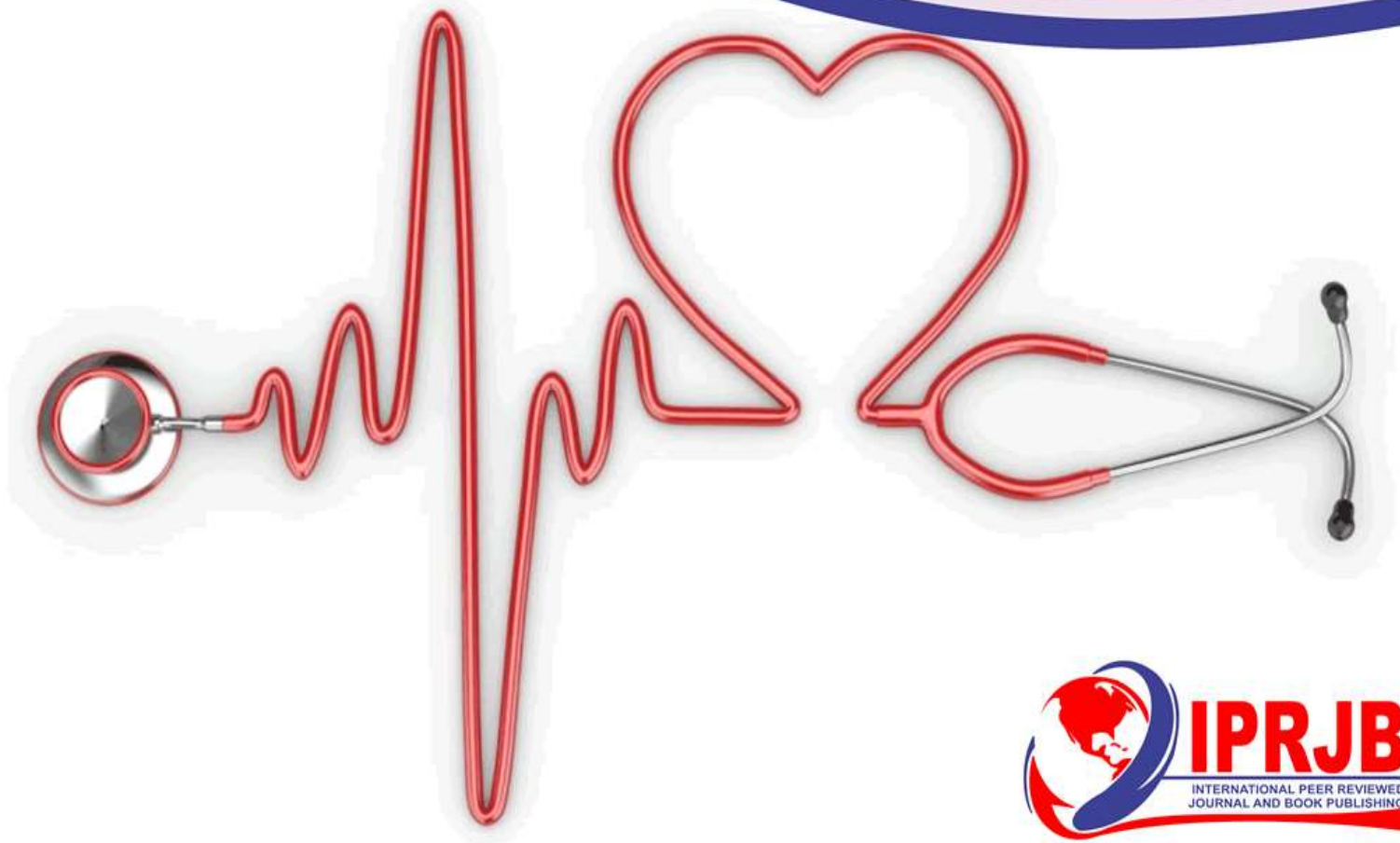


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DETERMINANTS OF DIET AND FLUID ADHERENCE AMONG END STAGE RENAL DISEASE PATIENTS UNDERGOING HAEMODIALYSIS AT MOI TEACHING AND REFERRAL HOSPITAL, UASIN GISHU COUNTY, KENYA

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Abstract

Purpose: This study was conducted to establish determinants of diet and fluid adherence among ESRD patients undergoing hemodialysis at Moi Teaching and Referral Hospital-Uasingishu county. Kenya.

Methods: A descriptive cross-sectional study design was applied. Using Fisher's formula, a sample size of 145 participants were conveniently recruited. Data collection was done by use of modified end stage renal disease adherence questionnaire (ESRD-AQ). Chi-square (χ^2) was used to test statistical significance. Frequency tables and bar graphs were used for data presentation. SPSS version 22.0 was used for data analysis.

