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Development of Dietary Guidelines for Persons undergoing Haemodialysis

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Abstract: *Food occupies the consciousness of all living beings and it is all the more prominent concern among individuals with chronic illness. This fact can be easily understood by analysing the content of most of the patients' queries to the health care professionals that are centered on dietary intake i.e. what food stuffs they can eat and which all they should avoid. As the result of many restrictions in their dietary intake, they feel a loss of control over life that can lead to poor life satisfaction and depression.* ***Methods:*** *A cross sectional survey was conducted among 50 chronic kidney failure patients those who are undergoing maintenance haemodialysis in the dialysis unit of Kasturba Hospital, using a purposive sampling technique. A semi structured interview schedule was used to assess their knowledge and practice of dietary intake.* ***Results:*** *None of the subjects had a clear view on actual renal diet and 40% believed there is no need of any dietary modifications, 100% believed it is difficult to adhere to dietary restrictions and only 78% practiced some kind of dietary modifications. Based on the identified need, dietary guideline for persons undergoing haemodialysis was developed and validated with the experts.*

Key words: *development, dietary guidelines, chronic kidney disease, persons undergoing haemodialysis*

I. Introduction:

Chronic kidney disease (CKD) is becoming a major public health problem worldwide. CKD is the 12th leading cause of death and 17th cause of disability.[1] Food plays avital rolein kidney rehabilitation and it is equally important like the regular dialysis for a person with CKD. Persons undergoing dialysis need to take adequate calories and higher amounts of protein to combat with the protein energy malnutrition due to regular haemodialysis. Since the kidney function is compromised it can no longer regulate the balance of minerals, vitamins and fluid, hence the diet needs to be low in potassium, phosphorus, sodium and fluid.

Common complications of CKD include vitamin deficiencies and electrolyte imbalances such as hyperkalemia, hyperphosphatemia and hypermagnesemia. Potassium is found high in many of the fruits including jack fruit, mango, musambi, orange, papaya, pomegranate, sapota and vegetables including papaya, bananas, and potatoes, Bitter gourd, brinjal, bamboo shoot, cabbage, drumstick, long beans, ladies finger and mushroom. Phosphateis found in such foods as nuts, dairy products, legumes, and meat) and magnesium (found in many vitamin and mineral supplements and medications, such as antacids and laxatives). Individualized diet counselling is essential for each of the clients based on their level of kidney function, lifestyle, culture, religion, financial status, comorbid conditions (diabetes, hypertension, hyperparathyroidism), treatment goals and biochemical parameters.

Non-adherence with the dietary regulations can result in chronically elevated serum levels of phosphate, which play an important role in the development of secondary hyperparathyroidism and renal osteodystrophy.[2]Hyperkalemia can cause dangerous arrhythmias, elevated levels of phosphate also may increase coronary artery disease, even in young patients,[3] leading to a significantly increased risk for mortality.[4,5]

Zrinyi et al in their cross sectional study of 107 haemodialysis patients from 20 dialysis centres in Geneva, reported that the patients with increased dietary self-efficacy had lower serum potassium and weight gain, showed more favourable compliance attitudes andbehaviours toward prescribed regimens and fosteredbetter relationships with staff.[6] This shows that the persons with adequate knowledge are likely to have favourable attitude towards the dialysis treatment and diet and adopt correct ways of dietary adherence that can have a direct positive impact in the longevity of the person.

Aim: To develop dietary guidelines for patients diagnosed with CKD and undergoing haemodialysis with a view to incorporate it in the cognitive behaviour diary for the subjects.

II. Materials and Methods:

A cross sectional survey was conducted among 50 CKD patients undergoing haemodialysis in the Dialysis unit of Kasturba Hospital as the first step of need assessment before the development of dietary guidelines. The sample were selected based on purposive sampling technique after getting the administrative permission, ethical clearance from the Hospital and informed consent from the participants. Those sample who were in the age between 20 to 60 years, who have started with maintenance dialysis as the mode of treatment for CKD for period more than six months, who can understand and speak English or Kannada and who are willing to participate in the study were included in the study. Those who have diabetic retinopathy, delirium, psychiatric illness or who were critically ill were excluded from the study.

