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DIETARY KNOWLEDGE AND NUTRITION STATUS OF POST KIDNEY TRANSPLANT PATIENTS ATTENDING MOI TEACHING AND REFERRAL HOSPITAL, ELDORET KENYA

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ABSTRACT

Background: Nutritional status of post-kidney transplant patients plays an important role in allograft function and overall healthy recovery of the post kidney transplant patient. There is insufficient academic evidence on dietary knowledge and nutritional status of post kidney transplant patients in Kenya. The objectives of this study was determine post kidney transplant patients' dietary knowledge level and its effect on nutrition status post kidney transplant.

Methods: This was a descriptive cross-sectional survey targeting post kidney transplant patients who had undergone kidney transplant within the last three months to 12 months at Moi Teaching and Referral Hospital Kidney Transplant Centre, Eldoret. Patients who have undergone kidney transplant below 3 months and above 1 year at the start of data collection were excluded in the study. Data was collected through administration of questionnaire, data collection sheet and patients' medical records to help in collection of anthropogenic data. Analysis of data using SPSS Version 23.0 was done using measures of central tendency. The cross tabulation and chi-square test were computed to examine existence of significant differences on the association between the independent variable.

Results: A total of 17 post-kidney transplant patients participated in the research. Results showed that 8 (47.1%) of post-kidney transplant patients of normal nutritional status, 6 (35.3%) were overweight and 3 (17.6%) were underweight. On post-kidney transplant patients' dietary knowledge level, 6 (35.3%) had high level, 10 (52.9%) had moderate dietary knowledge level and only 2(11.8%) had low dietary knowledge level. There was significant

relationship between dietary knowledge and nutritional status of post-kidney transplant patients ($p < 0.05$).

Conclusion: Dietary knowledge influenced the nutritional status of post-kidney transfer patients in Kenya. This ultimately affected post-kidney transplant patients' health, allograft function and reduced risks of cardiovascular risk factors.

Key Words: dietary, knowledge, nutrition, post – kidney transplant

INTRODUCTION

Kidney transplantation (KT) is considered to be the best treatment method for patients suffering from end stage kidney disease (ESKD) (1). Over the last 50 years, kidney transplantation has achieved remarkable success as a widely adopted medical practice across the world based on World Health Organisation report (2). Most kidney transplant procedures happen in United States and Europe because of improved medical infrastructure (3). Kidney transplant is common solid organ transplant procedure which results in enhanced quality of life of patients in addition to reduction of costs associated with frequent dialysis procedures (4). Despite successful kidney transplantation, malnutrition ensues (5). Nolte-Fong and Moore reported incidents of muscle mass loss and protein calorie malnutrition being linked to increased incidents of mortality after transplant (6). Healthy dietary patterns and practices are key to successful post kidney transplant recovery.

Nutrition education needs to be done for nutritional management after kidney transplant and prior to being discharge from hospital. Nutrition is an important component in the management of post-kidney transplant patients and kidney health professionals (dietitians and nephrologists) perform a crucial role in educating patients on dietary interventions (7). They provide knowledge and assist in development of skills which are essential in support of behaviour change among post-kidney transplant patients (8). Nutrition education is a formal process of instructing and training a patient on a skill or to

impart knowledge to help post-kidney transplant patients voluntarily manage or modify food, nutrition, and physical activity choices and behaviour to maintain or improve health (9). Nutrition education involves behavioural and cognitive approaches. The cognitive approach focuses on providing patients with knowledge and increasing their awareness, whereas the behavioural approach applies techniques to change patients' behaviour to facilitate their dietary and lifestyle modification (10). Effective education on nutrition intervention should improve health literacy, self-regulation, and self-efficacy, which ultimately would promote and empower post kidney transplant patients to change their behaviour and adopt the required dietary and lifestyle modifications and maintain these changes over time (8).

