Nutrition Knowledge and Practices in Management of Stage 5 Chronic Kidney Disease by Adult Patients at Kenyatta National Hospital, Kenya

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Abstract: This study sought to determine nutrition knowledge and its association with practices in management of stage 5 chronic kidney disease (CKD) among renal adult patients in Kenyatta National Hospital. A cross-sectional analytical design was used to facilitate collection of qualitative and quantitative data and enable identification of associations between variables. Cochran formula was used to calculate a sample of 110 respondents. A research administered questionnaire with closed ended questions was used to collect information. Descriptive statistics such as frequency and percentage were used to describe demographic and socio-economic characteristics of the population. Inferential statistics were done using chi square with an alpha of 0.05 to test association between independent and dependent variables. Most participants had moderate knowledge levels whereas more than half of the participants (66%) indicated poor nutrition management practices of their condition. There was significant association between period on dialysis in months and practices in management of stage 5 chronic kidney disease. Knowledge on importance of diet in management of stage 5 CKD (<0.001), moderation of fluid intake (<0.001), reduction in salt/ sodium intake (<0.001), and moderation in protein intake (<0.004) were significantly associated with nutritional management practices of stage 5 CKD. The study concluded that Knowledge levels were low in identifying foods rich in phosphorus, calcium and fat soluble vitamins. Practice scores were also poor despite moderate nutrition knowledge levels. Patients' knowledge on nutrition management of their condition may be achieved through frequent and consistent nutrition education and counseling including follow ups.

Key Terms: Knowledge, Practice, chronic kidney disease, nutrition management

INTRODUCTION

Chronic kidney disease (CKD) has been categorized as one of the diseases of public health concern globally (Samar et al., 2018). The disease progresses through various stages resulting in the fifth and last stage when a patient depends on dialysis or transplant for survival (Barnet et al. 2008). Stage 5 CKD has been identified as the end stage of kidney performance increasing morbidity and mortality rates of patients. Globally 4.9-9 million people need renal replacement therapy (RRT) and out of these, only 2.6 million are on dialysis with at least 2.3 million dying prematurely due to inadequate access to RRT (Garcia et al., 2015). In Brazil, between 2000 and 2012, a study indicated an increase in incidence and prevalence rates among stage 5 CKD patients. Prevalence rates ranged between 3.2% - 4.0%/year and incidence rate 1.1% – 2.5%/year. The incidence rate was noted to increase in both sexes, in all parts of the country especially among the older age groups (Lenildo et al., 2014). Increase in prevalence and incidence rates could be attributed to inadequate knowledge on co-morbidities leading to CKD and progression to subsequent stages. The incidence and prevalence rates are based on estimates due to lack of national or regional registries on stage 5 CKD in most developing countries (Naiker at al., 2003). ESRD is projected to increase at the rate of 6-8% in Africa (Ojo A., 2014), with incidence rate estimated at 2.6% (Velandria et al., 2011).

In Sub-Saharan Africa the prevalence and incidence rates of stage 5 CKD are on the increase with communicable and non-communicable risk factors entailed (Stanifer et al., 2014). Stage 5 CKD is prevalent and linked with adverse outcomes like heart diseases and increased mortality due to many associated illnesses (Van der Velde et al., 2011). CKD is not always identified and managed in an optimal and timely manner (Plantinga et al., 2008). It is said that CKD is a growing problem particularly in the

developing countries (Fouque et al., 2017). A systematic review carried out in sub-Saharan Africa, concluded that stage 5 CKD is prevalent and potentially escalating. This was associated with the risk factors of both communicable and non-communicable diseases (Stanifer et al., 2014).

The morbidity and mortality rates of stage 5 CKD was found to be much higher compared to similar rates among the general population (Zoccali et al., 2010). Kidneys' regulate water and electrolytes like sodium, phosphorus, potassium, magnesium and calcium concentration in the blood and body fluids. Kidneys further produce hormones that help to regulate blood pressure. The organ also helps in formation of the red blood cells besides promoting strength of bones in the body (Kerry et al., 2006). CKD affects proper functioning of the kidneys, progressively and irreversibly leading to stage 5 CKD or chronic renal failure (CRF). When kidneys fail, dialysis or kidney transplant will be required to maintain survival of the victim. Commonly identified causes of CKD locally include chronic glomerulonephritis, high blood pressure and diabetes (Campbell, 2002). Patients with CKD though the level of failure may be moderate, have increased risk of developing heart diseases (Rossi et al., 2014). Proper nutritional assessments and evaluations are imperative in order to prevent increased rate of loss in performance of the kidneys. There is dire need to manage the co-morbid conditions like cardiovascular diseases, peripheral arterial diseases, stroke, and hypertension normally associated with renal failure (Adeera et al., 2008).

