Original Research Article

Impact of Uraemia on Nutritional Status and Appetite of Renal Failure (ARF and CRF) Patients in Allahabad District

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ABSTRACT

Uremia is a serious complication of Chronic Renal Failure and Acute Renal Failure. Anorexia is a frequent part of uremic syndrome, contributing to malnutrition in dialysis patients. Protein energy malnutrition is more common among hemodialysis patients. Anorexia is the predominant factor for PEM which has unknown etiology. Anorexia, defined as the loss of the desire to eat, is relatively common in hemodialysis (HD) patients, occurring in one-third of cases.
Objectives: 1) To compare the nutritional status of ARF and CRF patients. 2) To find out the percentage distribution of anorexia among concerned population.3)To find out the relation between anorexia and uremia in concerned subjects.
Research Design: The research design selected for this study was cross sectional comparative and descriptive study. The study was hospital based survey. Among population of renal failure patients, ARF and CRF patients were selected using purposive sampling technique After that age based stratification was done to select 40-60 years old subjects and then 30 ARF and 30 CRF patients were randomly selected. Hence, the sample size was 60. Study was conducted in Nazareth Hospital of Allahabad city. Survey method, along with observation and interview techniques was employed for data collection.
Results: Results showed that most of the CRF patients were found to be more uremic and anorexic than ARF patients.
Conclusions: ARF patients can be cured to a considerable extent as it is often found that symptoms are reversible in some cases when they get proper nutrition along with medications while CRF symptoms are found to be irreversible. Thus, progression of ARF symptoms into CRF can be checked by maintaining protein-energy homeostasis through dietary intervention, modification in lifestyle pattern and nutrition education.

Keywords: Uremia, Anorexia, Dysgeusia, Acute Renal Failure, Chronic Renal Failure, Dietary Pattern, Haemodialysis.

INTRODUCTION

Chronic renal failure is a clinical syndrome consisting of a variety of symptoms and metabolic disorders due to the progressive irreversible decline of the kidney functions. Prevalence is estimated to be 8–16%.Acute renal failure is the sudden loss of your kidney's ability to eliminate

excess salts, fluids, and waste materials from the blood. Chronic renal failure may develop when ARF is not treated on time. According to the 2010 Global Burden of Disease study, chronic kidney disease was ranked 27th in the list of causes of total number of global deaths in 1990 (age-standardised annual death rate of 15·7 per 100 000), but rose to 18th in 2010 (annual death rate 16·3 per 100 000). This degree of movement up the list was second only to that for HIV and AIDS. (Lozano *et al*,2012) Uremia is a serious complication of Chronic Renal Failure and Acute Renal Failure. The term uremia, which literally means urine in the blood, was first used by Piorry to describe the clinical condition associated with renal failure (Piorry *et al*,1840). Uremia is not an independent kidney disease, but a series of clinical manifestations and it is the common syndrome of nearly all the kidney diseases in their end stages. Anorexia is a frequent part of uremic syndrome, contributing to malnutrition in dialysis patients. Protein energy malnutrition is more common among hemodialysis patients. Despite normal anthropometric indices, the biochemical evaluation of nutritional status shows that CRF subjects are not well nourished. (Radha *et al*,2013) There are number of factors which lead to PEM. Uremia, metabolic disorders, dysgeusia, dietary restrictions, metabolic acidosis, medications etc are some of the reason which decreases the oral food intake. Anorexia is the predominant factor for PEM which has unknown etiology. Anorexia, defined as the loss of the desire to eat, is relatively common in hemodialysis (HD) patients, occurring in one-third of cases. Gastro intestinal symptoms like nausea, vomiting, indigestion and heart burn were predominantly present and it positively affects the food intake also. The pathogenesis of anorexia in haemodialysis patients is essentially unknown. It has been proposed that uraemic toxins as middle molecules, inflammation, altered amino acid pattern, hormones (e.g. leptin and ghrelin) and neuropeptides (e.g. neuropeptide Y) are involved. (Bossola *et al*,2006) The pathogenesis of anorexia in uraemic patients remains an enigma, although it continues to have detrimental effects on nutritional status, quality of life and survival. Hence, it is necessary to carry out the research for exploring about its percentage distribution among subjects and its impact on nutritional status of the concerned population in Allahabad city.

