to screen dialysis patients for the prevalence of malnutrition during their stay in hospital through a tool namely Subjective Global Assessment (SGA).* **Methodology:** *SGA is a tool for screening malnutrition in a wide variety of health care setting. It is a valid and clinically useful measure of protein-energy nutritional status in maintenance dialysis patients. The study was carried out on 60 adults with minimum age of 18years.* **Results:** *Nutritional status assessments of patients on Haemodialysis using SGA Tool were found to be moderately malnourished (89%), 10% are severely malnourished and remaining was well nourished.* **Conclusion:** *It was concluded that the cause behind the poor nutritional status of majority is multi-factorial. The patients irrespective of age and gender were not able to meet their nutrient requirement as per the Guidelines for Maintenance Haemodialysis in India. India's CKD problems have reached epidemic proportions, thus it is suggested that emphasis on nutrition counselling of such patients is very important to sustain a better livelihood.*

Key Words : *Haemodialysis, SGA Tool, Dietary Recall, Nutrition, Chronic Kidney Diseases.*

INTRODUCTION

Globalization of urbanization is seen as one of the most important social changes of the 20th century. The most prominent feature of urbanization in developing countries is the top-heavy urban hierarchy. The size of the Indian urban population is projected to increase to nearly 586 million by 2030. By 2015, more than 50 cities in India are expected to have a population of more than one million. As per the 2011 Census (Registrar General and Census Commissioner, 2011), the level of urbanization in India have been increased from 28% in 2001 to 31.16% in 2011. Poor people in urban areas of developing countries face a daily struggle to meet their basic needs for shelter, food, water, education, and health. The poverty is an important factor responsible for poor nutrition situation of Indian population, nutritional deficiencies are widespread even in households that are economically well off. However, malnutrition is common among adults in India. Urban areas of India are undergoing a nutritional transition wherein under nutrition and over nutrition coexist in the same population groups.

The mortality increases as body weight decreases (under nutrition) or increases (over nutrition) away from the ideal body weight. The malnourished individual has lower resistance towards infection and overall health is poor (Salahudeen, 2003).

Dewar et al, 2012, conducted a study to assess the nutritional status in patients on HD in Jamaica using the SGA tool. Approximately 80% of the study population had moderate malnutrition. Being on HD for less than or equal to six months was significantly associated with moderate malnutrition $p = 0.002$.

Piratelli et al, 2012 conducted a study to evaluate nutritional status of 48 dialysis patients (18-80 years of age), suffering from CKD stage 5 i.e. ESRD, using anthropometric and as well as SGA. The frequency of moderate or severe malnutrition found to be ranging from 22% to 54%, according to the parameters used. Regarding the patients' conformity with the ideal weight, 29% of them weighed less than 75% of the ideal, and thus were classified as having moderate or severe malnutrition.

Another study was conducted by Oliveria et al, 2012 in which assessment of the nutritional status of 575 patients, who had undergone HD using SGA at dialysis centres in Belo Horizonte, Brazil was done and found that malnutrition was prevalent in 19.5% cases.

A study was performed to assess the nutritional status among patients on maintenance HD using SGA at the Prince Salman Centre for Kidney Diseases, Riyadh, Saudi Arabia. The study included 200 patients with a mean age of 50 ± 16 years; there were 108 males (54%) and 92 females (46%) and concluded that 4% of the patients were found to be underweight, 49% had average weight, 27.5% were overweight, 14% were obese, and 5.5% had morbid obesity (Saran et al 2011).

Cupisti et al, 2010 conducted cross-sectional study to assess the nutritional status of 94 stable HD patients in respect to 52 normal subjects using anthropometric measurements and SGA and found 5% of patients to be moderately malnourished. BMI< 20 Kg/m2 was detected in 16.3% cases. HD patients showed a lower energy and protein intake in respect to control. Age was the only parameter found to be inversely correlated with energy ($r = -0.35$, $p < 0.001$) and protein intake ($r = -0.34$, $p < 0.001$).

Another study conducted by Mutsert et al, 2009 studied the long-term and time-dependent associations of the SGA with mortality risk among 1601 patients of mean age: 59 ± 15 years and concluded that 23% were moderately malnourished and only 5% were severely malnourished.

Another cross-sectional study was conducted over 150 HD patients by using SGA, dietary recall, anthropometry and found 48% of patients to be well-nourished, 38% moderately malnourished and remaining to be severely malnourished (Sahin et al, 2009).

Desbrow et al, 2005 conducted a study to assess the nutritional status of patients undergone HD using patient- generated SGA and concluded that 80% of patients were well nourished and 20% of patients were malnourished. Patients classified as well - nourished attained a significantly lower median SGA score compared with those rated as moderately malnourished or at risk of malnutrition.