Patients experience difficulties during selection of foods that are ideal for their condition as prescribed. Normally tend to choose foods that are familiar and or available to them (Webb et al., 2015). Stage 5 CKD patients need sufficient knowledge on foods ideal for individualized requirements to make decisions basing on their nutritive value, portion sizes and availability of food (Elliot et al., 2015). Protein-energy wasting as an aspect of stage 5 CKD is associated with poor appetite, nausea and vomiting due to increased uremia levels in the body. Adequate knowledge on foods that increase ammonia levels in blood, adherence to the prescribed diet regimen and good practice levels have been linked to prolonged lives and reduction in adverse effects caused by the disorder. Further there is improved quality of life and substantial decline in risks of morbidity and mortality. The nutritionist at the renal unit of KNH did intermittent education and counseling to patients on dialysis basing on professional knowledge attained, with limited access to current literature. This study therefore sought to determine the demographic and socio-economic characteristics of adult stage 5 chronic kidney disease (CKD) patients attending renal unit of Kenyatta National Hospital, establish their nutrition knowledge in the management of stage 5 chronic kidney disease and determine the association between nutrition knowledge and practices in management of stage 5 chronic kidney disease (CKD) among renal adult patients in Kenyatta National Hospital

METHODOLOGY

This was a facility based cross-sectional analytical study that assessed nutrition knowledge and practices in management of stage 5 CKD among renal adult patients. A cross-sectional analytical design was used to facilitate collection of qualitative and quantitative data and enable identification of associations between variables (Katzenellenbogen et al., 2002).The study was carried out at Kenyatta National Hospital the national referral hospital in Nairobi country, Kenya. The facility is well equipped with modern dialysis equipment with well-trained health care workers specialized in managing renal insufficiency among patients undergoing dialysis in the hospital. The Hospital is a teaching and referral facility attracting many patients who are seeking for quality health care services. Patients are referred to the KNH from other smaller level facilities for specialized screening, assessment, treatment and management.

The study targeted stage 5 Chronic Kidney Disease adult patients attending renal unit for hemodialysis, a total of 305 patients underwent dialysis every week. The formula used to calculate sample size is by Cochran (Israel, 1992) for population less than 10,000 (Fisher et al., 1998).

$$N = Z^2 q (1-p) / d^2$$

Where; N = Sample size

Z = standard normal deviate corresponding to 95% Confidence Interval (1.96)

p = Prevalence of the characteristic of interest 50% used as p was unknown

q = the proportion of the absence of the characteristic of interest

d = degree of precision (set at ± 5%)

Substituting in the formula; $N = (1.96)^2 (0.5) (0.5)/ (0.05)^2 = 384$

Since the population size was less than 10,000 (N = 100), the following adjusted formula was used;

$$nf = n/1+(n/N)$$

$$384 /1+ (384/135) = 99.8 \text{ approx.}100$$

10% was added to cater for non-response to make a population of 110, however data for only 103 was reported as non-response rate was 6%. Simple random technique was used to select 110 patients determined by use of formula shown above. The number was arrived at by use of a random number generator.

A research administered questionnaire with closed ended questions was used to collect information. The data collection tools were pretested at Kenyatta National Hospital where ten patients with similar conditions were interviewed two weeks prior to the study. This facilitated correction and modification of possible ambiguous and unclear questions in the questionnaire. The research assistants were trained on how to ask questions and record data in a standardized way. This was ascertained during the pretesting of the instruments. The questions were then reviewed by a panel of nutrition experts before data collection to ensure questions elicited responses that provided intended information. Test-retest method was used to test reliability of the questionnaire in producing the same responses. The subjects of the pretest were interviewed twice within a span of one week between interviews to assess reliability stability of the questionnaire. Cronbach's alpha correlation coefficient was used to measure reliability of data collection tools. The researcher recruited two research assistants with a minimum of Diploma in Food Nutrition and Dietetics and with research experience. They were trained on each objective and importance of using it as a guide during the interview.