MATERIALS AND METHODS

This study was conducted to ascertain the percentage distribution of anorexia among patients suffering from acute renal failure and chronic renal failure. The research design selected for this study was cross sectional comparative and descriptive study. The study was hospital based survey. Only patients with a confirmed diagnosis of ARF and CRF irrespective of their genders were recruited and interviewed. Among population of renal failure patients, ARF and CRF patients were selected using purposive sampling technique. Patients suffering from Diabetes and any other disease at a time were excluded from the study. After that age based stratification was done to select 40 -60 years old subjects and then 30 ARF and 30 CRF patients were randomly selected. Hence, the sample size was 60. Study was conducted in Nazareth Hospital of Allahabad city. Survey method, along with observation and interview techniques was employed for data collection in order to assess their dietary and lifestyle pattern, their anthropometric measurements, clinical symptoms and biochemical parameters. The instrument used for the survey was structured questionnaire. Since the site of data collection in the study was Nazareth Hospital, we had to rely on the patients who

were found bed ridden (during Haemodialysis treatment) or who visited the same hospital for their routine checkups in Outdoor patients department. The subjects who met the inclusion criteria were approached and asked to participate in the study and those who did not meet the criteria were excluded from the study. Structured Questionnaire was used as a tool to assess Nutritional Status of concerned subjects through data collection. The questionnaire used in this study consisted of the following parts.1) Dietary survey 2) Anthropometric measurements 3) Clinical survey.

Data Collecting Procedure

After Ethelind School of Home Science granted approval for the survey, the permissions were sought from Director, Nazareth Hospital, Allahabad. The director of Nazareth hospital was requested for co-operation and permission. Data was collected by researcher herself. Since few number of participants had difficulty in reading or writing, the researcher asked them questions and wrote down their responses without any manipulation. In terms of educated persons, they were asked to answer the questions by themselves and then put it into the boxes provided there.

RESULTS AND DISCUSSIONS

This study was conducted using 60 renal failure patients (30 ARF and 30 CRF) aged 40 - 60 years at Nazareth Hospital, Allahabad using a structured questionnaire. The purpose of the study was to ascertain the impact of uremia on appetite level of patient. The data obtained from the current study are presented and discussed in this chapter. The findings of this study are presented under the following headings; Nutritional status which includes 1) Dietary Survey: 24 hour Dietary recall, Food consumption pattern, 2) Anthropometric Measurements, 3) Clinical survey: Clinical symptoms and Biochemical parameters.

Dietary pattern, gastrointestinal disturbance, and Body Mass Index were considered as independent variables and anorexia as dependent variables. From the study it has been found that 2 % of ARF patients and 26 % of CRF patients were bed ridden.28% of ARF and 4% of CRF patients were found to be involved in sedentary activity. However, none of the participants were found to be involved in heavy activity. The majority of ARF participants were found to lead a sedentary to moderate lifestyles while majority of CRF patients were found to be bed ridden. This finding is concordant with the findings of (Stengel *et al*,2003) who revealed that physical inactivity is associated with an increased risk of development of CKD. However, patients that report exercising 2-3 or 4-5 times a week have a reduced relative risk of mortality (0.74 and 0.70 resp.) in comparison to sedentary counterparts.(Stack *et al*,2005) In another study, it has been speculated that hyperleptinemia in ESRD patients may be one of the factors mediating anorexia and wasting.(Wynne *et al*,2005)

Table 1: Distribution Of Respondent On The Basis Of Their BMI.

Categories	BMI(kg/m^2) (WHO,2000)	ARF (%)	CRF (%)
Underweight	< 18.5	26.66	6.66
Normal (healthy weight)	18.5-24.9	53.33	30
Overweight	25-29.9	20	63.33
Obese Class I (Moderately obese)	30-34.9	-	-
Obese Class II (Severely obese)	35-39.9	-	-
Obese Class III (Very severely obese	≥ 40.0	-	-

From the above table it was found that fifty three percent of ARF subjects and thirty percent of CRF patients had normal Body Mass Index (BMI), twenty six percent (approx.) of ARF patient and about six percent of CRF patients were found to be under weight and twenty percent of ARF and 63 percent of CRF patients were found

to be overweight. Most of the CRF patients are found to be malnourished irrespective of their high BMI as in initial condition due to proteinuria and muscle wasting patients lose their weight but as protein energy imbalance increases, oedema develops in feet and after that affects the whole body. It has been seen that during progressive renal failure, catabolism and anorexia lead to loss of lean body mass, but concomitant fluid retention masks weight loss and may even lead to weight gain.(Aghakhani *et al*,2012) However, none of the participants were found to be Obese.

Table 2: Clinical Symptoms Of Respondents.

