Diet: The “Keys” to Longevity

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Commuting from the western suburbs of Chicago eastward, one can see a very large billboard on Interstate 88 that reads “Investment experts now recommend saving for a lifespan of 105 years.” Such messages, especially on billboards, were unheard of just 30 years ago. Gains in life expectancy over the past several decades have largely been the result of population reductions in BP and serum cholesterol levels through diet and medications (1–4). Population reductions in mean BP and serum cholesterol levels have led to sharp reductions in rates of cardiovascular events and stroke. In contrast, from 1980 to 2000, ESRD incidence increased substantially. Currently, the most rapid growth of ESRD is among those individuals ages 75 years and older.

The biggest challenge that the US healthcare system faces over the next several decades is caring for an aging population with a greater number of chronic medical conditions, including CKD. Diabetes and hypertension, two chronic medical conditions that heighten risk for ESRD, may be prevented and managed through nutritional interventions (5–7). These nutritional interventions emphasize diets high in fruits, vegetables, and low-fat dairy and discourage consumption of processed sugars and animal fat. These diets include but are not limited to the Dietary Approaches to Stop Hypertension (DASH) diet, which is high in fresh fruits, vegetables, and low-fat dairy products and low in processed foods and sugar, and the Mediterranean diet, which is also high in monounsaturated fats (mainly olive oil) and includes moderate amounts of alcohol (red wine) (8–11).

Use of a Mediterranean-type diet to reduce cardiovascular disease was probably first championed by Dr. Ancel Keys in 1959. Dr. Ancel Keys was very focused on the impact of caloric restriction on health. During World War II, he conducted the infamous starvation experiment, which subjected conscientious war objectors to severe caloric restriction combined with daily 4-mile walks (12). After the end of World War II, Dr. Keys then traveled to Europe to further explore the impact of food restriction on health. While traveling through Naples, Italy, he noted exceptional health among older men and lower rates of cardiovascular disease compared with rates in the United States. He linked the optimal health of the Naples natives with the local diet, which was high in pasta, fruit, and vegetables and low in animal and dairy fat. He hypothesized that the American diet, rich in animal and dairy fat, mediated high cholesterol levels and increased risk for cardiovascular disease. This theory led to the seminal Seven Countries Study, which showed a strong and direct correlation between animal fat intake and cholesterol levels and mortality (12,13).

In this issue of CJASN, Huang et al. (14) examine the association between adherence to a Mediterranean diet and mortality among men enrolled in the Uppsala Longitudinal Study of Adult Men, a cohort of men born between 1920 and 1924 living in Uppsala, Sweden. Diet information was collected during the third examination (1991–1995), and 73% of the original cohort participated and completed 7-day dietary records for determination of dietary patterns. Mortality over an approximately 10-year period was examined by adherence to a Mediterranean diet among older men with and without CKD defined as an estimated GFR (eGFR) <60 ml/min per 1.73 m². Adherence to a Mediterranean diet was categorized as low, medium, and high, with high adherence characterized by consumption of the highest amount of fresh fruits, vegetables, fish, and unsaturated fats (mainly olive oil). At baseline, men with medium and high adherence to a Mediterranean diet had a 23% and 42% lower odds of CKD after adjustment for CKD risk factors, including smoking status and presence of hypertension and diabetes. Among men with kidney disease, (n=506 or 46% of cohort), both medium and high adherence to a Mediterranean diet was associated with an approximately 25% lower mortality risk compared with the risk in those men with low adherence after adjustment for smoking status, hypertension, and diabetes. However, when the analysis was restricted to those men who were considered adequate diet intake reporters (reported caloric intake within the range of expected caloric needs), the association between adherence to a Mediterranean diet and mortality risk was substantially stronger, with a 52% and 58% reduced mortality risk among medium and high adherents to a Mediterranean diet, respectively, versus low adherents. Interestingly, there was no significant difference in systolic or diastolic BP, total lipid cholesterol or HDL, or C-reactive protein levels across levels of adherence to a Mediterranean diet among men with CKD. Phosphate intake did differ significantly by adherence to a Mediterranean diet, and it was lowest in those men with high adherence (1.5 g/d) and highest in those men with low adherence (1.6 g/d). Net excretion of acid also differed significantly among men with CKD, with the lowest net acid excretion among those men with high adherence.

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and the highest net acid excretion among those men with low adherence to a Mediterranean diet.

The results of this study add to a growing body of literature that focuses on overall diet quality and CKD outcomes (15,16). Lin et al. (15) showed that older women who followed a DASH-type dietary pattern had lower odds of microalbuminuria compared with those women who did not follow a DASH-type dietary pattern. Women who followed a DASH-type dietary pattern were also less likely to have rapid kidney function decline, which was defined as an eGFR decline≥30% compared with baseline eGFR, compared with women who did not follow a DASH-type dietary pattern (15).

Observational studies that examine the associations between dietary patterns and any chronic disease are limited by the fact that dietary behaviors segregate with other types of behaviors that impact health, such as medication compliance, use of preventive services, routine exercise, and social support. However, the publication of this observational study was preceded by the publication of the PREPARED trial (Prevención con Dieta Mediterránea), a three-arm (1:1:1) parallel design clinical trial of 7447 adults ages 55 years and older (17). Participants were randomized to a standard low-fat diet, a Mediterranean diet enhanced with extra virgin olive oil, or a Mediterranean diet supplemented with nuts (walnuts, hazelnuts, and almonds). After a median follow-up of 4.8 years, the trial was terminated early because of a 30% relative risk reduction of a combined end point of myocardial infarction, stroke, or cardiovascular death among the participants assigned to a Mediterranean diet supplemented with either olive oil or nuts compared with those participating following a low-fat diet. These findings were pretty striking given the fact that most of the participants were already following a Mediterranean-type diet before entering the trial. Thus, increasing adherence to a Mediterranean diet and/or consuming additional olive oil or nuts (high in monounsaturated fats) likely mediated the reduced mortality risk in the participants randomized to the Mediterranean diet.

We now have clinical trial data showing that a Mediterranean diet reduces mortality in older adults, and the observational study by Huang et al. (14) suggests that these findings may be generalizable to older individuals with CKD. Given the unique dietary needs of adults with CKD, the nephrology community needs more data from clinical trials to fully compare the risks and benefits of specific diets, such as the Mediterranean- or DASH-type diets, on kidney disease progression and mortality before recommending such diets routinely. However, completion of nutritional trials requires substantial resources and time. Ancel Keys died at the age of 100 years in 2004. If he were alive, he would likely tell us that a healthy diet is the key to living to 105 years, regardless of CKD.

Disclosures
None.

References

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