Results: The study revealed that knowledge on nutritional requirements for renal patients was marginally associated with dietary and fluid intake with a higher proportion of those with low nutritional knowledge (83.6%) adhering to diet and a relatively smaller proportion in the same category (58.9%) complying with fluid intake. A significant relationship with dietary adherence was observed where participants practiced fluid restrictions ($p=0.003$) and the frequency in which health staff talk about the importance of following proper diet ($p < 0.0001$). On social support domain, a significant association was observed in patients who agreed that various social support aspects help improve depression, self-esteem, self-management, etc. and who adhered to diet scored a significantly higher mean of 5.6 (95% CI = 5.5 – 5.6) in contrast to non-adherent counterparts who had a mean of 5.5 ($p = 0.0006$). Among the economic factors with significant association with diet adherence were; use of bus for transport ($p=0.02$); income of less than KSH. 30,000 ($p=0.006$); treatment cost ($p=0.007$) and ability to access material support that helps in adherence ($p=0.003$). Those who claimed that lack of transport was the main reason for missing dialysis practiced fluid adherence ($p=0.01$) with a smaller proportion (44%) adhering to fluid restriction in comparison to 70.8% who had transport and were non-adherent.

Unique contribution to theory, practice and policy: The study findings are unique to the study site and it's hoped that it can be used to inform hospital policy makers in addressing adherence challenges in ESRD patients on hemodialysis. The study recommends a holistic study on determinants of adherence to hemodialysis, medication use, dietary, and fluid compliance among patients undergoing HD at MTRH should be conducted in order to produce generalized results.

Key words: Adherence, Determinants, Diet, Fluids, Moi Teaching and referral Hospital.

1.0 INTRODUCTION

End Stage Renal Disease (ESRD) is on rise globally making it a public health concern (Yuen S. K., Suen H. P., Kwok O. L., Yong S.P., &Tse M. W. 2016). It is the terminal end of renal failure that requires dialysis or renal transplantation for patient survival. Renal patients on dialysis are faced with adherence challenges arising from strict regimens required of them like dialysis, medication use, fluid restriction and dietary restriction (Rambod M, Peyravi H, Shokrpour N, Sareban MT. 2010). Optimal management of renal patients depends largely on patients engaging with their recommended adherence orders. Patient engagement refers to a patient's knowledge, ability and willingness to manage his or her own health care, paired with interventions which promote positive adherent behavior (Carman, *et al.*, 2013). Dorothea Orem's Self Care Theory (1971) assumes that people should be self-reliant and responsible for their own care in order to maintain life, health and wellbeing. It's also important to know that the renal team, family members and significant others play an important role in helping renal patients cope with the new changes that require strict adherence practices (Christensen AJ, Ehlers J. 2002). A general observation from previous studies on non- adherence challenges in renal patients on dialysis reveals gaps needed to be addressed. A study published in the USA to assess factors to non- compliance in CKD population on dialysis found out socio-economic, psychological, therapy related, pathophysiological related and health care system related factors were associated with non-adherence to restriction orders for renal patients on dialysis (Chironda, *et al.*, 2016). A different study done in Malaysia to establish determinants of compliance trends among hemodialysis patients established that patients comply differently with diet, fluid, medication and dialysis. The study established that younger male, economically stable and patients on sustenance hemodialysis were likely to be noncompliant. Poor knowledge, negative self-efficacy skills, economical setbacks were associated with non-adherence to fluid, dietary, medication and dialysis, respectively (Chan, *et al.*, 2012). A cross sectional study done in Rwanda to establish adherence to hemodialysis and associated factors revealed patients cope differently to hemodialysis with scores ranging from 7%-80%. The common factors associated with adherence to hemodialysis were age (mean = 27; $p = 038$) and religion (Marie, C. & Mukakarangwa, 2018). A recent study conducted in Kenya to establish factors associated with adherence to dietary prescription among adult patients with chronic kidney disease on hemodialysis in national referral hospitals (KNH, MTRH) found out that "flexibility in the diets", "difficulties in following diet recommendations" and "adherence to limiting fluid intake" were independently associated with adherence to diet (Opiyo, *et al.*, 2019).