All 14 questions on knowledge were scored according to responses made by the participants. Each correct response was awarded one point while zero was awarded for every incorrect response. Participants who scored 0-4 points were categorized as low in nutrition knowledge, 5-9 Moderate, while 10 - 14 high. Nutritional management practices were measured using five parameters namely; reducing potassium intake, identifying supplements used, feeding norms, accessibility (cost) of recommended food and reducing salt intake to combat pressure. A dummy variable (Nutritional management practiced) was deduced with average mean being the cut point. Score above the mean meant good practice while below the mean was poor. Data from KII was transcribed, responses arranged in general categories identified in the discussion guideline then coded. Common themes were identified, inference made from each theme and conclusions drawn then triangulated with the data from the questionnaire. Results were presented in form of tables Conclusions about the study population were drawn based on statistical findings of the sample.

Descriptive statistics such as frequency and percentage were used to describe demographic and socio-economic characteristics of the population. Inferential statistics were done using chi square with an alpha of 0.05 to test association between independent and dependent variables. A percentage value of $P < 0.05$ was used as a criterion for statistical significance as is usually recommended for social sciences (Sproull, 1988).

RESULTS AND DISCUSSION

Demographic And Socio-Economic Characteristics Of The Study Population

Male respondents made up more of the study population than females 63.1% vs 36.9% (Table 1). Most participants had completed secondary school (39.8%), while 26.2% had completed primary and tertiary qualifications, respectively. Only 1% had never attended school. Most participants were Christians (90.3%), 6.8% were traditional African, 1.9% Muslims and 1% were Hindus. Many respondents were unemployed (49.5%), 22.3% were self-employed with 14.6% earning a salary and 13.6% doing casual work. The majority (80.6%) earned less than 20,999Ksh per month. The main source of support was the family (59.2%) or self (35%). Most of the participants were between 30-41 years, at 33% of the sampled population. The least being the elderly who were 66 years of age and above, comprising 7.8% of the respondents.

Table 1 Demographic and socio-economic characteristics of the study population

Variables	N = 103	n	(%)
Gender	**Male**	**65**	**63.1**
	Female	38	36.9

Marital status	**Married**	**73**	**70.9**
	Single	25	24.3
	Widowed	3	2.9
	Divorced	2	1.9
Education levels	None	1	1
	Primary	27	26.2
	Secondary	**41**	**39.8**
	Tertiary	27	26.2
	Graduate	7	6.8
Religion	**Christians**	**93**	**90.3**
	Traditional African	7	6.8
	Muslims	2	1.9
	Hindu	1	1.0
Main occupation	Employed and salaried	15	14.6
	Self-employed	23	22.3
	Casual work	14	13.6
	Unemployed	**51**	**49.5**
Monthly earning	**≤ 20,999**	**83**	**80.6**
	21,000 – 30,999	7	6.8
	31,000 – 40,999	8	7.8
	41,000 – 50,999	3	2.9
	≥ 51,000	2	1.9
Source of medical support	Self	36	35
	Family	**61**	**59.2**
	External	6	5.8
Age category in years	**18-34**	**34**	**33**
	35-44	26	25
	45-54	16	16
	55-64	15	15
	65 &above	12	11

Nutrition Knowledge in the Management of Stage 5 Chronic Kidney Disease

Over half (61.2%) of the participants said they were expected to decrease fluid intake per day (Table 2), 32% said they were required to take fluids moderately, (4.9%) said they should increase fluid intake. Only 2% said they should not change amount of fluid intake. Fluid intake should be moderated to meet body needs. On knowledge of problems resulting from excess fluid intake 35% said loss of breath. 32% weight gain, 13% lung problems and 1% weight loss. Multiple responses encompassed 19% (n=20) of the study population. Excess fluid intake results in all the options given in the choices except weight loss. These problems are also experienced when patients delay going for dialysis. Pulmonary oedema may result hampering functionality of the heart due to buildup of fluids.

Table 2 Knowledge levels on use of fluids

Knowledge	Variables	n	(%)
Use of fluids			
	No change	2	2
	Increase	5	4.9
	Moderate	33	32
	Decrease	63	61.1
Problems from excess fluid intake			
	Loss of breath	36	55
	Weight Gain	33	22
	Lung problems	13	13
	Weight loss	1	1
Expected fluid intake 500-1000ml/day			

Strongly agree	18	17.5
Agree	35	34
Strongly disagree	9	8
Disagree	41	39.8

Most participants (64.1%) said green bananas and potatoes respectively, have high potassium levels compared to other foods (Table 3) Green bananas contain 465mg of potassium/100g) while potatoes have 391mg/100g. There were multiple responses from 38.8% participants; 4.9% said milk while 3.9% said fruit. Only 1% said fish and meat respectively. The standard serum potassium level is 3.5-5 mmol/L (Ahmed et al., 2001). High potassium levels in the body causes irregular heart beat and heart disease which is often fatal. Knowledge on problems that would arise with high levels of potassium in blood indicated 65% of the participants saying itchy skin; 14.6% said dizziness and heart disease respectively, 13.6% said muscle cramps. 7.8% gave multiple responses. Most respondents had no idea on the effects of high potassium levels in the body.