Nutrition education positively influences the efficiency of personal management and needs to be conducted by dietitian based on condition of patients' knowledge, needs and the skills of their caregivers (11). Research shows that lifestyle and social demographic factors; age, level of education, and gender are associated with dietary knowledge (12). Factors influencing dietary knowledge are aversion for healthy foods, feelings and emotions, need for nutritional guidance, economy, bad and good self-perception, eating habits, family support, dietary restrictions, and willingness to change (13). Non-adherence among post kidney transplant patients or caregivers is ordinary and could be described by patients' inadequate knowledge on nutrition (14). Nutrition observance is still a problem that

kidney transplant patients go through and therefore regular follow up by a nutritionist is required so as to encourage and ensure optimal outcomes (15). Further, nutrition education and changes performs significant role in decreasing risk of comorbid factors for lengthened sustenance of kidney allograft. To avoid incidents of rejection and kidney failure after transplant, patients are expected to follow strict health dietary patterns to ensure post-transplant success (16). Information from previous studies shows that the level of adherence to dietary guidelines is low in developing countries (17, 18). After kidney transplant, patients may experience weight gain with research showing the gains to be between 10 – 35% because of nutritional dietary habits among other factors (1). In the first six weeks after transplant, patients are supposed to maintain proper diet but the nutritional status and the dietary intake post kidney transplant have not been adequately studied.

The extent to which post-kidney transplant patients are aware (prior knowledge) of dietary requirements and effect on their nutritional status are issues that have not been well researched in Kenya based on the review of available literature. Research by Mwenda et al. focused on prevalence of CKD among inpatients at Kenyatta National Hospital (19). Opiyo et al. research centered on decision making on nutritional patterns by patients with CKD in Kenya's national referral hospitals (18). This study examined dietary knowledge and nutrition status of post kidney transplant patients attending Moi Teaching and Referral Hospital Kidney Transplant Centre in Eldoret Kenya.

MATERIALS AND METHODS

The study was conducted at Moi Teaching and Referral Hospital Kidney Transplant Centre, Eldoret. Post kidney transplant patients attending scheduled clinic in the last 3 months to

one year were included in the study. A census approach was used to select the respondents for the study. On exclusion criteria, Post-kidney transplant patients below 3 months (June – August 2024), those diagnosed with diabetes, inflammatory symptoms, graft failure, were pregnant and those with cardiovascular conditions were also excluded from the research. The data was collected in August – September 2024 at Moi Teaching and Referral Hospital (MTRH), Kidney Transplant Centre. Data was collected using questionnaire and observation checklist from post kidney transplant patients. The research instrument was pre-tested through conducting a small pilot study to check on the instruments clarity, accuracy and effectiveness with a small group of people before full scale implementation. The respondents involved in the pre-testing phase included 10 post-transplant patients above one year who were visiting MTRH for regular clinic at the Kidney Transplant Centre, Eldoret. The observation checklist was used to collect data on body mass index (BMI) of post-kidney transplant patients. The weighing scale and height metre used were calibrated and certified by MTRH biomed department. According to dietary guideline, a BMI score of less than 18.5 one is considered to be underweight, normal BMI of 18.5 – 24.9 is considered to be normal, 25.0 – 29.9 is considered to be overweight while those above 30.0 are considered to be obese. On secondary data, patients' medical history was sought. The study collected data from respondents after obtaining ethical clearance from MTRH ethical review committee and also respondents informed consent. Data collected was subjected to quantitative analysis using descriptive statistics; frequencies, percentages, means, standard deviation and cross tabulation (contingency tables). To examine the relationship between dietary knowledge and nutritional status, a chi square analysis was computed owing to the low sample size. Statistical Package for the Social

Sciences (SPSS version 23.0) aided in data coding, entry and analysis.

RESULTS

A total of 17 post-kidney transplant patients out of a population of 24 were included in the study. The seven who did participate in the study were those ones that were excluded based on this reasons; 2 developed diabetes, 1 was pregnant, 2 developed hypertension and 2 developed complications due to non-adherence to medication. The distribution of respondents based on sex show that 9 (52.9%) were males while 8 (47.1%) were females. Outcome show that

majority 10 (58.0%) of post-kidney transplant patients were aged below 35 years, 6 (35.2%) were aged between 36 years to 55 years and only 1 (5.9%) were aged 56 years and above. Results reveal that 8 (47.1%) respondents were in 9 – 11 months of post kidney transplant, 5 (29.4%) were within a period of 3 – 5 months, 3 (17.6%) were in their 12th month after kidney transplant and 1 (5.9%) said that they were in 6 – 8 months of recovery after transplant.