The above mentioned imbalances demand proper nutrition awareness and counselling in order to maintain good nutritional status for daily chores. Keeping in mind the scenario of CKD patients nutritional imbalance, it is necessary to study and assess the nutritional status so that timely advice can be given to them. Timely intervention in such conditions can help to achieve better livelihood.

The specific objective of the study was to screen dialysis patients for the prevalence of malnutrition using Subjective Global Assessment (SGA) tool.

METHODOLOGY

The research design of current study is descriptive design where an attempt has been made to analyse nutritional status of dialysis patients. The locale selected for the research study was the Bhatia Global Hospital, Paschim Vihar, West Delhi. The criteria for selection of locale were accessibility and permission to interact with the patients, also easy reach from my residence. In present research study simple random sampling was used to select the samples. The sample comprised of total 60 adults, both male and female (38 males, 22 females).

The inclusion criteria for the selection of patients was formulated which is as follows-

1. Age >18 years.
2. Duration of Dialysis = >6 months.
3. Patients should be ambulatory.

The exclusion criteria for the selection of patients was formulated which is as follows:-

1. Coma.
2. Dementia.
3. Multiple organ failure or undergone any surgical hospitalisation in last 30 days.

The duration of study was December 2012- February 2013.

Tools and Technique: The failure to diagnose malnutrition leads to neglect of nutritional support during illness. However it is very necessary to diagnose nutritional status of individual as early as possible. An active nutritional support has been shown to improve outcomes and reduce cost of treatment in severely malnourished patients (Shirodkar et al, 2005). There are numerous tools and scoring methods which are used to screen for malnutrition in the community and hospitals (Jones et al, 2002 and Kondrup et al, 2002). The tools used for data collection are General background performa and Nutritional assessment through SGA Performa.

RESULTS ANS DISCUSSION

Demographic and Socio-economic Details: After analysing the data, demographic and socioeconomic details of subjects are presented in the table given below, which describes the background of all the subjects.

In the present study, subjects were categorised in three age groups i.e.18-38 years, 39-58 years and 59-78 years. Out of total subjects 20% belonged to age group 18-38 years, 42% belonged to age group 39-58 years and remaining 38% belonged to 59-78 years age group. The data revealed that majority of them were male (63%) and remaining 37% were female. Suman et al 2007 conducted a study at Karnataka Institute of Medical Sciences, to assess the nutritional status of pre-dialytic and HD patients which also revealed that majority of dialytic patients (84%) were male and rest were female.
As we all know, education plays an important role in selection of healthy meals, the current study is showing a mix trend of illiteracy and literacy. This trend will have major effect on dietary practices. According to the Table 1, data obtained on educational status revealed that half of subjects were illiterate, 45% of them were graduate whereas remaining 5% were in senior secondary.

The data on marital status of subjects illustrates that majority of subjects (85%) were married, 12% were unmarried and remaining 3% of subjects had been struggling alone against CKD as they had lost their spouse. Thus, approximate 15% of the population actually had to be correctly advised regarding dietary selection for their own wellbeing.

Information on the type of family about the subjects depicts that half of them resides in nuclear family and remaining half, had a joint family which besides supporting them emotionally also supports one another financially

Table 1: Demographic Profile of Subjects

Category	Number (N=60)	Percentage (%)
Age		
18-38	12	20
39-58	25	42
59-78	23	38
Gender		
Male	38	63
Female	22	37
Education		
Iliterate	30	50
Senior secondary	3	5
Graduate	27	45
Marital status		
Unmarried	7	12
Married	51	85
Widow	2	3
Family type		
Nuclear	30	50
Joint	30	50
Working status		
Working	10	17
Non-working	42	70
Retired	8	13
Monthly income		
< 15,000	5	8
15,000-20,000	20	33
>20,000	35	58

Today's livelihood depends on the financial backbone of oneself. As per the data obtained, 70% of subjects were non-working and entirely dependent on their other family members for their livelihood. Only 17% were working and remaining 13% had taken early retirement from their work due to their critical condition. 58% of subjects had family monthly income of more than 20,000 which seemed to be sufficient to meet the cost of their weekly dialysis sessions and medications. Whereas 33% subjects had family monthly income ranging in between 15,000-20,000 and remaining 8% were seemed to be adjusting in less than 15,000 only.

Medical History Details: After analysing the data on medical history which includes the etiology behind CKD commencement of dialysis and the duration of dialysis session the patient is gone through is presented in figure 1.