Respondents' knowledge on use of salt showed majority (87.3%) saying they should avoid or reduce intake; 7.8% said they should take in moderation while 3.9% said they should increase. Only 1% would not change amounts used. Increased salt intake among stage 5 CKD patients was associated with increased thirst and buildup of fluid in the body (Nutrition and Hemodialysis, 2013). The participants' responses on food items with high sodium/salt levels showed 71.4% said sausages 15.5% said lemon while 6.8% and 3.9% boiled maize and dried fruits respectively. Sausages contain salt normally used as a preservative leading to increased levels in the food product.

Almost three quarters of the population therefore were aware of the high salt content in sausages. Three quarters of the participants (75.5%) said high blood pressure would arise on high intake of sodium/salt, 39.6% said heart burns, 28.1% gave multiple responses, 10% said cardiac disease and obesity would result. High salt intake increases electrolyte imbalance affecting osmotic pressure. This leads to increased thirst that result in high water intake in an effort to create the balance. This intercellular fluid imbalance affects the blood pressure, consequently causing high blood pressure sometimes heart burn and cardiac disease.

Table 3 Knowledge levels on use of minerals

Knowledge Variables	**n**	**(%)**
Foods with high potassium levels		
Milk	5	4.9
Fruits	4	3.9
Potatoes	66	64.1
Green bananas	66	64.1
Problems expected from high potassium levels in the blood		
Dizziness	15	14.6
Itchy skin	67	65
Muscle cramps	14	13.5
Heart disease	15	14.6
Proportion of common salt to be used (2g/day)		
Avoid/reduce	90	87.3
Moderate	8	7.8
Increase	4	3.9
No change	1	1
Foods containing high salt levels		
Sausages	74	71.4
Lemon	16	15.5
Boiled Maize	7	6.8
Dried Fruits	4	3.9
Foods rich in calcium		
Milk	57	55.3
Fish	40	38.8
Rice	9	8.7
Fruits	6	5.8
Problems expected when calcium levels are high		
Bone disease	68	57.3
Muscle cramps	27	26.2

	Vascular calcification	10	9.7	
	Vomiting	3	2.9	
Foods rich in phosphorous				
	Dairy products	57	55.3	
	Nuts and seeds	31	30.1	
	Fruits	11	10.7	
	Vegetables	7		6.8
Problems expected when phosphorous levels are high in the blood				
	Stomachache	55		53.4
	Liver disease	34		33
	Bone & Joint disease	13		12.6
	Cardiac disease	8	7.8	

Milk is one of the dairy products containing high calcium levels. Half (50%) of the respondents selected milk as the food rich in calcium, 38.8%, said fish. All other foods rice, meat, fruits and beans each scored less than10%, 13.6% gave multiple responses Over fifty percent of the respondents gave dairy products, yoghurt and milk as foods rich in phosphorous(55.3%), a third (30.1%) said nuts and seeds while 10.7% said fruits. while 5.8% said vegetables. Dairy products, yoghurt and milk provide the highest source of phosphorous.

Over fifty percent of participants 57.3% said bone disease would result from high levels of calcium in the body, 26.2% said muscle cramps, 9.7%, 2.9% and 3.9% of the participants said vascular calcification, vomiting and multiple responses respectively. Vascular calcification normally arises due to high build-up of calcium mineral in the body. Most respondents therefore had no knowledge on the consequences of high levels of calcium in the body. Over half of respondents 53.4% said they would have stomachache if they took food high in phosphorous, 33% said liver disease, 12.6% said bone and joint disease and then10% said cardiac disease, 6.8% of participants gave multiple responses. High phosphorous levels in the body lead to precipitation of calcium and withdrawal from the bones leading to bone disease (osteodystrophy) experienced through weakening and fragility of the clients' skeletal system. Almost three quarters of the participants (72.8%) reduced/avoided salt intake to normalize blood pressure, 37.9 % took less fluid and 3.9 % checked their blood pressure daily. Only 1% took less food to manage blood pressure with 15.6% multiple responses.