Nutritional Status for Post Kidney Transplant Patients

Table 1 presents the descriptive results of 17 post-kidney transplant patients' nutritional status.

Table 1:
Nutritional Status of Post-Kidney Transplant Patients

	N	Min	Max	Mean	Std. Deviation
Weight (kg)	17	39.00	105.00	65.44	18.26
Height (m)	17	1.55	1.75	1.65	0.07
BMI (kg/m ²)	17	14.00	40.50	24.22	7.65

Key: kg – kilogram, m – metres

Table 1 show that the minimum weight recorded was 39 kg with a maximum of 105 kg and average weight of 65.44kg among the respondents. With respect to height, the minimum recorded is 1.55m to a maximum of 1.64m. The minimum BMI was 14.0 kg/m², maximum was 40.50 kg/m² with an average of 24.21kg/m². The data in the table above on BMI once grouped resulted to production of results given on nutritional status of post-kidney transplant patients. According to the result, 8 (47.1%) of post-kidney transplant

patient's nutritional status was normal, 6 (35.3%) nutritional status was considered to be obese (over weight) and 3 (17.6%) were found to be underweight.

Dietary Knowledge Level

The respondents were asked whether they were aware of the food (including nutrients) that they were supposed to consume and those to avoid during their recovery from kidney transplant. Their responses are given in Figure 1.

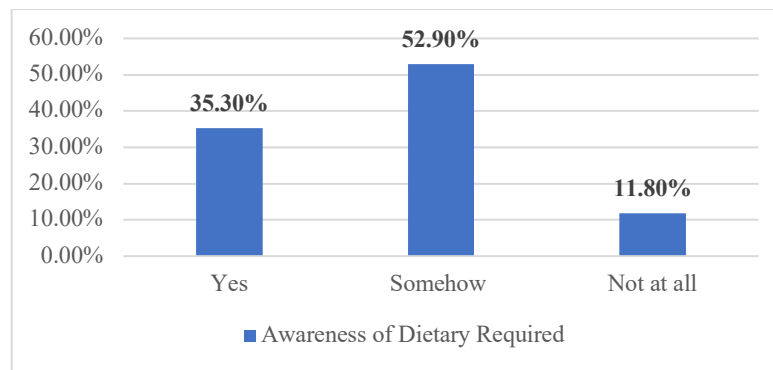


Figure 1: Respondents awareness of food nutrients to use and avoid

Results show that 6 (35.3%) of respondents were aware of the diet required in their full recovery, 9 (52.9%) had moderate level of awareness and 2 (11.8%) were not aware at all of dietary required. When probed to indicate the food items they were advised to consume more included; vegetable and fruits, *ugali*, rice, eggs, cabbage, carbohydrates (CHO), animal proteins. Those under kidney diet had strict diet to follow with less salt. When asked to indicate the food that they were advised to avoid included; processed foods, carbonated

drinks (juices and soda), foods with acids, beans and plant proteins. The respondents were allowed to consume normal diet 1 year after transplant although with advice from dieticians at the kidney clinic.

Further, through five statements measured on a scale; always-4, sometimes-3, rarely-2 and never-1, the respondents were asked to indicate the extent to which they received knowledge from the sources given in Table 2.

Table 2: Source of dietary knowledge for post-kidney transplant patients

	Sources	Never	Rarely	Sometimes	Always	Mean	Std.Dev
1	Doctors recommendation	4 (23.5%)	6 (35.3%)	6 (35.3%)	1 (5.9%)	2.24	0.90
2	Dietary guideline pamphlet	14 (82.4%)	1 (5.9%)	1 (5.9%)	1 (5.9%)	1.35	0.86
3	Information from support group	9 (52.9%)	3 (17.6%)	5 (29.4%)	0 (0.0%)	1.76	0.90
4	Nutritionist / dietician counselling	0 (0.0%)	0 (0.0%)	1 (5.9%)	16 (94.1%)	3.94	0.24
5	From the internet / or other media	7 (41.2%)	1 (5.9%)	7 (41.2%)	2 (11.8%)	2.24	1.15
	Composite mean					2.31	0.81