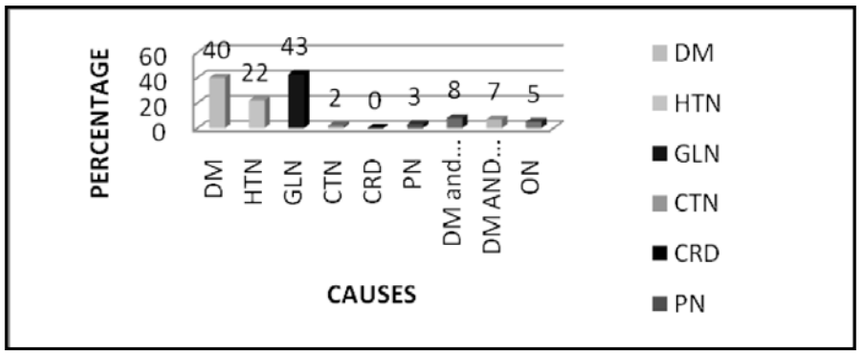


Figure 1: Etiology of CKD

The above figure1 illustrates the etiology behind CKD. The study revealed that most common cause of CKD was chronic glomerulonephritis (43%), which may present clinically as acute glomerulonephritis (GLN), nephrotic syndrome, asymptomatic proteinuria or hematuria or both, which in long run causes chronic glomerulonephritis. Another one was DM and hypertension (HTN) found in (40%) and (22%) subjects respectively. The pathogenesis of diabetic nephropathy is undoubtedly multifactorial and includes hemodynamic alterations, level of glycemic control, genetic predisposition and race. Approximate 8% of subjects were found to be suffering from other diseases namely obstructive nephropathy (ON) and pyelonephritis (PN). Only 1 patient was found to be suffering from chronic Tubulointerstitial nephritis, caused due to fibrosis of renal tubules and interstitium. 8% of patients were seen suffering from both DM and as well as chronic GLN. On other hand, there were 7% of patients as well who were diagnosed with DM and HTN both. These complications further worsen the condition of patient suffering from CKD.

A similar trend was observed in a study conducted by the Department of Food Science and Nutrition University of Agricultural Sciences, Karnataka among Chronic Renal Failure (CRF) revealed that the most common cause of CRF was chronic GLN (40%) as the most common cause followed by DM and chronic PN. About 8% had HTN and equal number of patients was found to be suffering from polycystic renal disease and chronic obstructive nephropathy (Suman et al, 2007). In another cross sectional study, Malekmakan et al, 2009 reported HTN as the main cause behind CKD followed by diabetes mellitus among Iranian HD patients and further concluded that better management of hypertension and diabetes could prevent patients from ending up with ESRD. This shows that HTN and DM are prevalent among patients on dialysis which complicates their disease and affect their nutritional status too.

Besides these complications, the duration of dialysis i.e. commencement of dialysis also affects the nutritional status of patients on HD. The dialysis, may promote wasting by removing nutrients such as amino acids, glucose, proteins, water soluble nutrients and other trace elements from their body. Chazot et al, 2001 evaluated the nutritional status of patients treated with HD for more than 20 years and concluded that despite of adequate dialysis dose and protein intake, patients treated by HD for a

long period of time became malnourished. Thus long term support on dialysis may also responsible for malnourishment in patients.

The figure 2 given below, illustrates the details on the commencement of dialysis of the subjects. The current study revealed that majority (60%) of patients have been undergoing dialysis from more than past 24 months , whereas remaining 32% and 8% are on dialysis from past 12-24 months and 6-12 months respectively. The dialysis session of all the subjects lasts for about six hours weekly i.e. two days/ week. Thus, all of them had undergone total 24 dialysis sessions in last three months and majority of them may be are at high risk of malnourishment.