Respondents' use of proteins showed half of them (50.5%) saying it should be reduced (Table 4). 44.7% said it should be taken in moderation, 2.9 there should be no change and 1.9% said it should be increased. Patients undergoing haemodialysis are supposed to increase protein intake as it is lost during dialysis, metabolism and inflammation. Less intake would lead to wasting and finally Protein Energy Malnutrition a condition that increases morbidity and mortality rates. Majority of the respondents (85.4%) said malnutrition would result from low intake of proteins, 13.6% and 10.7% said oedema and bone disease respectively while 11.7% gave multiple responses. Only 1.9 % said blood pressure would result. Most participants knew malnutrition would arise from low protein intake. Clarity on how they were expected to use or the right quantity corresponding to their body needs was missing.

Knowledge on co-morbidities or Non communicable diseases leading to stage 5 CKD showed majority of the participants (80.6%) said diabetes, 60.2% said hypertension. There were multiple responses from close to half of the respondents at 49.5% indicating knowledge on diabetes and hypertension as diseases leading to stage 5 CKD. Few participants (7.8%) said heart failure with only 1% saying pneumonia. Kidney disease, diabetes, hypertension and heart failure are diseases that overtime lead to stage 5 CKD. The responses indicated awareness of diabetes and hypertensions leading to stage 5 CKD but not heart failure, yet all the three are co-morbidities.

Table 4 Knowledge Levels on Use of Proteins

Knowledge	Variables	n	(%)
Use of proteins			
	Reduce	52	50.5
	Moderate	46	44.7
	No change	3	2.9

Increase		2		1.9
Problems that may arise due to low protein intake				
Malnutrition		88		85.4
Oedema	14		13.6	
Bone disease		11		10.7
High Blood pressure		2		1.9
Diseases that lead to stage 5 CKD				
Diabetes	83		80.6	
Hypertension		62		60.2
Heart failure		8		7.8
Pneumonia		1		1

Knowledge levels considered all the categories of key food types forming a composite result. The participants' responses on importance of diet in management of stage 5 CKD indicated 63% as knowledgeable. On nutritional aspects in management of their condition over three quarters were not knowledgeable (76%). Majority of the participants understood nutrition information given as education and counseling by the nutritionist. There were 59% of respondents who did not know that fluid intake was supposed to be moderated. Buildup of extra fluid due to inability of the kidneys to regulate it can raise blood pressure more. Kidneys play an important role in regulating blood pressure with aldosterone hormone. Salt intake was reduced or totally avoided by over three quarters of the study population (78%).Most participants (86%) were not knowledgeable on use of proteins.

Table 5 Knowledge Levels among Stage 5 Chronic Kidney Disease

Variable	n	%
Diet is important in management of CKD		
Not knowledgeable	38	37
knowledgeable	65	63
Nutritional aspect of management of CKD		
Not knowledgeable	78	76
knowledgeable	25	24
Understanding nutrition information given		
Not knowledgeable	93	18
knowledgeable	10	82
Moderate fluid intake for CKD		
Not knowledgeable	61	59
knowledgeable	42	41
Reduced sodium for CKD		
Not knowledgeable	80	78
knowledgeable	23	22
Moderate use of protein for CKD		
Not knowledgeable	89	86
knowledgeable	14	14
Reduced use of cholesterol rich food		
Not knowledgeable	101	98
knowledgeable	2	2
Reduced use of soluble vitamin A rich foods		
Not knowledgeable	90	87
knowledgeable	13	13

Take upto1000ml of Water daily		
Not knowledgeable	73	71
knowledgeable	30	29
Hypertension lead to CRF		
Not knowledgeable	10	10
knowledgeable	93	90

Patient on dialysis, require increased protein intake. This should be consumed at a rate of at least 1.2 g/kg bwt/day, 50% of which should be of high biological value. Use of cholesterol levels showed that almost all participants 98% did not know that foods high in cholesterol should be reduced. Lack of knowledge on reduction in use of vitamin A rich foods (87%) and use of 500- 1000ml of water/day (71%) was realized.