The results indicate that the primary source of dietary knowledge in the kidney units was the nutritionists (dietitians) from the MTRH Kidney Transplant Centre, as reported by 14 respondents (82.4%). They offered nutrition counselling to patients in their post-kidney transplant recovery journey. Through open-ended question, the respondents indicated that they also received dietary information from; patients who had previously undergone kidney transplant, family

members and the hospital psychological counsellor.

Table 3 shows the post-kidney transplant patients knowledge of foods to avoid or consume during their recovery process as low-1, moderate-2, high-3 and very high-4.

Table 3: Respondents Level of Knowledge on Foods to Avoid or Consume after Kidney Transplant

	Sources	Low	Moderate	High	Very high	Mean	Std.Dev
1	Knowledge regarding phosphate binder medication	13 (76.5%)	1 (5.9%)	1 (5.9%)	2 (11.8%)	1.53	1.07
2	Knowledge of PO ₄ , K ⁺ and Na ⁺ contents of restricted and non-restricted foods	8 (47.1%)	4 (23.5%)	2 (11.8%)	3 (17.6%)	2.00	1.17
3	Knowledge of food items (types) that need to be restricted	2 (11.8%)	6 (35.3%)	6 (35.3%)	3 (17.6%)	2.59	0.94
	Composite					2.04	1.06

Key: PO₄-Phosphate, K⁺ - Potassium, Na⁺ - Sodium

Result show that 13 (76.5%) of patients were not provided with the right information on foods that may contain high phosphate to protein ratio (processed foods, fast foods and carbonated beverage) to avoid. Results show that almost half 8 (47.1%) post-kidney transplant patients had low level of information on the role that phosphate binders play in their recovery after kidney transplant process. Finding also reveal that only 35.3% of post-kidney transplant patients were highly aware of the food items that they needed to restrict themselves from

consuming in different periods of their recovery from kidney transplant surgery.

Dietary Knowledge and Nutritional Status of Post Kidney Transplant Patients

To establish the relationship between dietary knowledge and post kidney transplant patients' nutritional status, a cross tabulation analysis was computed to check on the association between the two ordinal data sets. Chi square was also used to establish the significance of the test (association) at 95.0% confidence level. The results of analysis are presented in Table 4.

Table 4: Dietary Knowledge and Nutrition Status.

			Nutrition state base on BMI			Total
			Normal	Obese	Underweight	
Dietary Knowledge	Low	Count	2	3	0	5
		% within Dietary Knowledge	40.0	60.0	0.0	100.0
	Moderate	Count	2	3	2	7
		% within Dietary Knowledge	28.6	42.9	28.6	100.0
	High	Count	4	0	1	5
		% within Dietary Knowledge	80.0	0.0	20.0	100.0
Total		Count	8	6	3	17
		% within Dietary Knowledge	47.1	35.3	17.6	100.0

Among the 17 post-kidney transplant patients, those with low dietary knowledge (n=5) were mainly obese (3, 60%), while 2 (40%) had a normal BMI and none were underweight. Post-kidney transplant patients with moderate dietary knowledge (n=7) showed a more varied distribution, with 3 (42.9%) obese, 2 (28.6%) normal, and 2 (28.6%) underweight. In contrast, among those with high dietary knowledge (n=5), the majority 4 (80%) had a normal BMI, and 1 (20%) was underweight, with none being obese. Overall, the pattern indicates that higher dietary knowledge is associated with

healthier body weight, whereas lower dietary knowledge tends to correspond with higher rates of obesity. To check the significance of the results, a chi square correlation was computed to test the hypothesis.

The hypothesis stated that:

H₀₁ There is no relationship between dietary knowledge and nutritional status of post kidney transplant patients.

The results are presented in Table 5.