Non-adherence practices among ESRD patients causes remarkable disease complications such as heart failure, hypertension, pulmonary edema, difficulty in breathing, and hypotensive episodes among others Lindberg M (2010). It also leads to uremic/anemic complications, deranged fluid, electrolyte and acid base balances, episodes of frequent infections and increased catabolism for poor dietary adherence (Morton G, Fontaine DK. 2009). These improper adherence practices among ESRD patients on hemodialysis has led to increased morbidity and mortality cases. Efforts instituted to improve patient's quality of live and survival, seems not to be bearing quality fruit as adherence to these regimens remain a major challenge in ESRD population (Rambod, *et al.*, 2010). Moi Teaching and Referral Hospital (MTRH) is the second largest referral hospital in Kenya. It caters for a large volume of patients from the entire north-rift, parts of western Kenya and neighboring countries like Uganda and South Sudan. There is a high turnover of patients attending dialysis services in the hospital from these regions with notable adherence challenges particularly dietary and

fluid adherence. There is increased morbidity and mortality cases related to poor adherent practices to dietary and fluid orders. Past studies reveal significant non-adherent practices to dietary and fluid orders among renal patients ranging from 2% -81% for diet and 9.7% - 70% for fluid orders respectively Theofilou P. (2012). No study regarding determinants of diet and fluid adherence has been conducted in this site in order to address adherence challenges among ESRD patients on hemodialysis. The author believes that variables such as knowledge, practices, contribution of social support among others is paramount in improving the quality of live in renal patients on sustenance dialysis. It was on this basis that this study focused on determinants of dietary and fluid adherence among ESRD patients undergoing hemodialysis at MTRH.

1.2 Statement of the Problem

End Stage Renal Disease (ESRD) is a global public health problem that is on rise (Yuen *et al.*, 2016). In Kenya, there is increased prevalence of CKD/ESRD, with contributing factors being increasing prevalence of diabetes mellitus, hypertension and advanced age (Sigamani, 2012). Non-adherence to care orders is seen to be a major setback among ESRD patients undergoing hemodialysis at MTRH particularly dietary and fluid adherence. Non-adherence to food, fluids, medication use and dialysis has been noted to cause high prevalence of morbidity and mortality among patients on routine hemodialysis at MTRH. More so poor adherence has led to psychosocial issues such as depression, anxiety, and feeling of low self-esteem. In this study, the research focuses on determinants of diet and fluid adherence alone among ERSD patients undergoing hemodialysis at MTRH. The researcher believes that variables such as knowledge and practices, economic and social support are necessary to diet and fluid adherence in the management of ERSD patients. To the best of the researcher's knowledge, patients dialyzing at MTRH have always been struggling to adhere to the orders placed by the nutritionists and the entire renal team necessitating the conduction of this study.

Objectives

1.2.1 Broad objectives

To examine the determinants of diet and fluid adherence among end-stage renal disease patients undergoing hemodialysis at Moi Teaching and Referral Hospital.

1.2.2 Specific Objectives

- i. To establish knowledge and practices of diet and fluid adherence among End stage renal disease patients on hemodialysis at Moi Teaching and Referral Hospital.
- ii. To find out the contribution of social support structures on diet and fluid adherence in end stage renal disease patients on hemodialysis at Moi Teaching and Referral Hospital.
- iii. To determine the influence of economic status on diet and fluid adherence among end stage renal disease patients on hemodialysis at Moi Teaching and Referral Hospital.

1.2.3 Research Questions

- i. What is the relationship between knowledge and practices and adherence of diet and fluid among End stage renal disease patients on hemodialysis at Moi Teaching and Referral Hospital?
- ii. What is the role of social support on diet and fluid adherence among end stage renal disease patients on hemodialysis at Moi Teaching and Referral Hospital?

- iii. How does economic status influence diet and fluid adherence among end stage renal disease patients on hemodialysis at Moi Teaching and Referral Hospital?

2.0 METHODOLOGY

Study design: This was a cross-sectional study conducted to establish determinants of diet and fluid adherence among ESRD patient undergoing hemodialysis at Moi Teaching and Referral Hospital Uasin- Gishu County – Kenya. This is the second largest referral hospital in Kenya. It caters for a large volume of patients from the entire north-rift, parts of western Kenya and neighboring countries like Uganda and South Sudan.

Study population: There is a high turnover of patients attending dialysis services in the hospital most of them in their final stage of kidney disease (ESRD). Fisher's formula was used to calculate a sample size of 145 participants who were picked conveniently.

Inclusion criteria: involved participants who were 18 years and above, diagnosed with ESRD and on sustained haemodialysis for more than a month, as well as participants who consented freely for the study. *Exclusion criteria* included patients who were on peritoneal dialysis, the critically ill and patients who had been on haemodialysis for less than a month.

Data collection procedure: A modified end stage renal disease adherence questionnaire (ESRD-AQ) was used as a Self-report tool to evaluate fluid and dietary adherence among the Participants. The tool has been extensively used to measure adherence among renal patients with acceptable validity and reliability. Information on social economic dynamics of the participants was also included in the collecting tool. This was presented in a 5 likard scale point that covered variables such as: - I strongly agree, I agree, neutral, I disagree and strongly disagree. Interdialytic weight gain (IDWG) and biochemical marker (potassium) were retrospectively collected from the patient's files and used objectively comparatively for this study.