All the questions on knowledge were scored according to responses made by the participants. There were 14 categories of questions used to assess knowledge levels of the participants. Each correct response was awarded one point while zero points were awarded for every incorrect response. Participants who scored 0-4 points were categorized as low in nutrition knowledge (24%), 5-9 Moderate (46%) while 10 -14 high (25%) in nutrition knowledge (Table 6). Most participants had moderate knowledge levels. Adoption of the Blooms, 1956 standards as cut -off references was used to categorize knowledge scores.

Table 6 Nutrition Knowledge Scores In Managing Stage 5 CKD

	N=103		
	n	scores	%
Low	25	0- 4 points	24
Moderate	46	5- 9 points	45
High	32	10-14 points	31

Practices On Nutritional Management Among Stage 5 CKD Patients

Slightly over half of the respondents (57.3%) ate less fruits and cooked vegetables in a lot of water to reduce the amount of potassium in fruits and vegetables. 42.7% did not know how reduce potassium levels in food used (Table 7). Slightly over half of the respondents could reduce potassium from fruits and vegetables used. Most participants did not know if they were taking iron tablets (77.7%), only 22.3 % took iron tablets. Iron tablets help increase blood levels in the body by facilitating formation of red blood cells. Over half of the participants (64.1%) had no feelings of nausea or vomiting nor constipated, while 39.5% experienced the discomforts.

Table 7 Practice on Nutrition Management

Practice parameters	**(n=103)**
Practice	**Proportion (%)**
Cooking vegetables in much water and eating less fruit to reduce potassium levels	
Yes	59 (57.3)

No	44 (42.7)
Taking iron supplements	
Yes	23 (22.3)
No	80 (77.7)
Feeding without nausea/vomiting/constipation	
Yes	37 (35.9)
No	66 (64.1)
Reducing salt to manage BP	
Yes	76 (73.8)
No	27 (26.2)
Ability to buy, get and take recommended food	
Yes	14 (13.6)
No	89 (86.4)

To control blood pressure 73.8% of the participants reduced salt intake, while 26.2 % did not control salt intake. Majority of the participants could not afford to buy and take the recommended dietary regime (86.4%) the remaining 13.5 % bought and took as recommended by the nutritionist. Financial support from family members was essential for better health to the patients. Family support play an important role in practice patterns among the patients, due to the high cost implications amount of time spent during hemodialysis. More than half of the participants (66%) indicated poor nutrition management practices of their condition (Table 8) with scores betweeon 0-2 points. Only slightly above a third of the participnats (34%) indicated good nutrition management practices with scores between 3-5 points.

Table 8 Practice Scores on Nutrition Management of Stage 5 Chronic Kidney Disease

Practice		N=103	
	n	Scores (points)	%
Good	35	3-5	34
Poor	68	0-2	66
TOTAL	103		100

Association between Demographic, Socio-Economic Factors and Practices in Management of Stage 5 Chronic Kidney Disease

There was significant association between period on dialysis in months and practices in management of stage 5 chronic kidney disease with p value of <0.001 at 95% C.I, df of 3 (Table 9). There were 14 (53, 8%) respondents with less than 3 months duration on dialysis who had good nutrition management practices compared with 12 (46.2%) respondents who displayed poor nutrition management practices. The results showed a decline in nutrition management practices as duration on dialysis increased. Age, education, marital status, education, occupation, monthly income and support for dialysis had p values of 0.582, 0.998, 0.324, 0.076, 0.833, 0.601 and 0.738 respectively. Education level missed to have a significant difference, though it impacts practice in many studies. This could be attributed to the fact that majority of the respondents (82.8%) had secondary school education and above with only 1% without education, those with primary education were 26.2%. They therefore had better understanding levels requiring continuous follow up to ensure good practices are followed. Chi square was used to determine the association between practices and socio-economic factors in nutrition management of stage 5 CKD.

A study by Marie at al., (2018) shows age to be having a statistically significant associated with practice in hemodialysis, however, it was noted that the effect of age was clinically quite small despite a statistically significant association that exists in this study. Maries study contradicts findings in this study where age has no significant association with practice. Practice levels are associated with other factors like family support though this does not concur with this study.

The results showed that lower levels in quality of life were associated with lower levels of an individual engagement. The study further revealed that age and high monthly income, had a positive relationship with engagement with the participants. Only duration on dialysis had a significant difference with practice. The scores showed a tendency of respondents' reduced levels in practicing the recommended dietary regimen prescribed as their duration on dialysis increased. This could be attributed to the assumption by HCWs that once a participant has acquired nutrition information they remained aware and accountable throughout life. Close follow up and

motivation for behavior change remained essential to maintain participants' quality of life and focus on any unusual changes that occurred in their bodies.