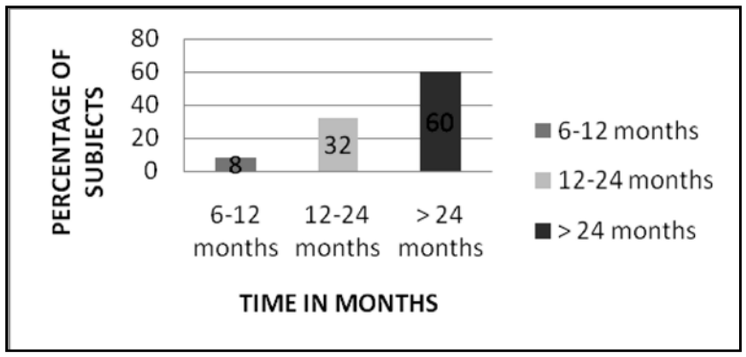
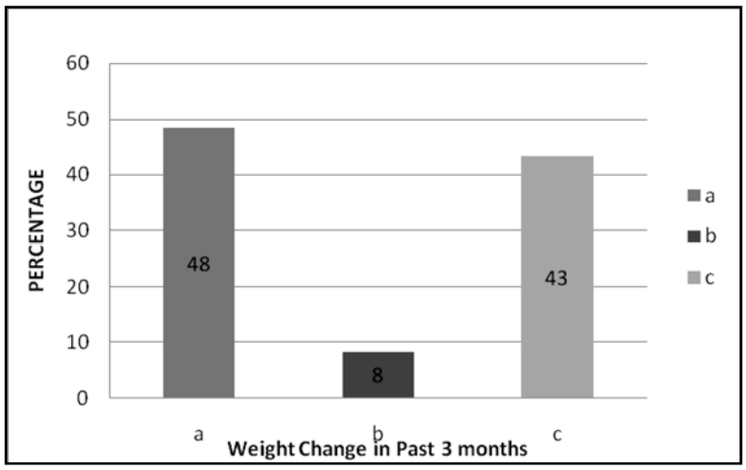


Figure 2: Commencement of Dialysis

Subjective Global Assessment (SGA): SGA is considered to be a simple and reliable malnutrition screening tool. SGA has been classified in two categories which are as follows:-

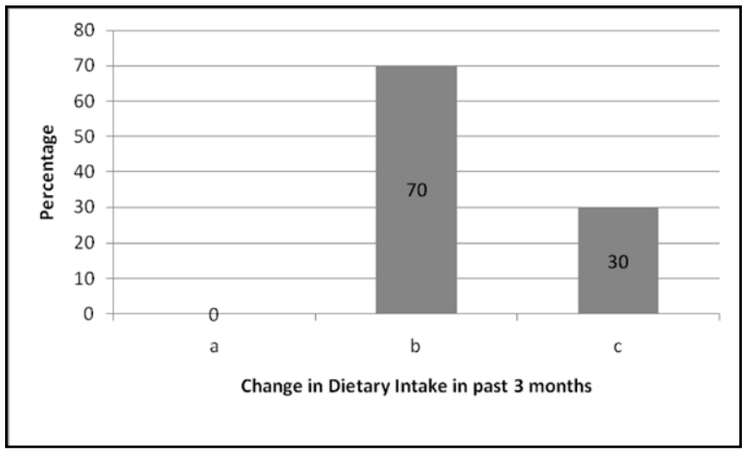
- Medical Examination
- Physical Examination



Note:' a' indicates weight is increasing, ; 'b' indicates no change in weight; 'c' indicates weight is decreasing

Figure 3: Weight Change in Past 3 Months

Figure 3, illustrates the change in weight in past 3 months respectively. The current study revealed that 48% of total subjects were diagnosed with increase in weight whereas decrease in weight is found to be in 43% of subjects and remaining were diagnosed with no change in weight. Therefore, the data shows the mixed trend of increase and decrease in weight. This trend might be possible due to the change in their dietary intake prior to HD, dietary restrictions and as well as medications, which the patient is taking to accelerate the recovery.

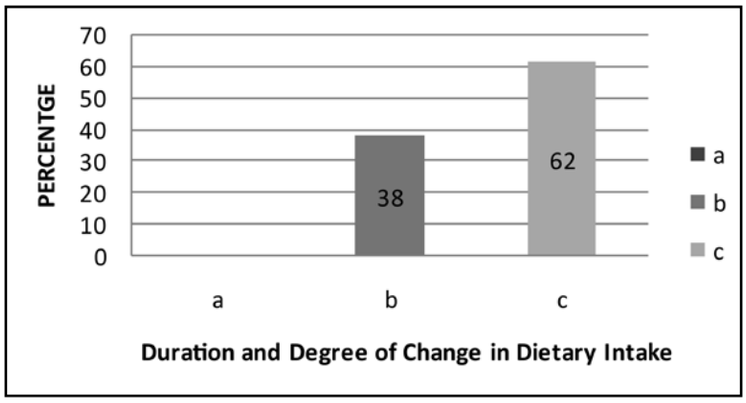


Note:' a' indicates no change/ slight change for short duration ; 'b' indicates intake borderline and decreasing ; 'c' indicates intake poor and decreasing