Data analysis: Data analysis was performed using statistical package for social sciences (SPSS) version 22.0. Descriptive statistics were computed for each variable. Categorical data on knowledge, practice and adherence to dietary and fluid intake were compared using a three-way contingency table involving three binary or categorical variables and chi-square (χ^2) test applied. A two-sample t-test was used to compare two independent groups based on their social support structure and adherence to diet and fluid restrictions using social support Likert Scale domain. A null hypothesis of no difference between the means of the compared groups on outcome variable (assessed domains) was rejected where $p > 0.05$. Presentation of data was mainly through frequency tables expressed in percentages and level of significance displayed.

3.0 FINDINGS

3.1 Response Rate

A total of 145 patients on hemodialysis were interviewed. All participated in the study and all responded to the researcher administered questionnaire with a response rate of 100%.

3.2 Demographic Characteristics of the Respondents

Table 1 shows socio-demographic characteristics of study participants. Most of the participants were females (57.9%) while 42.1% were males. Nearly two-thirds (65.5%) were aged 40 years and above. Sixty-five percent had at least attained secondary a level of

education. Most were married (66.2%) with majority being Christians (95.9%). Forty-five percent were engaged in agricultural sectors while 22.8% were in private business.

Table 1: Socio-Demographic Characteristics

Variable	Response	n =145	%
Gender	Male	84	57.9
	Female	61	42.1
Age group in years	18 - 25	5	3.4
	26 - 32	24	16.6
	33 - 39	21	14.5
	40 - 46	27	18.6
	47 - 53	33	22.8
	≥54	35	24.1
Level of education	Primary	51	35.2
	Secondary	72	49.7
	Tertiary	22	15.2
Marital status	Single	49	33.8
	Married	96	66.2
Religion	Christianity	139	95.9
	Islam	3	2.1
	Traditional	3	2.1
Occupation	Business	33	22.8
	Formal employment	24	16.6
	Agriculture	65	44.8
	Other	23	15.9

3.3 Socio-demographic Characteristics and Disease Staging and Diet and Fluid Adherence in Patients undergoing Hemodialysis

When the adherent and non-adherent groups were compared in terms of socio-demographic characteristics and disease staging, a significant difference in regard to level of education, marital status, disease staging and primary diagnosis was confirmed with respect to adherence to diet as shown in Table 2. A significantly higher proportion of patients who had attained primary level of education (88.2%) adhered to diet compared with those in secondary and above (71.3%) ($p = 0.02$). A higher proportion of singles (89.8%) than married patients (70.8%) adhered to diet ($p = 0.01$). There was also evidence of association between disease stage and dietary adherence ($p = 0.004$) with a significantly smaller proportion (57%) of those in acute stage adhering to dietary intake. Results also show that patients suffering from glomerulonephritis were less likely to observe dietary requirements ($p=0.00005$). On the contrary, patients who were farmers were more likely to adhere to dietary intake compared with the rest of the other occupations although the result on the test of significance was marginal ($p=0.06$). However, none of the socio-demographic characteristics had any significant association with fluid adherence.

Table 2: Association Between Socio-Demographic Characteristics and Dietary and Fluid Adherence

Explanatory variables	Category	Dietary adherence		P value	Fluid Adherence		p value
		n=112 Yes (%)	n=33 No (%)		n=96 Yes	n=49 No	
Sex	Male	75.0	25.0	0.5	64.3	35.7	0.6
	Female	80.3	19.7		68.9	31.1	
Age groups in years	< 40	76.0	24.0	0.8	68.0	32.0	0.7
	≥ 40	77.9	22.1		65.3	34.7	
Level of education	Primary	88.2	11.8	0.02	66.7	33.3	0.9
	Secondary and above	71.3	28.7		66.0	34.0	
Marital status	Single	89.8	10.2	0.01	65.3	34.7	0.9
	Married	70.8	29.2		66.7	33.3	
Occupation	Agriculture	84.6	15.4	0.06	72.3	27.7	0.2
	Other jobs	71.3	28.7		61.3	38.7	
Disease stage	Acute	57.1	42.9	0.004	67.9	32.1	0.8
	Chronic	82.1	17.9		65.8	34.2	
Primary diagnosis	Glomerulo-nephritis	36.8	63.2	0.00005*	57.9	42.1	0.4
	Other conditions	83.3	16.7		67.5	32.5	