Table 9 Association between demographic, socio-economic factors and practices in management of stage 5 chronic kidney disease

	Nutritional management practice (n/%)				
Variable	**Poor**	**Good**	χ^2	**df**	**p-value**
Age					
<30 years	16 (66.7)	8 (33.3)	1.986	3	0.582
30-40 years	18 (64.3)	10 (35.7)			
41-50 years	9 (52.9)	8 (47.1)			
>50 years	24 (72.7)	9 (27.3)			
Religion					
Christian	54 (65.9)	28 (34.1)	0.005	2	0.998
Muslim/Hindu	8 (66.7)	4 (33.3)			
Traditional	6 (66.7)	3 (33.3)			
Marital status					
Married	44 (67.9)	26 (37.1)	0.974	1	0.324
Single/divorced/widowed	24 (72.7)	9 (27.3)			
Period on dialysis in months					
<3	12 (46.2)	14 (53.8)	**19.264**	**3**	**<0.001**
3-6	6 (35.3)	11 (64.7)			
6-12	19 (82.6)	4 (17.4)			
>12	30 (83.3)	6 (16.7)			
Education					
Primary	22 (81.5)	5 (18.5)	6.864	3	0.076
Secondary	24 (58.5)	17 (41.5)			
Diploma	15 (55.6)	12 (44.4)			
Degree	7 (87.5)	1 (12.5)			
Occupation					
Formal	9(64.3)	5 (35.7)	0.022	1	0.883
Informal	50(66.3)	30 (33.7)			
Monthly income					
<20k	53 (63.9)	30 (36.1)	1.863	1	0.601
20-30	6 (85.1)	1 (14.1)			
31-40k	5 (62.5)	3 (37.5)			
>41k	4 (80.0)	1 (20)			
Support for Dialysis					
Self-sponsored	23 (63.9)	13 (36.1)	0.112	1	0.738
Family/Friends	45(67.2)	22 (32.8)			

Association between Nutrition Knowledge and Practices

Table 4.10 shows the bivariate analysis between nutrition knowledge and practices in management of stage 5 chronic kidney disease. Knowledge on importance of diet in management of stage 5 CKD (<0.001), moderation of fluid intake (<0.001), reduction in salt/ sodium intake (<0.001), and moderation in protein intake (<0.004) were significantly associated with nutritional management practices of stage 5 CKD. Conversely being not knowledgeable on nutritional aspects in management of stage 5 CKD (0.806), understanding nutrition information (0.672), reduction of cholesterol rich foods (0.547), use of soluble vitamin A rich foods (0.715), intake of up to 1000ml of water/day (0.315) and identification of co-morbidities leading to stage 5 CKD (0.326) were not significantly

associated with nutritional management practices. Respondents who were knowledgeable 22 (73.3%) on amount of water to be used (up to 1000ml/ day) tended to practice nutritional management as advised by the nutritionist (0.315). Patients responses to knowledge questions on nutrient levels in different foods was high especially those rich in potassium, phosphorus and salt/ sodium (Section B). There was however low scores on the effects caused by changes in levels of the specific nutrients in the body (in Section D).

A study by Miyata et al., (2018) was carried out to determine haemodialysis knowledge on two groups of patients, one practicing and the other not. Upon analysis, the researcher found that hemodialysis-related knowledge scores did not vary in two groups of patients implying that other factors influence practice not just knowledge scores on nutrition management of haemodialysis. Another study by Durose et al., (2004) compared knowledge on renal diet and complications the diet can cause. He came up with similar results where patients with more knowledge on renal diet were not related with practices. This could be due to much focus on types of food to restrict basing on education and counseling than impact the variation of nutrients may cause in the body. Food items like green bananas and potatoes were easily identified as high in potassium, but effects of high potassium in the body was not known. A similar trend applies to phosphorous where foods rich in the mineral were identified but not the effects of high serum levels in the body. Salt was the only mineral identified in foods consumed and its effects recognized. This may be due to the taste of salt and the fluid built up and or inter-dialytic weight gained with increased intake of the mineral. Weighing is done every visit before dialysis commences. The statistical significance in the association between knowledge and practice on salt and fluid intake was realized but not on other minerals.