Figure 4: Change in Dietary Intake in past 3 Months

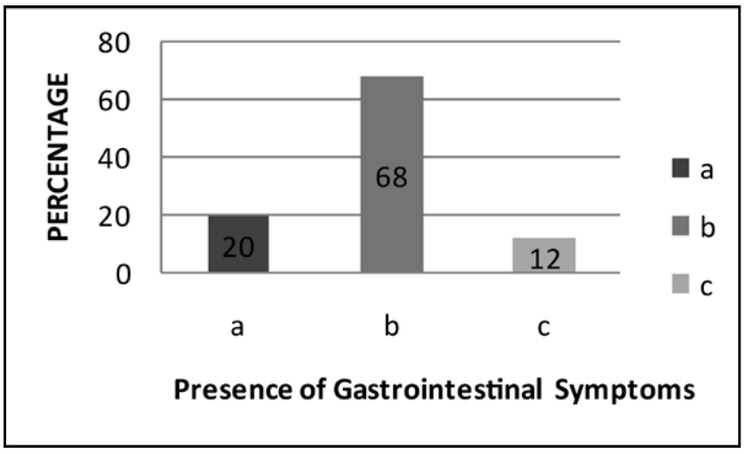
The above figure 4 illustrates the change in dietary intake in past 3 months. The current study states that dietary intake is on borderline and decreasing in the majority (70%) of subjects which reflects that they are moderately malnourished and remaining 30% are suffering from poor intake and decreasing gradually indicating their severely malnourished. Besides the complications like anorexia, vomiting, diarrhoea, dietary restrictions and monotony of diets might also had contributed towards their poor dietary intake. Zimmerer et al 2003 correlated monotony diets with poor nutritional intake among HD patients and concluded that patients with the most monotonous diets had the lowest energy (21 kcal/ kg/d) and protein intake.

Figure 5, indicates the data about duration and degree of dietary change. The current study illustrates that 62% subjects were either on starvation or were unable to eat and remaining 38% were found to be consuming mild to moderate suboptimal diet for more than 2 week. As stated before besides suffering from CKD, all the patients are suffering from other co-morbidities namely DM, HTN, GLN, etc. which brings certain dietary restrictions, monotonous diet and complicates their condition too which might had caused reduction in their food intake leading to a such poor degree of change in their dietary intake.



Note: 'a' indicates less than 2 weeks, little or no change; 'b' indicates more than 2 weeks, mild to moderate subboptimal diet; 'c' indicates unable to eat or starvation.

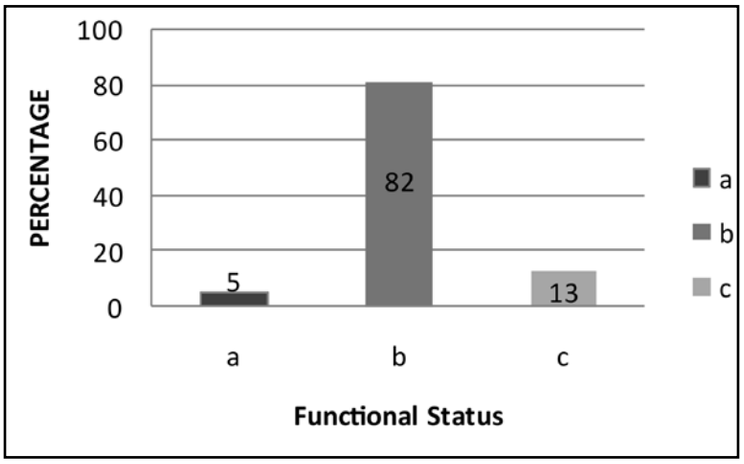
Figure 5: Duration and Degree of Change in Dietary Intake



Note: 'a' indicates few or no symptoms intermittently; 'b' indicates some symptoms for >2 weeks; severe symptoms that are improving ; 'c' indicates daily symptoms or frequently > 2 week.