Table 5: Chi-Square Tests for dietary knowledge and nutritional status of post kidney transplant patients

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.829	4	0.212
Likelihood Ratio	8.125	4	0.087
Linear-by-Linear Association	0.168	1	0.682
N of Valid Cases	17		

The value of Pearson Chi square is 5.829 with asymptotic significance value of 0.21 which is above the critical value of 0.05 hence, the

null hypotheses is accepted ($p > 0.05$) implying that there is no significant relationship between dietary knowledge and

nutritional status of post-kidney transplant patients ($\chi^2(4)=5.829$, $p=0.212$).

DISCUSSIONS

Post-kidney transplant patients' nutritional status was normal for 47.1% of respondents, 35.3% were found to be obese and 17.6% were found to be underweight. The significant percentage of post – kidney transplant patients who are obese and underweight could be linked to potential risks for graft rejection or other complications, thereby making it more relevant to clinical practice. Study findings found out that 6.1% of recipients had BMI of less than 20kg/m² and 10.5% had a BMI more than 35kg/m² in Cleveland Ohio, USA (23). Additionally, a research in Spain reported weight gain and weight loss after kidney transplantation (24). They observed that there was increase in weight among young patients due to more food intake when dietary restrictions associated with chronic kidney failure were discontinued. This means that dietary guidelines could be helpful to patients in order to address the issue of weight gain or loss after kidney transplant. Normally after kidney transplant, there is weight gain or loss with a related increase or decrease in BMI would result in a higher or lower risk of graft loss. The study found out that 52.9% of respondents had moderate dietary knowledge level, 35.3% had high dietary knowledge and only 11.8% were found to have low dietary knowledge level. This was mainly contributed by that the fact that there was no standardised dietary guideline manual to be used by post-kidney transplant patients leaving a number

of patients confused on what to follow during their dietary intake. Furthermore, dietitians were the main source of information that these patients relied upon. In addition, patients who had previously undergone kidney transplant, family members and MTRH Kidney Transplant Centre psychological counsellor provided dietary information on post-kidney transplant. The understanding of various mineral supplements and their intake by the post-kidney transplant patients was found to be low. The respondents did not know which quantity of mineral supplements they needed to consume more and which ones they needed to stop using or reducing. This could have significant consequences on the post-kidney transplant patients' health outcomes; prolonged recovery, graft failure and increases vulnerability to diseases. Increase in dietary knowledge by post-kidney transplant was associated with normal nutritional status. But the result was not statistically significant. This is because the sample size was small (17). The cross-tab outcomes showed that those post-kidney transplant patients with higher dietary knowledge had normal nutritional status compared to those with low dietary knowledge. This finding is supported by research conducted in Kenya where respondents' knowledge on diet management of CKD stage five was significantly associated with nutritional management practices (25).

Limitations of the Study

Administration of questionnaire to some post kidney transplant patients was a challenge because of their health status

(recovery period) and result to postponement in questionnaire administration. To address this limitation, prior arrangements and re-scheduling of administration of questionnaires was undertaken together with the sampled respondents. It was also agreed on the proper dates to issue the questionnaires and collect data on nutritional status.

CONCLUSIONS

More than half of the post-kidney nutritional status were either underweight or obese. Half of the post-kidney transplant patients in this study had moderate dietary knowledge level. Dietary information was availed to post-kidney transplant patients mainly by dietitians. Increase in dietary knowledge was associated with improved nutritional status of post-kidney transplant patients.

Recommendations

There is need for Ministry of Health (Kenya) to develop a national standardised nutritional guideline for post-kidney transplant stages (less than 3 months, 3 – 6 months, 6 – 12 months and 12 months and above).

There is need also for Ministry of Health Kenya to develop brochures to be used in dissemination of dietary information to post-kidney transplant patients detailing specific and routine dietary patterns that they have to observe during their recovery period and measures to take in case of issues that they may arise during their recovery process.

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Conflicts of interest

The authors have no conflicts of interest to declare.

Credit Statement

Emily J. Lelei: Conceptualisation, Methodology and Writing.

Silvenus O. Konyole: Supervision, Reviewing and Editing.

Gordon Nguka: Supervision, Reviewing and Editing.

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