Studies show that up to 75% of hemodialysis patients (Beer, Mountford, and Boundville, 2018) are at a higher risk of malnutrition caused by loss of nutrients from dialysis thus the need for high intake (Hernández Morante et al., 2014). In addition, Hernández et al.,(2014) found that high inflammation is caused by production of cytokine, loss of blood, and effects of uremic syndrome like reduced food intake or appetite. The presence of protein-energy malnutrition is often harmful to patients on hemodialysis due to increased risk of mortality, reduced quality of life, and increased risk of hospitalization (Beer, Mountford, & Boundville, 2018). Uremic state triggers the process of muscle breakdown, which could appear in form of fluid retention (Oquendo, Asencio, & de las Nieves, 2017). It is therefore important to look beyond weight loss to identify PEM, since this is not often the indicator. According to Beer at al., (2018) the patient's eating habits become the ultimate contributing factor to malnutrition making dietary intervention crucial in managing stage 5 CKD.

Table 10 Association between nutrition knowledge and practices in management of stage 5 chronic kidney disease

Variable	Nutritional management practices (n/%) Poor	Good	(df=1) χ^2 (p-value)
Diet is important in management of CKD			
Not knowledgeable	16 (42.1)	22 (57.9)	**15.350 (<0.001)**
knowledgeable	52 (80)	13 (20)	
Nutritional aspect of management of CKD			
Not knowledgeable	52 (66.7)	26 (33.3)	0.060 (0.806)
knowledgeable	16 (64.0)	9 (36.0)	
Understanding nutrition information given			
Not knowledgeable	62 (66.7)	31 (33.3)	0.179 (0.672)
knowledgeable	6 (60)	4(40)	
Moderate fluid intake for CKD			
Not knowledgeable	49 (80.3)	12 (19.7)	13.652 **(<0.001)**
knowledgeable	19 (45.2)	23 (54.8)	
Reduced sodium for CKD			
Not knowledgeable	46(57.5)	34 (42.5)	11.591 **(<0.001)**
knowledgeable	22(95.7)	1 (4.3)	
Moderate use of protein for CKD			
Not knowledgeable	54 (60.7)	35 (39.3)	8.339 **(0.004)**
knowledgeable	14 (100)	0	
Reduced use of cholesterol rich food			

Not knowledgeable	66 (65.3)	35(34.7)	0.547 (fisher exact)
knowledgeable	2 (100)	0	
Reduced use of soluble vitamin			
Not knowledgeable	60 (66.7)	30(33.3)	0.133 (0.715)
knowledgeable	8 (61.5)	5(38.5)	
Take upto1000ml of water daily			
Not knowledgeable	46 (63)	27 (37)	1.009 (0.315)
knowledgeable	22 (73.3)	8 (26.7)	
Hypertension led to CKD			
Not knowledgeable	8 (80)	2 (20)	0.965 (0.326)
knowledgeable	60 (64.5)	33 (35.5)	

Fisher exact is applied appropriately, significant results bolded (<0.05), df = degree of freedom.

CONCLUSION

Most of the study participants were young male adults, married, of low socio-economic status and with secondary school education. The study showed that nutrition knowledge scores in the study population were moderate especially regarding dietary intake and following recommendations for best outcome in nutritional health and overall improvement in quality of life. Knowledge level was however low in identifying foods rich in phosphorus, calcium and fat soluble vitamins. Socio-demographic factors influenced the quality of life and practices regarding nutritional management of renal condition. Practices on nutritional management of the patients' condition were poor, considering also that 96% of them said they could not afford the recommended diet. Practice scores were poor despite moderate nutrition knowledge levels. The poor nutrition management practice scores indicated a possibility of having persistent complications among the respondents irrespective of moderate knowledge scores.

Nutrition management needs high level of knowledge on essential nutrients needed by the body, their role, interaction and functions. More focus on motivation follow up and practicing nutrition management skills acquired may greatly improve patients' quality of life. Patients' knowledge on nutrition management of their condition may be achieved through frequent and consistent nutrition education and counselling including follow ups. There is need to strengthen nutrition counselling by educating patients on reasons for restricting or modifying dietary regiment not just identifying foods as minerals, proteins or fluids. The Ministry of Health nutrition division, in collaboration with other nutrition institutions, practicing health facilities and relevant stakeholders, should come up with policy statements, guidelines, protocols and strategies specifically on nutritional management of stage 5 CKD. Standard operating procedures and Subjective global assessments need to be adopted to have a universal assessment aiding in prediction of morbidities. This will outline provision of essential nutrition services and mandatory management practices to alleviate complications slowing down progression of the disease and improving patients' quality of life

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