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## Nutritional assessment in patients on hemodialysis

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### Core tip

Protein-energy malnutrition is considered as a highly prevalent serious problem in patients on maintenance hemodialysis (MHD). Increased oxidative stress, inflammation, and uremic toxins lead to protein catabolism and anorexia. Dietary limitations as a part of therapeutic procedure restrict intake of total energy and nutrients. Dietary assessment of patients on MHD is usually ignored in dialysis units and patients often do not receive sufficient energy and nutrients. Expert dieticians aware of chronic kidney disease (CKD) stage and dialysis can provide acceptable dietary assessment of patients on MHD. Frequent food recalls or records and training the patients before nutritional evaluation on the standard scales are important for nutritional assessments.

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Protein-energy malnutrition is considered as a highly prevalent serious problem in patients on maintenance hemodialysis (MHD) and is associated with poor prognosis, morbidity, and mortality (1). Besides increased oxidative stress, inflammation, and uremic toxins which lead to protein catabolism and anorexia, dietary limitations as a part of therapeutic procedure restrict intake of total energy and nutrients. However, it is important to note that both the nature of chronic kidney disease (CKD) and hemodialysis sessions create high stressful conditions so that the nutritional needs will certainly increase in these patients.

In overall, providing a fine detailed dietary plan in which almost all of the nutritional needs were considered seems to be very difficult and if possible, the patient compliance is low because of the numerous restrictions (2). The more the dietary plan was similar to the interest of patient, the better will be the cooperation and the chance of succeeding. Dietary assessment of patient with CKD or those on MHD is usually forgotten in medical care centers and dialysis units and patients often do not receive sufficient energy and nutrients (1). Evaluation of patient diet by 24 hours recalls or food records provides valuable information about their desire, habits, and nutritional behaviors and help the dietician to tailor the dietary plan for each patient. Hence, dietary assessment should be considered as part of the treatment. It is also

necessary to follow-up the patient by dietary recalls and records to find out the efficacy of the plan and the patient cooperation. It is also worth noting that an expert dietician aware of CKD stage and dialysis can provide an acceptable dietary assessment of patients. For example, more than one recall or record are necessary to overcome some important biases like “recall bias”, “over- and under-estimating”, and day-to-day variation in food intakes. The dietician should also be aware of data extraction techniques to minimize the inevitable defects of nutritional assessment (3). Recently, Mardani et al evaluated the nutritional status of patients on MHD in Khoramabad through three food recalls (4). Patients were asked to write their food intake for 3 days, 2 normal and 1 weekend. All the food intakes noted by each patient were convert to gram per day and the nutritional details were extract by the food processor N III software. Body mass index (BMI) of patients was calculated and serum albumin was measured. Results showed that the prevalence of underweight was 10.4%. Serum level of albumin was lower than normal in 24.4% of patients. Dietary assessment represented that the patient’s daily intake of energy and protein was 1750 kcal and 0.8 g/kg of body weight, respectively. Detailed nutritional information extracted from Food Processor software demonstrated that most of the patients suffered from vitamin A, vitamin E, calcium, phosphor, zinc, and magnesium

and also potassium deficiency. They concluded that more precise studies on the etiology and instructing the patients about dietary intake can improve nutritional status in patients on MHD. Planning the dietary assessment with 3 recalls and considering a weekend are the 2 major strengths of their nutritional assessment. People dietary intake vary on holidays with normal days. It seems that people eat less cautiously on holidays. In this way, the dietary assessment will be much closer to reality for each patient. Besides the memorial biases which lead to over- or under-estimating, uncertainty of scales is another problem in nutritional evaluation. As an example, 2 subjects state that they drink one glass of milk in breakfast while, the amount of milk they drank was exactly different. Subjects have different conception of scale and this can seriously interfere with the results. In conclusion, nutritional assessment is very important and even critical for managing patients with CKD or those on MHD; and it can improve clinical outcomes. Taking more than one food recalls or records and considering at least one of them in holiday can overcome the inevitable memorial biases. Training the patients before nutritional evaluation about the standard scales is also important to reach more exact results. By such strategies, nutritional assessment helps us to improve nutritional status in CKD- or hemodialytic-malnourished patients.

#### Author's contribution

TJ is the single author of the manuscript.

#### Conflicts of interest

The author declared no competing interests.

#### Ethical considerations

Ethical issues (including plagiarism, data fabrication, and duplicate publication) have been completely observed by the author.

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