The data was collected using a Background Proforma and a Semi-structured Interview Schedule on Dietary Knowledge and Practice. The instruments were validated by five experts from the field of medical surgical nursing, dietetics and nephrology. After establishing the content validity, the tools were translated to Kannada and retranslated to English by language experts and no modifications were brought in the Kannada tool further as it was matching with the original.

III. Results

Table1: Frequency and percentage distribution of sample characteristics

n=50

Sample characteristics	Frequency	Percentage
Age in years		
20-30	8	16
31-40	8	16
41-50	16	32
51-60	18	36
Gender		
Male	36	72
Female	14	28
Education		
Primary School	8	16
Secondary School	14	28
Pre-degree	15	30
Diploma/Graduation	13	26
Religion		
Hindu	39	78
Christian	9	18
Muslim	2	4
Duration of haemodialysis		
6months - 2 years	28	56
2 years one month -4 years	20	40
>4 years	2	4

Table 1 shows that maximum sample (36%) belonged to age ranging between 51 to 60 years and qualified Pre-degree (30%). Majority were males (72%) and Hindus (78%). Most of them (56%) started with haemodialysis since six months to two years.

Table2: Description of knowledge and practice on dietary intake in frequency and percentage

n=50

Item	Yes		No	
	F	%	F	%
Do you have previous exposure to information on dietary modification?	45	90	5	10
Have you consulted a dietician on the right kind of dietary intake?	7	14	43	86
Have you modified your diet after starting dialysis?	39	78	11	22
Do you think there is need of any dietary modifications	20	40	30	60
Do you think that it is difficult to practice dietary modification?	50	100	0	0

The data presented in Table 2 show that majority of them (90%) had some exposure to information regarding dietary modification and a few (14%) have consulted dietician on the right kind of dietary intake. Only 78% of people undergoing haemodialysis have modified their diet after starting the treatment. Some of them (40%) felt that there is actually no need for a strict diet modification as haemodialysis takes care of regulating the blood and all of them (100%) said it is difficult to practice dietary modifications. When asked to describe the renal diet none of them were able to explain all the aspects of it whereas majority(98%) of them

were aware of the fruit restrictions and restriction of tender coconut water but instead of including the right fruit in their diet, most of them avoided all the fruits from their diet.

These results clearly indicated the need for developing dietary guidelines for the persons undergoing haemodialysis. The first draft of the same was prepared after review of literature and personal discussion with experienced nephrologists, dialysis technicians and dieticiansand based on their suggestions the final draft was prepared and validated by giving it to nine experts from the field of nephrology, dietetics, dialysis technology and medical surgical nursing. Some additions and deletions in the food lists were made (for example 'ragi manni' a porridge prepared with strained finger millet cooked with milk and jaggery, was removed because of its high potassium content) and food items of similar category were grouped under known food groups for easy selection and use as per the suggestion given from professor of dietetics and the final list of food items that can be taken and avoided is given in the table 3.