Clinical Symptoms	ARF (%)		CRF (%)	
	Present	Absent	Present	Absent
Anorexia	42	58	78	22
Nausea	35	65	88	12
Discomforts in the abdomen	45	55	83	17
Vomiting	33	67	81	19
Oedema	27	83	100	-
Breathlessness	18	82	86	14
Low urine output	22	78	100	-
Anaemia	87	13	100	-
Muscle cramps	21	79	72	28
Pain in bone	28	72	76	24
Hypertension	86	14	100	-

The above table shows that the clinical symptoms of CRF patients were found to be worse than ARF patient as most of the CRF patients were taking haemodialysis treatment thrice a week while most of the ARF patients were found to be on medications only. It has been found that 42 % of ARF and 78 % of CRF were found to be anorexic. This findings correlates with the findings of (Kalantar-Zadeh *et al,*2004) who reported diminished appetite in 124 out of 331 (38%) HD patients and that, of these, 7% had poor appetite and 31% had fair appetite. Likewise, gastrointestinal symptoms like nausea, abdominal discomforts, vomiting were found to be more prevalent in CRF patients. This finding is concordant with the findings of (Radha *et al*,2013) who revealed that among all clinical symptoms, gastrointestinal symptoms were more common because of uremia, inflammation, medications, interaction of blood with dialyzer membrane during dialysis (which increases inflammatory cytokines) and infection. About 27% of ARF and 100 % of CRF patients were found to be sufferers of oedema. It has been found that 18 % of ARF and 86% of CRF patients were suffering from breathlessness.22% ARF and 100% CRF patients were found to be sufferers of low urine output.87 % ARF and 100 % of CRF patients were found to be anaemic.21 % ARF and 72 % CRF patients were found to be sufferers of muscle cramps.28 % of ARF and 76 % of CRF were found to be sufferers of bone pain.86 % of ARF and 100 % of CRF patients were found to be hypertensive.

Table 3: Average Nutrient Intake Of Respondent

Nutrients	Recommended Dietary Allowances(ICMR,2011)	ARF (Average)	CRF (Average)
Energy (kcal/d)	2320	1800	1200
Protein (g/d)	30	30	15
Fat (g/d)	25	30	15
Calcium (mg/d)	600	400	200
Iron (mg/d)	17	15	8

The above table shows that nutrient intake of ARF subjects were found to be better than CRF patients but both the groups were not taking the required amount as per RDA of an adult. From the twenty four hour diet recall it was found that mean dietary intake was very low. The energy, protein and fat intake of the selected subjects were comparatively less than Recommended Dietary Allowance (RDA). It has been

observed that there is a greater reduction of daily energy intake than daily protein intake in stable chronic HD patients. Lorenzo *et al*, (1995). From the study it has been found that cereal, fat and sugar consumption of ARF and CRF patients were same. Pulse, milk and vegetable consumption was found to be more in ARF patients in comparison of CRF patients. Glv's, fruits, non veg foods are generally prohibited in renal failure patients but ARF patients were taking the concerned foods more in comparison to CRF patients. It was observed that patients were not so much aware about prohibited and permitted foods. It was also found that 20 % of ARF patients and 40% of CRF patients were found to be anorexic all the time. 20% of ARF and 60 % of CRF patients were feeling more anorexic after haemodialysis.60 % of ARF patients were not feeling anorexia at all. Even though the appetite level was normal, participated subjects reported that they have early satiety when food is consumed. This finding is concordant with the findings of Aguilera *et al,*(2001) who revealed that uremia is the predominant factor for the cause of poor eating habits since it creates disorders in the hormone production from adipose tissue, gastric problems, production and retention of neuropeptides.

Table 4: Average Blood Parameters Of Respondents

Blood Test	Normal range	ARF (average)	CRF (average)
Serum Urea	M-15-40mg/dl F-10-30mg/dl	115	160
Serum Creatinine	M-0.6-1.2mg/dl F-0.4-1.0mg/dl	2.5	8.0
Serum Albumin	3.4-5.4 g/dl	3.0	2.4
Serum Sodium	136-145mEq/L	140	160
Serum Potassium	3.8-5.0mEq/L	4.1	5.2
Serum Calcium	9.0-11mg/dl	10.2	8.0
Serum Phosphorus	1.5- 6.8 mg%	5.5	7.5
Haemoglobin	M–12-18g/dl,F-11-16 g/dl	10.0	8.0