**Fisher's Exact Test*

3.4 Association Between Knowledge and Diet and Fluid Adherence

Table 3 shows results on knowledge factors associated with diet and fluid adherence. Low level of knowledge on fluid adherence was marginally associated with dietary (p=0.07) and fluid (p=0.06) adherence. Whereas a higher proportion of those with low level knowledge (83.6%) adhered to diet, a relatively smaller proportion in the same category (58.9%) were compliant on fluid intake. When diagnosed, the number of times patients weighed self or sources of information on diet and fluid produced non-significant results. Knowledge on the importance of limiting fluid intake (p = 0.07) and of taking proper diet (p = 0.07), were marginally associated with adherence to fluid restrictions. A higher proportion of patients who were aware that they should limit fluid intake to keep their body healthy adhered to fluid intake.

Table 3: Association Between Knowledge and Diet and Fluid Adherence

Explanatory variables	Category	Dietary adherence		P value	Fluid Adherence		p value
		n=112	n=33		n=96	n=49	
		Yes	No		Yes	No	
When diagnosed	< 6 months ago	73.9	26.1	0.2*	67.4	32.6	0.7
	≥6 months	83.0	17.0		64.2	35.8	
Number of times patient weighs self	At the hospital	75.0	25.0	0.1	66.4	33.6	0.9
	Different times	94.1	5.9		64.7	35.3	
Low level of knowledge on diet adherence	High	73.1	26.9	0.1	62.4	37.6	0.2
	Average or high	84.6	15.4		73.1	26.9	
Low level of knowledge on fluid adherence	Low	83.6	16.4	0.07	58.9	41.1	0.06
	Average or high	70.8	29.2		73.6	26.4	
Sources for information about diet and fluid	Yes	72.7	27.3	0.6	63.6	36.4	0.8
	No	78.1	21.9		66.7	33.3	
Importance of limiting fluid intake	Because of kidney and to keep body healthy	75.3	24.7	0.5	71.9	28.1	0.07
	Health staff told me to do so or I got sick	80.4	19.6		57.1	42.9	
Importance of taking proper diet	To keep body healthy	75.3	24.7	0.5	71.9	28.1	0.07
	I would get sick if I don't	80.4	19.6		57.1	42.9	

*Fisher's Exact Test

3.5 Association Between Practice, Diet and Fluid Adherence

Table 4 shows the association between practice factors and diet and fluid adherence. Among the practice factors that had a significant relationship with dietary adherence were the frequency of adhering to fluid restrictions ($p=0.003$) and frequency in which health staff talk about importance of following proper diet restrictions ($p < 0.0001$). In both cases, a statistically significant smaller proportion of patients adhered to diet (62.5%) if they were following fluid restrictions all the time or where health staff talked about the importance of following a proper diet during every dialysis treatment, every week or every month.

With regard to practice on fluid adherence, there is evidence that a higher proportion of patients who do not experience any difficulty in keeping dietary recommendations adhere to fluid intake ($p=0.003$). Eighty percent of such patients were in compliance with fluid restrictions.

Table 4: Association Between Practice, Diet and Fluid Adherence

Explanatory variables	Category	Dietary adherence		p value	Fluid Adherence		p value
		n=112	n=33		n=96	n=49	
		Yes	No		Yes	No	
Last time talked to health professional about fluid restrictions	This week or last week	72.9	27.1	0.2	67.1	32.9	0.8
	≥ 1 month	81.3	18.7		65.3	34.7	
How often follows fluid restrictions	All of the time	62.5	37.5	0.003	66.7	33.3	0.9
	Most often or less	84.5	15.5		66.0	34.0	
How often health staff talk about importance of following a proper diet	Every dialysis treatment or every week	61.3	38.7	<0.0001	64.0	36.0	0.6
		94.3	5.7		68.6	31.4	
How difficult it is to follow dietary recommendations	A little difficult	78.1	21.9	0.8	71.2	28.8	0.2
	Difficult	76.4	23.6		61.1	38.9	
Difficulty experienced in keeping dietary recommendations	No difficulty	73.3	26.7	0.3	80.0	20.0	0.003
	Some difficulty	80.0	20.0		56.5	43.5	

3.6 Comparison between Social Support and Economic Dimensions and Diet Adherence

Findings on two-sided t –test on the relationship between social support and economic alterations and dietary adherence is presented in Table 5. There was a significant association between social support dimensions that helps patients cope and practice dietary adherence. Patients who agreed that various social support aspects improve depression, self-esteem, self-management, etc and who adhered to diet scored a significantly higher mean of 5.6 (95% CI = 5.5 – 5.6) in contrast to non-adherent counterparts who had a mean of 5.5 (p = 0.0006) suggesting that social support had a positive influence on adherence to dietary restrictions. In addition, patients who agreed that economic alterations affect diet adherence scored a marginally significant higher mean of 5.4 (95% CI = 5.3 – 5.5) in contrast to non-adherent colleagues who had a mean of 5.2 (p = 0.06). This implies that economic changes affect diet adherence.

