Evaluating the Evidence and Assessing Professional Perceptions of the Complex Renal Dietary Restriction in Hemodialysis

Alyssa L. Welte RD, CD, LDN
Clinical RD and Master’s Student
Illinois State University
Normal, IL
alwelte@ilstu.edu

Jennifer L. Barnes PhD, RD, LDN
Assistant Professor
Department of Family and Consumer Sciences
Illinois State University
Normal, IL
jlbarn2@ilstu.edu

Abstract
Recent literature reviews, position papers, and meta-analyses have initiated a conversation regarding the lack of quality evidence supporting the renal diet. This is particularly important when considering the multitude of dietary restrictions posed on end-stage renal disease (ESRD) patients. Nutrients of concern include sodium and how this relates to fluid intake, lack of differentiation between the types of phosphorus, and the possibly overly restrictive potassium guideline. How these restrictions increase risk for nutrient deficiencies and an overall atherogenic dietary profile must be carefully considered. Research is currently being conducted to determine renal RDNs’ practices and the likelihood of liberalizing the renal diet to benefit patients with ESRD.

Learning Objectives
• Identify the level of evidence supporting the current dietary restrictions of the renal diet for ESRD.
• Explain the rationale in favor of liberalizing the renal diet for ESRD.

Introduction
Often regarded as the most challenging diet to teach and follow, the renal diet for hemodialysis (HD) patients requires restriction of sodium, potassium, phosphorus, and fluids. Specifically, the current HD diet recommends less than two grams of sodium, three grams of potassium, and one gram of phosphorus per day based on the patient’s specific needs (1). These restrictions result in minimal acceptable food options and a severely restricted diet, including only one serving of dairy per day, limiting fruits and vegetables to six servings per day of low-potassium options, limiting water and fluids, and avoiding convenience foods (2). As described in the study by Khoueiry et al., the restrictive nature of the renal diet is counterintuitive to a generally healthy diet, especially when this end-stage renal disease (ESRD) population would benefit from a heart-healthy diet (3).
The currently available data on the efficacy of this diet has recently been evaluated through multiple literature reviews, revealing a lack of quality evidence supporting these restrictions. Concerns include attempts to control interdialytic weight gain (IDWG) through a focus on fluid rather than sodium restriction. Guidelines did not differentiate between the types of phosphorus, with a potentially overly restrictive potassium guideline (4,5,6,7). Not only are these restrictions difficult to understand, but the dietary prescription results in a minimal list of remaining acceptable foods. This also poses the issue that the renal diet does not support choices for heart health, which includes many renal-restrictive fruit and vegetables, whole grains, and other high fiber, antioxidant-rich foods like beans and legumes (3). Liberalizing the renal diet as suggested by current trends in the literature would promote a more heart healthy intake in patients who are already at a higher risk for cardiovascular disease. However, renal diet guidelines have been the standard for many years, and dietitians and other healthcare professionals may be hesitant to liberalize the diet due to lack of support by standards of care, knowledge of the recent research or unwillingness to change their practice.

Even with the trend in the literature to begin liberalizing the strict diet, there are currently no assessments to show if RDNs feel comfortable incorporating a more liberalized diet into their education for their patients. The literature is also so new that some professionals may not be aware of the data, or lack thereof. Further, additional research on liberalizing the renal diet must be done in order to establish improvement in patient outcomes that would guide the revision of formal diet recommendations and standards of practice.

Current Restrictions and Cause for Concern

The current renal diet leaves little room for variety. The potassium restriction limits many fruits and vegetables (8). Phosphorus restriction limits many fresh, whole foods such as dairy products, beef, chicken, pork, fish, and whole grains. Inorganic phosphorus, most commonly in the form of phosphorus additives, has grown in our food supply (5,9). Food labels and nutrient databases rarely differentiate the source of phosphorus (organic vs. inorganic), making it difficult to accurately determine intake. Together these nutrient restrictions lead to an extremely limited diet, but also take away many healthy foods and can put patients at increased risk for malnutrition and other nutritionally related health concerns (10).

Experts have critiqued the renal diet as not promoting cardiovascular health, and with cardiovascular disease as a common comorbidity of renal failure, this should be a large concern and reason to consider liberalizing the renal diet (3). After eliminating many fresh fruits and vegetables, beans and legumes, and whole grains, patients often struggle to consume adequate fiber and other micronutrients. Nutrient deficiencies of the diet can include vitamin C, vitamin B6, and folate as well as vitamin D and iron (3,11). Kalantar-Zadeh et al. also summarized information from nephrologists who found that patients who are less compliant with their dietary prescriptions often lived longer than those who closely followed the limited diet, leading many to question the purpose of the highly restrictive guidelines and demonstrating the need for future research (11).