Figure 6: Presence of Gastrointestinal Symptoms

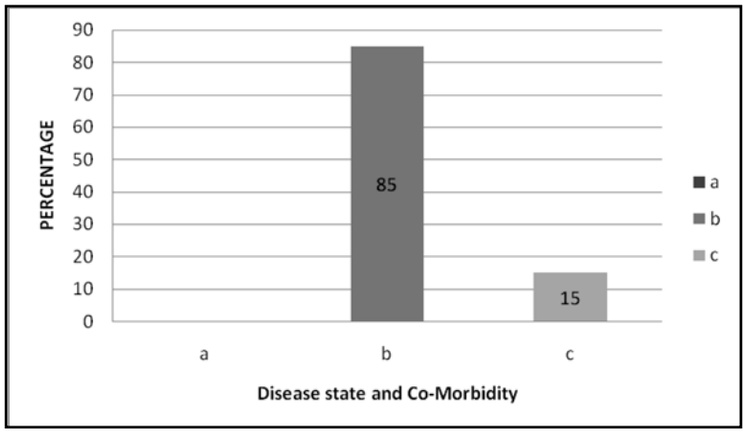
Above figure 6, indicates the data about presence of GI (gastrointestinal) symptoms. Majority of them were found to be suffering from some GI symptoms for >2 weeks which indicate they are moderately malnourished, 20% were suffering from symptoms daily or frequently for >2 weeks and remaining 8% were diagnosed with either few or no symptoms. These GI symptoms may include diarrhoea, nausea, vomiting and anorexia which bring certain dietary restrictions and further complicates the condition for the patient on HD. This may lead to reduced food intake, resulting in malnutrition and impaired well-being in them. Due to so many complications and dietary restrictions, it becomes difficult for them to meet their daily dietary intake. Study was conducted to assess the prevalence of GI symptoms in patients with CRF by Strid et al, 2002 by using a Gastrointestinal Symptom Rating Scale (GISR) and concluded that there was high prevalent rate of GI symptoms among the patients and is associated with psychological general well being too.



Note:' a' indicates no impairment in strength, stamina and full functional capacity; mild- moderate loss and improving; 'b' indicates mild to moderate loss of strength, stamina/ some loss of daily activity or severe loss but now improving; 'c' indicates severe loss of function, stamina and strength.

Figure 7: Functional Status

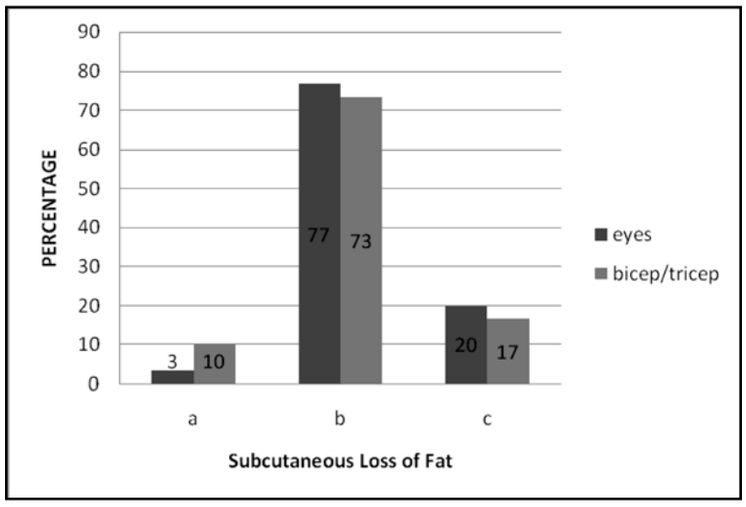
The above figure 7 reflects the functional status of the patients. The present study states that majority of them (82%) had felt some loss of daily activity which indicates that all of them are moderately malnourished whereas 13% have a severe loss of function, stamina and strength and remaining had no such impairment. As stated before, all patients were diagnosed with life threatening conditions other than CKD, which further hinders the condition of patient on HD and brings certain dietary restrictions. This may lead to the reduced food intake which affects their nutritional status which might have contributed towards their poor functional status. Additionally, some patients may experience aggravation of their physical and mental fatigue after dialysis sessions, which further prolongs their inactive period at home and as well as outside. Thus, majority of them were found with little difficulty in performing their daily routine activities which indicates their poor nutritional status.



Note: 'a' indicates no risk; ' b' indicates low or medium risk ; 'c' indicates high stress

Figure 8: Disease State And Co-Morbidity

Figure 8 reflects the disease state and co-morbidity of the patients. As per the data obtained from medical history, all patients were diagnosed with co-existing diseases other than CKD namely DM, HTN, GLN, ON, etc. The present study states that 85% of subjects diagnosed with single co-existing disease are under low or moderate risk and remaining 15% who were diagnosed with two co-existing diseases are found to be under high stress which reflects their severely malnourished. Malekmakan et al, 2009 founded HTN as a co-morbidity, followed by DM among Iranian HD patients. The co-morbidity further hinders the condition of patient on HD and brings certain dietary restrictions. This lead to the reduced food intake which affects their nutritional status.



Note: 'a' indicates little or no loss; 'b' indicates mild to moderate in all areas; severe loss in some areas; 'c' indicates severe loss in most areas.