Table 5: A Comparison Between Social Support and Economic Dimensions and Diet Adherence

Dimensions	Category	N	Mean	SD	df	t-test	95% CI	p value
Feelings about support from significant others	Diet adherent	112	4.6	0.8	143	-0.71	4.6 – 4.8	0.5
	Diet non-adherent	33	4.7	4.7			4.5 – 3.0	
Feelings about support from family	Diet adherent	112	5.5	0.3	143	-0.89	5.4 – 5.6	0.4
	Diet non-adherent	33	5.4	0.6			5.2 – 5.5	
Social support that helps cope with adherence to diet	Diet adherent	112	5.6	0.1	143	-3.50	5.5 – 5.6	0.0006
	Diet non-adherent	33	5.5	0.2			5.4 – 5.5	
Economic alterations affect diet adherence	Diet adherent	112	5.4	0.4	143	-1.93	5.3 – 5.5	0.06
	Diet non-adherent	33	5.2	0.5			5.1 – 5.4	

3.7 Association Between Economic Status and Adherence to Diet and Fluid

Table 6 shows economic factors associated with diet and fluid adherence. Among the economic factors with significant association with diet adherence are: use of bus for transport (p=0.02); income of less than KSh. 30,000 (p=0.006); treatment cost (p=0.007) and ability to access material support that helps in adherence (p=0.003). More patients using bus as means of transport for dialysis treatment were more likely to adhere to diet (83.3%). Likewise, those with income of less than KSh. 30,000 were more likely to follow dietary restrictions and hence compliant. In contrast, among those who claimed that treatment cost was expensive, significantly smaller proportions (68.8%) were diet adherent unlike those who stated that it was very expensive (87.7%). Even among those who stated that they were able to access material support in dietary adherence, a significantly smaller proportion (69.8%) were diet compliant compared with those who did not have such access (91.8%).

With regard to economic status factors influencing fluid adherence, only one factor produced significant results. Those who claimed that lack of transport was the main reason for missing dialysis treatment, a significantly smaller proportion (44%) adhered to fluid restriction (p=0.01) in comparison to 70.8% who had transport and were non-adherent.

Table 6: Association Between Economic Status and Adherence to Diet and Fluid

Explanatory variables	Category	Dietary adherence		P value	Fluid Adherence		p value
		n=112	n=33		n=96	n=49	
		Yes	No		Yes	No	
Misses dialysis	Yes	70.5	29.5	0.1	60.7	39.3	0.2
	No	82.1	17.9		70.2	29.8	
Reason for missing dialysis is lack of transport	Yes	80.0	20.0	0.7	44.0	56.0	0.01
	No	76.7	23.3		70.8	29.2	
Uses bus for transport	Yes	83.3	16.7	0.02	67.8	32.2	0.6
	No	67.3	32.7		63.6	36.4	
Income (KSh. Per month)	<30,000	84.6	15.4	0.006	67.0	33.0	0.8
	≥30,000	64.8	35.2		64.8	35.2	
Income affects diet and fluid adherence	Yes	80.6	19.4	0.3	59.7	40.3	0.1
	No	74.0	26.0		72.6	27.4	
Treatment cost	Expensive	68.8	31.2	0.007	67.5	32.5	0.7
	Very expensive	87.7	12.3		64.6	35.4	
Able to access material support that helps in adherence	Yes	69.8	30.2	0.003	70.8	29.2	0.1
	No	91.8	8.2		57.1	42.9	

4.0 DISCUSSION

The main objective of this study was to establish the determinants of diet and fluid adherence among end stage renal disease patients undergoing hemodialysis at Moi Teaching and Referral Hospital- Eldoret, Kenya. The discussion of results is as follows

4.1 Socio-Demographic Characteristics

Analysis of demographic characteristics of respondents revealed that out of 145 respondents, majority 84(57.9%) were male and 61(42.1%) were female. This finding is in concurrence with Chironda, *et al.*, (2014), who found that more males (61.2%) presented with end stage renal disease than females at 38.8%. In contrast, Cucor (2007) study found that there were more females (53%) on hemodialysis with end stage renal disease than males at 47%. The disparity in gender may be proportionally related to behavioral lifestyles. Men may not be

sensitive in what they consume every day. Most of them may be overindulging in sedentary life that predispose them to the risk of developing non-communicable diseases like hypertension, diabetes and other medical diseases that can lead to renal failure.