Table:3 Food items that are to be taken and avoided by Haemodialysis patients

Type of food	Foods that can be taken	Foods that should be avoided (High potassium/ sodium/ phosphorous content)
Cereals	Barley, bread, burger, oats, pasta, raw rice, sago, sooji, wheat flour	Brown rice, finger millet (ragi), wheat
Pulses & legumes *(LBVP)	Sprouted beans, sprouted green gram, tofu (soya curd)	Bengal gram, black gram dhal, dry peas, green gram, green gram dhal, red gram dhal, soya beans, soya chunks
Milk & milk products *(HBVP)	Paneer, cottage cheese, unsalted butter, Greek yogurt(strained curd), ghee	Milk, curd, cheese, ice cream, custard, pudding mix
Animal foods *(HBVP)	Egg white, fish with white flesh, chicken(flesh)	Chicken bone, skin and liver, fish bone, prawns, crab, dried fish, red meat(mutton and beef sausages)
Vegetables	Bottle gourd, snake gourd, ridge gourd, broad beans, broccoli, chow-chow, cauliflower, cucumber, corn, green mango, knoolkhol, lemon, peas, zucchini	Bitter gourd, brinjal, bamboo shoot, cabbage, drumstick, green papaya, long beans, ladies finger, mushroom, plantain, plantain flower, pumpkin, tomato (leaching)**
Roots & tubers	Arrow root, beetroot, carrot, garlic, oninon, pink radish	Colocasia, potato, sweet potato, tapioca, white radish, yam (leaching)**
Green leafy vegetables	fenugreek leaves, celery, lettuce, mint leaves	Amaranth, spinach, coriander leaves, drumstick leaves (leaching)**
Fruits	Apple, blueberries, cherries, guava, passion fruit, papaya, peach, pear, pine apple, rose apple(jamun), red grapes, straw berries, water melon(in small quantity)	Amala, apricot, banana, jack fruit, mango, musambi, orange, papaya, pomegranate, plum, sapota, seethaphal, dried fruits
Nuts, seeds & spices	Ground nuts, walnuts, sesame, fenugreek, pepper	Cashews, coconut, condiments, garam masala
Sweets & Snacks	Honey, sugar, unsalted popcorn, jam, sugarless hard candy, jelly, plain donuts, unsalted popcorn, corn flakes, muffin, cake	Jaggery, chocolates, biscuits, nuts, fast food, salted chips
Oil, fat & Other foods	Vegetable oils, unsalted margarine, unsalted dalda	Ajinomoto, baking powder, canned food, cocoa powder, pickles, papad, salt, sauces,soda bicarbonate, soup cubes

*__HBVP:__ High biological value protein, *__LBVP:__ Low biological value protein

**__Leaching:__ The vegetables with high potassium can be consumed after leaching. It is done for removing the excess potassium in the vegetables.

Diet Adherence Tips for Haemodialysis patients

1. Take a diet that is low in potassium, phosphorous and sodium. Stick on to the foods given in the first column to remain healthy.
2. Read food labels in the packets so that you can avoid high potassium, phosphorous and sodium containing foods.
3. Protein will help to replace muscles and other tissues that you lose during dialysis, the 50% of total protein intake should be met by high biological value protein. So include it in small quantity (1gm per Kg body weight or 30-40 grams every day).
4. Take two egg whites three hours before dialysis.
5. Avoid salt and instead use other ingredients such as mint leaves, ginger, garlic, pepper and lemon to flavor foods.
6. All these food items contain potassium, phosphorous and sodium in small quantity, so take all type of foods in moderate quantity.
7. Expose to sunlight. (Get Vitamin D for better Calcium absorption and healthy bones).
8. Cook one spoon fenugreek seeds with rice for evening meal every night, in order to increase the hemoglobin.

9. The vegetables with high potassium can be eaten after leaching. It is done for removing the excess potassium in the vegetables. (Method of leaching: Peal the vegetables and cut into pieces. Soak in warm water for two hours before cooking. Discard the soaked water and cook in a large volume of fresh water.)**
10. If you are a diabetic, avoid sugar, honey, cake, fruits from the list of foods that can be taken.
11. Unsalted margarine, dalda and other fats to be restricted in case of high cholesterol or blood pressure.

The table of food items and the diet adherence tips[7-12] were incorporated in the booklet for the persons undergoing haemodialysis and also they were given with a teaching session on the dietary modifications required, with the help of power point presentation. Family members also were requested to attend the teaching session as the diet selection, preparation and diet adherence are family decisions than individual in traditional Indian society. The dietary guidelines were incorporated in the cognitive behavioural therapy and the entire sample along with the family felt that it is highly important to know the correct dietary guidelines.