Figure 9: Subcutaneous Loss of Fat

The various co-morbidities, complications and reduced food intake may lead to loss of fat in body which can be easily assessed by the visual examination of body parts besides monitoring their body weight and computing other anthropometric measurements. The above figure 9, illustrates the subcutaneous loss of fat around eyes and as well as bicep/triceps. The current study suggests that majority of subjects are moderately malnourished as they were diagnosed with mild to moderate loss or severe loss in some areas around eyes and bicep/triceps. 20% and 17% of subjects were found with severe loss in most areas around eye and bicep/triceps respectively, which indicate their severely malnourished status. Remaining approximately 13% were diagnosed with either little or no loss of fat.

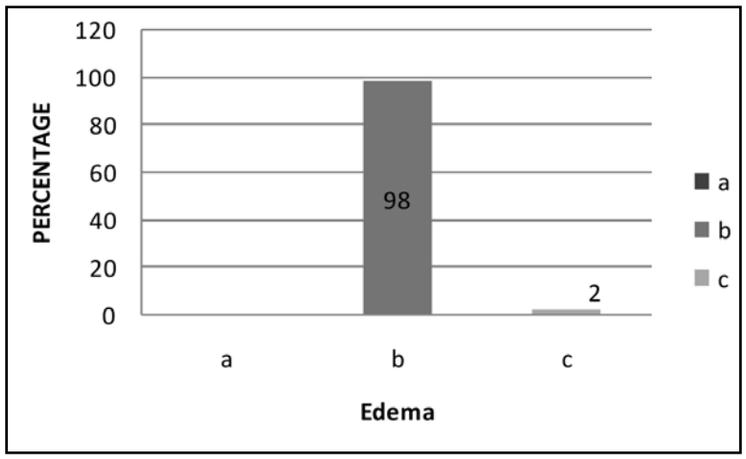
The progression of CKD, can be characterised by clinical signs in patients, which include muscle wastage. Muscle wasting is very common among the patients on HD. It can be contributed by poor dietary intake, loss of nutrients in dialysate, recurrent illness and age of patient can also be responsible for it. The table 2 illustrates the muscle wastage among the patients around temple, clavicle, shoulder, Scapula, knee, quadriceps and calf. The present study states that on an average 70% subjects had

either mild to moderate muscle wastage in all areas or severe loss in some areas which indicates that they are moderately malnourished, whereas 27% were diagnosed with little or no muscle wastage and remaining 3% were found with severe loss in most areas. Severe muscle wastage in body may further contribute to poor rehabilitation, decreased strength, impaired wound healing, vigor and can lead them to live a unhealthy lifestyle.

Table 2: Muscle Wasting

Category	A		B		C	
	Number	Percentage	Number	Percentage	Number	Percentage
Temple	10	17	50	83	0	-
Clavicle	0	-	39	65	21	35
Shoulder	10	17	49	82	01	02
Scapula	15	25	44	73	01	02
Knee	09	15	42	70	09	15
Quadriceps	11	18	40	67	09	15
Calf	08	13	44	73	08	13

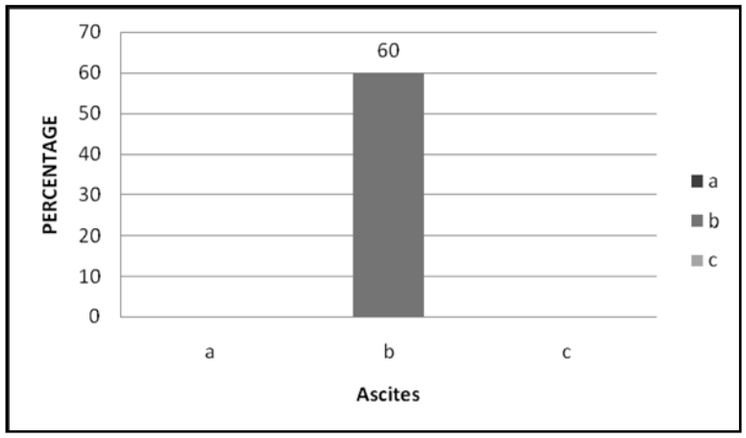
Note: 'A' indicates little or no loss; 'B' indicates mild to moderate in all areas; severe loss in some areas; 'C' indicates severe loss in most areas.