In regard to age the group of hemodialysis patients participating in this study, the majority nearly two-thirds (65.5%) were aged 40 years and above with those of 54 years and above constituting the majority (24 %). This finding is in agreement with a study by Ali (2013) who indicated that most respondents were within age group (41-51) years. Najma, *et al.*, (2005) reported that an average age for end stage renal disease patients on hemodialysis is 66 and the age ranged between 60-70 years. These findings may partly explain the extend to which kidney disease mostly occurs. It's observed that the development of renal failure culminates from the presence of other risk factors like diabetes, high blood pressure, glomerulonephritis and polycystic kidney disease among others that take time before renal failure finally develops. On respondents' occupation, most 65 (45%) practiced agriculture while the rest were either formerly employed or engaged in private business. It was evident that majority of the respondents did not have formal employment. The implication of unemployment is that most of the respondents were poor, questioning their ability to dietary and fluid adherence. It's thought that poverty increases the risk of health disorders and worsens outcomes in those who already have the disease.

In regard to the stage of kidney disease and the services they received and the primary diagnosis of renal disease, the study found out that majority (79.9%; n=111) were in chronic stage of the kidney disease compared with 20.1% (n=28) who were in acute stage. Most of patients in the acute stage (67.9%) and all of those with chronic disease were referred for dialysis. Sathvik *et al.*, (2008) argued that patients suffering from kidney failure and particularly those at chronic stage require renal replacement therapy to stay alive, and hemodialysis (HD) is considered as the most widely used renal replacement therapy. The leading primary diagnosis of renal disease was hypertension (48.6%) followed by diabetes mellitus (18.3%) and glomerulonephritis (13.4%). The rest had other related conditions (19.7%). These findings are similar to that of Leung (2003) who found out that the main causes of renal failure are diabetes, hypertension, glomerulonephritis, and polycystic kidney disease among others. CKD can also be the final result of untreated Acute Kidney Injury (AKI) caused by infections, medicines and toxic substances. This study also found that a small proportion of patients suffered from acute renal failure as a result of herbal use that later progressed to chronic renal failure. The researcher observes that it is important to identify kidney disease early before the damage is done. The risk factors should be firmly controlled and the patients closely screened for signs and symptoms of renal damage. Kidney disease can be treated effectively if diagnosed in the early stages.

4.2 Association between Knowledge and Diet and Fluid Adherence

Patient's knowledge about their disease process is important for better outcome. This study sought to establish knowledge factors associated with diet and fluid adherence among ESRD patients undergoing hemodialysis at MTRH. The results revealed no significant findings between knowledge and diet and fluid adherence although low level of knowledge was marginally associated with dietary ($p=0.07$) and fluid ($p=0.06$) adherence with a higher proportion of those with low level knowledge (83.6%) adhered to diet, a relatively smaller proportion in the same category (58.9%) were compliant on fluid intake. Similar are the findings of Opiyo. *et al.*, (2019) who found out that overall, adherence to dietary orders was generally low among dialysis patients although they were knowledgeable of the recommended foods for their health condition. They established that being aware of the right

foods to consume did not translate into adherence to the dietary prescription. Again, Durose, *et al.*, (2004) in his study to determine Knowledge of dietary restrictions and the medical consequences of noncompliance by patients on hemodialysis. Concluded that knowledge was not predictive of dietary compliance citing that distribution of health literacy scores was significantly negatively skewed even after logarithmic transformations were performed. Our findings may indicate that those who had low nutritional knowledge were keen to follow simple nutritional advice more than those who were well informed although they were statistically marginal ($p > 0.05$). Other studies have pointed out the importance of knowledge in dietary and fluid adherence in HD patients. Chan, *et al.*, (2012) in his study to assess renal patient's knowledge on diet and fluid regimen including food sources for nutrients, established that lack of knowledge or information pertaining to diet and fluid management was the major factor cited for dietary non-compliance (92.8%) followed by the complexity of fluid management.

4.3 Association between Practice and Diet and Fluid Adherence

Optimal outcome of renal patients on hemodialysis results from strict practice of what is instructed to them by the health care givers Berg, *et al.*, (2006). This study sought to establish association between practice factors and diet and fluid adherence. Among the practice factors that had a significant relationship with dietary adherence was frequency in which health staff talked about the importance of following diet restrictions ($p < 0.0001$). Our findings may imply that the more the health staff talked to the patient on the importance of adhering to dietary regimens, the more the patients followed these instructions. This finding is in line with that of Neri, *et al.*, (2011) who indicated that the involvement of health care professionals helps improve the way hemodialysis patients perceive their health. Other studies have also reported positive association between social support and other aspects of treatment, such as diet, medication, and fluid restrictions. Plantinga, *et al.*, (2010) argues that actions of the multidisciplinary health staff are important because it seems to be associated with improved clinical responses and quality of life. With regard to practice on fluid adherence, there is evidence that a higher proportion of patients who do not experience any difficulty in keeping dietary recommendations adhere to fluid intake ($p = 0.003$). Eighty percent of such patients were in compliance with fluid restrictions. The findings may imply that those who practiced adherence to dietary recommendations may as well adhere to fluid restrictions.