IV. Discussion

The present study found that majority of them (90%) had some exposure to information regarding dietary modification and a few (14%) have consulted dietician on the right kind of dietary intake. Only 78% of people undergoing haemodialysis have modified their diet after starting the treatment. A study conducted at Hospital of Madrid, among CKD patients reported that 77.74% of them had good knowledge and perception regarding renal diet and 35.77% altered dietary behavior when environmental conditions change. Almost half of the patients (48.76%) expressed that renal protection diet represent a variation in their dietary habits. Most of them (56.79) reported that the diet was not been explained to them.[13.] The subjects verbalized guilt for exacerbating and advancing their kidney failure due to the practice of faulty dietary habits.[14,15] Clarkson and Robinson in their qualitative study, reported gaps in the healthcare service wherein subjects lacked adequate information on health care that worsened health.[16]

The present study identified that that 40% of the persons undergoing haemodialysis felt that there is actually no need for a strict diet modification as haemodialysis takes care of regulating the blood and all of them (100%) said it is difficult to practice dietary modifications. Two qualitative studies have earlier identified their absolute dietary dissatisfaction especially the salt restriction as expressed with statements such as "nobody wants to eat a tasteless food without salt."[14,15]

In the current study none of the persons undergoing dialysis were able to explain all the aspects of renal diet whereas majority(98%) of them were partially aware of only the fruit restrictions and thus the researchers took up development of dietary guidelines. Earlier researchers also have undertaken similar works and prepared learning materials for homecare for the same population at different periods.[17,18] A systematic review of randomized trials carried out by Mason, Khunti, Stone, Farooqi and Carr identified 22 studies involving wide range of multicomponent interventions with variable aims and outcomes depending on the area of kidney disease care.[19]

While teaching the persons undergoing haemodialysis and the family members, it was understood that individualized dietary education and modification is useful for them as they can clarify their doubts based on their dietary patterns, habits and likes. Many were vegetarians and they were suggested to increase other protein sources such as Greek yogurts, tofu (soya curd), mutter and sprouted green gram.

Fenugreek seeds are found to have a protective mechanism against of the peroxidation of lipid (LPO) membrane and cholesterol metabolism in the brain of rats, which may be attributed in part to its modulatory effect on plasmatic lipid metabolism.[20] Anaemia is one among the most common problems faced by the persons undergoing haemodialysis. Fenugreek seeds and leaves also said to have properties of enhancing haemoglobin levels and ideal for the persons undergoing haemodialysis as they contain less potassium compared to other iron rich foods such as finger millet, bitter guard, spinach, drumstick leaves etc. Different forms of fenugreek ingestion was suggested to them such as soaking few spoons along with rice and urda dal while making dosa/idli, soaking overnight and having it in the next morning etc. It was agreeable for them to make fenugreek leaves along with sprouted green gram or soaked potatoes as side dish for rice or chappathi.

Another issue among this population is protein loss through dialysis, resulting in fatigue, weight loss and lethargy. Thus recommended dietary modification contains intake of 1.5 grams of high biological value protein (60% of HBVP) per kilogram body weight in haemodialysis. Egg white is a rich source of HBPV and thus suggested them to have two egg whites four to five hours prior to dialysis, considering the time required for

digestion. Many of them found omelet prepared with two egg whites as a better option than taking the boiled egg white.

V. Conclusion:

It is definitely possible for the CKD patients to support their kidneys by following the renal diet. There is a high need for dietary education for the persons undergoing haemodialysis as well as their family members. Nurses maintain a close relation with the people undergoing maintenance dialysis and in better position to guide them with the right kind of diet. The nurses need to extend their support by providing needed education, motivation and psychological support towards this vital aspect of the treatment. The process of adaptation and maintenance to a healthy new dietary habit requires constant support, follow up and reinforcement.

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