From the above table of biochemical evaluation it was found that all ARF and CRF subjects had elevated levels of urea, creatinine (uremia) but CRF patients were found more uremic than ARF subjects. This findings correlates with the findings of Piorry *et al*,(1840) who reported that uremia more commonly develops with chronic kidney disease (CKD), especially the later stages, of CKD, but it also may occur with acute kidney injury (AKI) if loss of renal function is rapid. Likewise hyperkalemia, hyperphosphatemia and hypernatremia were also found to be prevalent more in CRF patients than ARF patients. This findings correlates with the findings of Khedr *et al*, (2009) who reported that higher serum potassium levels are due to poor diet compliance, weekly twice dialysis and use of acetate dialysate. Similarly sixty six percent of the CRF subjects were found to be hyperphosphatemic while most of the ARF subjects were found to have normal serum phosphorus levels. This finding is concordant with the findings of Kimata *et al*,(2005) who revealed that prevalence of hyper phosphatemia in hemodialysis subjects was high in spite of medical and dietary intervention. While hypoalbuminemia, hypocalcemia and anaemia were present in both the groups but found to be more prevalent in CRF patients in comparison to ARF patients. Dietary factors are not the single cause of hypoalbuminaemia in CKD patients. In uraemic patients, hypoalbuminaemia is most closely linked to the presence of inflammation and/or metabolic acidosis. Kaysen *et al*,(1995) In patients with chronic kidney disease, normochromic normocytic anaemia mainly develops from decreased renal synthesis of erythropoietin. The anaemia becomes more severe as the glomerular filtration rate (GFR) progressively decreases. Stauffer *et al*,(2014)

The above table shows Albuminuria, Pus cells in urine were found in both the groups. Haematuria were also found in both

the groups but more prevalent in CRF patients. This finding is concordant with the findings of Hillege *et al*,(2002) who revealed that large population studies have consistently shown that albuminuria and proteinuria strongly and independently predict the risks of CKD progression. In another study, Juan *et al*,(2012) revealed that haematuria is a frequent manifestation of glomerular disease. Likewise, epithelial cells excretion was found in both the groups but prevalent more in CRF patients. Ketone excretion was not reported in ARF patients while it has been reported in 18 % CRF patients. These biochemical parameters indicate uremia which was found to be more prevalent in CRF patients in comparison to ARF subjects.

Table 5: Average Urine Parameters Of Respondents

Urine Test	ARF		CRF	
	Present	Absent	Present	Absent
Albumin	30	-	30	-
Sugar	-	30	-	30
Pus cells	30	-	30	-
RBC's	22	8	30	-
Epithelial Cells	5	25	28	2
Ketone	-	30	18	12

CONCLUSION

The progressive decline of glomerular filtration rate in chronic kidney disease patients is associated with a significant reduction in food intake. Anthropometric assessment of nutritional status shows that most of the CRF patients were found to be malnourished as comparison to ARF patients. From the biochemical evaluation of nutritional status, nutritional parameters such as decreased serum albumin level and uremia (high urea, creatinine in blood) also indicates that CRF patients were not well nourished and have higher mortality risk than ARF patients. Gastro intestinal symptoms such as nausea, vomiting, indigestion and heart burn were found to be more prevalent in CRF patients than ARF patients and that plays a potential role in reducing appetite of CRF patients which may lead them to malnutrition. Appetite suppression in uremia is multifactorial and may include effects of uremia per se and of various comorbidity and psychosocial factors but it is still unsettled to what extent these factors cause or contribute to appetite loss in uremic patients. In this study, it has been found that ARF patients were less anorexic hence proper diet counselling can help them to cope up with malnourishment as it has been proposed in some previous studies that branched chain amino acid deficiency due to enhanced protein catabolism, hyperleptinemia, etc. may be the causal factor of anorexia (further studies are required).Our findings demonstrate that reduction in appetite level of patient are somewhat related to physical inactiveness, gastrointestinal disturbances, social isolation, excessive food restrictions, which is found to be more prevalent in CRF patients rather than ARF patients. It is often found that symptoms are reversible in some cases when they get proper nutrition along with medications while symptoms in CRF patients are found to be irreversible. Thus, progression of ARF symptoms into CRF can be checked by maintaining protein-energy homeostasis through proper diet recommendations as per the condition of patient, strict food restriction should not be prescribed to each patient, food preferences of patient and dietary restrictions (as per the condition of patient) must be kept in mind while preparing a food to enhance the hunger level of patient. Along with it, proper activity level must be maintained as per the condition of subject and efforts should be done to enhance the quality of life of patient through social gatherings or by creating pleasant environment at home. Patient must not be asked repeatedly about their disease by people around. This study brings into focus the fact that good dietary and lifestyle

modification may reduce the deterioration of ARF symptoms into CRF. Therefore, diet counsellor should be encouraged to have liberal and case sensitive approach while prescribing any diet and lifestyle modification to the subject. We did notice a trend toward a difference and a larger study may have had the power to detect relationships.

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