Note: 'a' indicates little or no edema; 'b' indicates mild to moderate edema; 'c' indicates severe edema

Figure 10: Edema

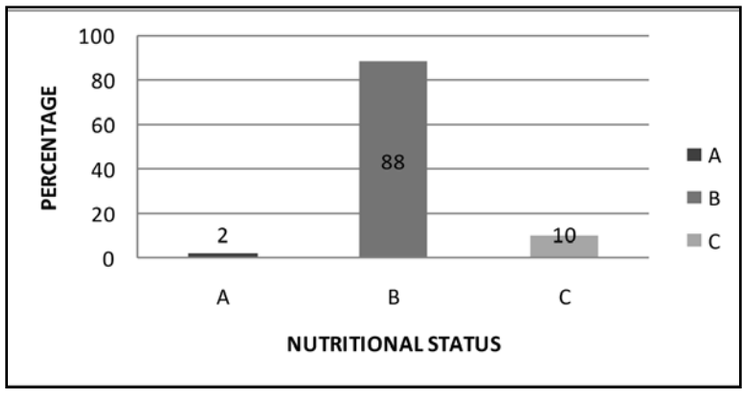
Besides the muscle wastage, there are other two early symptoms of CKD too and edema is one of them. Due to the impaired kidney functioning, the urine output declines gradually and fluid start accumulating in the body leading to edema. A fall in plasma osmotic pressure, enhanced renal renin production which favours the sodium reabsorption may also contribute towards edema (Khanna et al, 2005). The above figure 10 illustrates the data about edema among the patients respectively which suggests that almost all subjects were diagnosed with mild to moderate edema except one subject with severe edema.



Note: 'a': No ascites, 'b':mild to moderate ascites or improving clinically, 'c': severe ascites or progressive ascites

Figure 11: Ascites

Besides the edema, ascites is another early symptom of CKD. Due to the impaired kidney functioning, the urine output declines gradually and fluid start accumulating in the body leading to edema. As the condition further worsens, causes massive edema leads to ascites. The above figure 11 illustrates the data about ascites among the patients. The current study states that all of them were diagnose with mild ascites which indicate that subjects are moderately malnourished. Suman et al, 2007, observed certain clinical signs among patients undergoing dialysis which included edema in 92% cases followed by swollen joints in 52% cases.



Note: 'A' indicates well-nourished; 'B' indicates moderately malnourished; 'C' indicates severely malnourished

Figure 12: Final SGA Score

The nutritional status depends upon the dietary intake and physical well-being of the patient. The complications caused due to renal disease are silent and potentially lethal, resulted from dietary or normal imbalance, renal abnormalities, GI disturbances and pharmacologic effects which gradually with the progression in condition of patient affects their nutritional status badly and lead them to live a

unhealthy lifestyle. The figure 12 illustrates the final SGA score of subjects which states the nutritional status of the patients on the basis of all the parameters as discussed before under medical and physical examination. The present study states that according to medical and physical assessment done of all the patients on HD it was found that majority of subjects (89%) are moderately malnourished (B), 10% are severely malnourished (C) and remaining are well nourished (A). In Indian context, beside the certain co-morbidities and inadequate intake of nutrients, social and gender inequality, old age, poverty, destitution and low level of awareness about 'do's and don'ts of balanced food, health and as well as hygiene may the factors responsible for such malady and poor nutritional status. Recently in 2012, a study was conducted to assess the nutritional status of patients undergoing hemodialysis at dialysis centres in Belo Horizonte, MG, Brazil using the SGA and found malnutrition in approximately 20% of cases (Oliveria et al, 2012). Yang et al 2007, conducted a cohort study in Taiwan in which 50 patients participated and on the basis of SGA score, 26 patients were found to be well nourished and remaining 24 were malnourished. Another study conducted by Tayyem et al, 2008 to assess the nutritional status among ESRD patients in Jordian hospitals found that 62% of patients were severely malnourished by using SGA.

CONCLUSION

On the basis of tools used (Anthropometry, Dietary Recall and SGA) it can be concluded that overall nutritional status of majority of patients is poor. The patients irrespective of age and gender were not able to meet their macro-nutrient requirement on daily basis. But they are able to keep a control over micro-nutrients intake i.e. sodium, potassium and phosphorous, which are restricted among CKD patients. Beside the dietary restrictions and complications, loss of nutrients during the removal of fluid from body may also be responsible for poor nutritional status of patients. Thus, it is suggested that patients must be kept on HD on the basis or required removal of excess fluid from body which is based upon urine output in last 24 hours, fluid loss through diarrhoea / vomiting and sweating / perspiration. Besides this, it is necessary to monitor the dietary intake of patients on HD and timely advice and counselling must be done to improve their nutrient intake, in order to make them to live better livelihood. The hospitals and other concerned organisations/institutions must come forward to organize various melas, seminars to spread awareness among the CKD patients and as well as their care takers who play the significant role in recovering patients from their disease condition. Apart from this, they must promote the development of new products for such patients, which besides providing appealing taste must be sufficient to meet their daily macro and as well as micro-nutrient requirements.

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