Lack of Evidence to Support the Current Guidelines

Within the recent years, scholarly reviews have revealed the lack of evidence supporting the efficacy of the current dietary restrictions of the renal diet (6,7,12). Biruete et al. thoroughly analyzed the available research to consider the rationale behind the common nutrient restrictions: sodium, organic and inorganic phosphorus, and potassium (4).

Sodium: The ESRD diet traditionally limits both fluid and sodium, with more emphasis on minimal fluid intake in order to control IDWG. Because sodium is the primary extracellular cation, it is closely associated with intra- and extracellular fluid balance as well as the thirst mechanism. This suggests that an increased focus on sodium intake, rather than fluid consumption, may be more effective. Indeed, HD clinics in other countries report significant success in controlling hypertension by focusing on sodium rather than fluid (13,14,15). On average, the American adult consumes approximately 3,529 milligrams of sodium per day with a majority of the intake coming from processed foods (16). An analysis by Carrigan et al. discovered that processed foods with additional additives contribute approximately 30 to 40% more sodium than similar, low-additive, fresh foods (17). For the renal diet, Biruete et al. stated that the most recent guidelines do not quantify a specific sodium limit (4); however, past guidelines recommended a prescription, nearly half of what the average American typically consumes. McCausland, Waikar, and Brunelli published research indicating that patients with higher sodium intake had increased risk of mortality and reference several other studies examining the benefits of a sodium restriction (18). Still, a limited number of randomized control trials, including research by Rodriguez-Telini et al. and Sevick et al., have studied the effects of sodium restrictions on dialysis patients, which indicates the need for additional high quality research (19,20).

Phosphorus: The National Kidney Foundation (NKF) recommends a phosphorus restriction of 800 to 1,000 milligrams per day, without differentiating between the two types of phosphorus: organic and inorganic (1,5). From the data collected by the United States Department of Agriculture, the average phosphorus intake for Americans is approximately 1,399 milligrams, well over the NKF’s recommendation for chronic kidney disease patients (16). The majority of phosphorus intake in the American diet comes from milk and dairy products (21). Furthermore, phosphorus intake comes in various forms. Organic phosphorus is found naturally in milk products, meat, poultry, fish, whole grains, and legumes. The body more efficiently absorbs phosphorus from animal-based products than plant-based foods (6). Noori et al. also references inorganic phosphorus that comes from supplements, medications, and food additives (6). The body absorbs this additive form of phosphorus at a much higher rate compared to organic phosphorus, making it a larger concern for the renal diet (4,6).

León, Sullivan, and Sehgal analyzed the ingredients of foods in a typical American grocery store and found that 44% of products contain phosphorus additives (22). Further, 72% of prepared and
This research will bring attention to the aforementioned lack of significant evidence to support the current renal diet guidelines, which will affect the direction of future research, the continuing education of RDNs, and the way they educate patients. In addition, it will reveal the awareness of practitioners in relation to the renal diet and evolution of practice. By exposing the comfort level of practitioners to liberalize the diet, it could lead to further research regarding ways to change current practice. This exposure may improve practice by addressing the deficiencies in translating research to clinical application while working to promote confidence in practitioners to liberalize the renal diet. This could ultimately lead to improved patient quality of life and decreased severity of co-morbidities, particularly cardiovascular disease. Specifically, patients could benefit from these changes by increasing heart healthy food choices and decreasing complications such as malnutrition and protein energy wasting (3,4,10). Further, this work can influence future studies, including clinical trials, to improve the renal diet and, possibly, changes to the standardized ESRD diet prescription.

Consider the Liberalized Renal Diet

Currently, there is a movement in the renal community to consider liberalization of the renal diet to create a better outcome for the patient. The restrictive potassium guidelines eliminate many fruits and vegetables from the diet, which also eliminates many other micronutrients, phytochemicals, and fiber beneficial for overall health. Limiting phosphorus, especially organic phosphorus, restricts the entire dairy group along with beans, legumes, and whole grains. The sodium restriction, however appears to be beneficial to prevent fluid overload, decrease hypertension, and other cardiovascular problems commonly associated with HD. Overall, new research is suggesting a focus in the renal diet from vast restrictions to liberalization of fresh foods, on an individualized basis. Moe et al. summarized a new mindset titled “Good Food First” focusing on fresh, whole foods rather than processed foods (25). By simply limiting processed foods, the patients will ultimately decrease their sodium and inorganic phosphorus intake with a concomitant increase in vitamins, minerals, phytochemicals, and fiber.

Although there is some evidence for a more liberalized renal diet, dietitians and other practitioners may feel uncomfortable changing the current guidelines, especially if they are unaware of the trends in the research. Currently, research is being done to determine renal dietitians’ practices and the likelihood of liberalizing the renal diet to benefit their patients. The key variables include participants’ confidence in reviewing and applying new literature, their practices regarding traditionally restricted food items and nutrients, and their comfort level toward liberalizing the diet. An original, cross-sectional questionnaire was developed and utilized to gauge these variables with findings in preparation for publication.

References