4.4 A Comparison between Social Support and Economic Dimensions and Diet Adherence

Findings on a two-sided t –test on the relationship between social support and economic alterations and dietary adherence in this study revealed a significant statistical association between social support dimensions that helps patients cope with dietary practices. Patients who agreed that various social support aspects improve depression, self-esteem, self-management, etc and who adhered to diet scored a significantly higher mean of 5.6 (95% CI = 5.5 – 5.6) suggesting that social support had a positive influence on adherence to dietary restrictions. Previous studies have reported a positive correlation of social support and adherence plans for ESRD patients on hemodialysis. Ramirez, *et al.*, (2012) argues that social support and coping strategies are known to reduce distresses and improve patient outcomes. It's seen that social lives of adult patients are significantly affected along with a change in daily routines and their ways of living. Patients with chronic diseases are seen to benefit from daily activities and social support provided by significant others. Clarke, *et al.*, (2015) points out that social support of friends, family and renal health professionals' as well family

dynamics have been found to improve adherence among kidney failure patients. CKD and its treatments can restrict daily activities, employment, family life, and social relationships leading to feelings of isolation, distress and anxiety. Social support has been shown to improve survival and quality of life in dialysis.

In regard to economic factors associated with diet and fluid adherence, the study found out that most patients using bus as means of transport for dialysis treatment were more likely to adhere to diet (83.3%) ($p=0.02$). Likewise, those participants who accessed economic support from significant others were able to stick to food orders ($p=0.003$). The use of public means to dialysis center and the economic support from significant others and dietary adherence in this cohort of patients may explain that economic challenges faced by these patients made them to strictly follow their dietary plans having in mind that if they broke them they may get sick soon and may need to revisit the hospital more often for dialysis or even admission. Economic hardship is seen to be a hurdle in ESRD populations because the disease process debilitates them from being productive and living a normal life. James (2013) points out that limited economic resources result in reduced frequency of dialysis and eventually of therapy. Many of the psychosocial stressors among ESRD are associated with the logistics and economic aspects of being in treatment. The cost of treatment/transportation/or other costs, decrease in social life, interference with jobs and length of treatment is seen to be associated with economic challenges.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

It is the conclusion of the study that adherence to dietary and fluid components is essential in management and reduction of the morbidity and mortality related to ESRD. Although nutritional knowledge was not strongly associated with dietary and fluid compliance among patients undergoing hemodialysis at MTRH, our findings conclude that the practical element of the renal team providing nutritional talk/counselling to the dialysis patients produced a positive correlation in terms dietary and fluid adherence. Our findings also conclude that social support offered to ESRD patients on HD is of great help in aspects of hemodialysis, diet, medication, and fluid adherence. We point out medical professionals (nurses, nutritionists, doctors and significant others) play an important role in ratification of fluid and dietary challenges among ESRD patients on sustenance hemodialysis. The study found out that economic support also played a crucial role in dietary and fluid adherence. Most psychosocial stressors among ESRD are associated with logistics and economic aspects of being in treatment. The cost of treatment/transportation/or other costs, decrease in social life, interference with job, and length of treatment is seen to be associated with adherence challenges. Nevertheless, there were a considerable proportion of respondents who did not practice adherence to dietary and fluid guidelines while undergoing hemodialysis. It was evident that many ESRD patients undergoing hemodialysis at MTRH were experiencing difficulties in change or modification of behavior as they try to cope up with changes accompanying renal pathologies.

5.2 Recommendations

The following recommendations were made. A holistic study on determinants of adherence to hemodialysis, medication use, dietary, and fluid compliance among patients undergoing HD at MTRH should be conducted in order to produce generalized results. New research of this nature should be conducted to establish association between socio-behavioral changes and ESRD patients on hemodialysis maintenance. Variables such as quality of life, psychosexual

behavior, depression, patient dissatisfaction and perception on renal disease and dialysis care may be tested in future. The Government through the ministry of health should consider subsidizing renal consumables used in dialysis for patients not under National hospital insurance fund (NHIF). Universal health coverage should be enacted to cover all chronic cases like renal disease among others in order to ease their management and hence reduce morbidity and mortality of these patients.

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