

Eating to add years of life and life to these years: what should be in the menu?

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Life expectancy continues to rise in most Western countries, but this does not necessarily translate into enhanced population health nor an increase in the number of years lived in good health (1). People living longer might spend more years with chronic diseases as they age, which, in turn, reduces their quality of life and increases health care costs. Therefore, quantifying years of life lived in total, but also with and without disease, is important for health, economic, and social policies broadly. Pursuing a healthy lifestyle, such as not smoking, being physically active, and having a normal weight, has been associated with longer disease-free life expectancy (2). What about a healthy diet?

One of the first studies quantifying the effect of dietary factors on life expectancy and disease-free life expectancy was the “Polymeal” study published in 2004 (3). The authors chose this name in response to the 2003 BMJ publication on the “polypill” (4) (a hypothetical combination of 6 medications that could reduce cardiovascular disease by 80%), suggesting a “more natural, safer and probably tastier alternative to the polypill”—the “polymeal.” This study estimated that regular intake of a “polymeal” containing wine, fish, dark chocolate, fruits and vegetables, garlic, and almonds could increase life expectancy free from cardiovascular disease by 9 y in males and 8 y in females from the Framingham Heart Study (3).

In this issue of the Journal, a study by Lagström et al. (5) examined 8000 British civil servants enrolled in the Whitehall II cohort study (1985–2013) and found that healthy eating was associated with longer cardiometabolic disease-free life expectancy. They demonstrated that years in good health after age of 50 were 23.9 y (95% CI: 23.0, 24.9 y) for participants adhering to the healthiest diet [quintile (Q) 5] and 21.4 y (95% CI: 20.6, 22.3 y) for their counterparts with the unhealthiest diet (Q1). The authors conclude that people with the highest adherence to dietary guidelines lived 2.5 y longer without coronary heart disease, stroke, or type 2 diabetes (5). Lagström et al. also showed a clear dose–response association between diet quality quintiles and life expectancy without cardiometabolic disease in both male and female participants, independent of BMI, physical activity, and smoking. These dose–response associations were similar across socioeconomic positions, indicating that the benefit of a healthy lifestyle could reach all spheres of society (5).

The study (5) assessed diet comprehensively using the Alternative Healthy Eating Index (AHEI; AHEI-2010), which is calculated using 11 dietary components, each scored 0 (poor) to 10 (optimal) (range: 0–110). High diet quality is defined as high

intakes of vegetables, fruit, whole grains, nuts and legumes, total PUFAs, and long-chain omega-3 fatty acids; moderate intake of alcohol; as well as low intakes of sugar-sweetened beverages and fruit juice, red and processed meat, *trans* fat, and sodium (6).

As opposed to the reductionist approach based on single nutrients or single foods widely used until the 2000s, the analysis of dietary patterns, as used by Lagström et al., focuses on the overall diet quality. This analysis of total diet has 3 main advantages (7, 8). First, it prevents potential confounding by other features of the diet. For instance, dietary patterns do not focus on the intakes of saturated fat in absolute terms but rather assess if saturated fat is substituted by polyunsaturated fat or by carbohydrates from highly refined foods. Second, this approach increases the ability to assess stronger effects due to the cumulative effects of foods. Finally, it allows consideration for interactions among synergistic and antagonistic components (e.g., competitive inhibition of zinc absorption by iron) (7, 8). Therefore, the assessment of dietary patterns provides more valid evidence on the prevention of nutrition-related diseases than previous approaches.

In a study similar to the study by Lagström et al., a research team in the Netherlands investigated the associations between dietary patterns and life expectancy without disease or disability after a median follow-up of 12 y in 33,000 individuals (9). The authors used a priori (scores) and a posteriori (data-driven) methods to define dietary patterns and found that people who had higher adherence to Dutch dietary guidelines (score similar to the AHEI) did not live significantly longer in good health (9). However, they showed that participants who adhered more to a Mediterranean-style diet (a priori) or those who followed a prudent dietary pattern (a posteriori; rich in fish, vegetables, wine, and high-fiber cereals) could expect to have a 4-mo longer disease-free life than those having dietary habits different from these 2 diets. The authors notably demonstrated that, among all components of the Mediterranean Diet Score, higher adherence to the components “fruit” and “cereals” was most strongly associated with a longer life free of disease (9). Unfortunately, Lagström et al. (5) did not provide estimates for each individual component of the AHEI. Thus, it remains unclear whether the observed associations were due to the overall dietary pattern or

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some specific dietary components among the 11 assessed, and if so, which ones.

Very recently, data from the Nurses' Health Study (NHS; 1980–2014; $n = 73,000$) and the Health Professionals Follow-Up Study (HPFS; 1986–2014; $n = 38,000$) in the United States showed that life expectancy without cardiometabolic disease or cancer at age 50 y was ~ 4 y longer in men and women with the best diet quality (Q5 using AHEI-2010), compared with those with the worst diet (Q1) (10). The study also showed that improving diet quality was more effective in terms of years of life gained than having a moderate alcohol intake of 5–15 g/d, but less effective than not smoking, being physically active 3.5 h/wk, or having a BMI (in kg/m^2) between 18.5 and 25 (10). The smaller difference between the lowest and highest AHEI quintiles observed by Lagström et al. (2.5 y) may be explained by smaller variations in diet quality for the British civil servants (Q1: <44 ; Q5: >61) than for the US health professionals [Q1 vs Q5: <40 vs >58 in the NHS and <42 vs >62 in the HPFS; data extracted from (6)]. The different distribution of diet quality (within and between quintiles) between cohorts renders the comparison of results challenging. Further research could focus on determining the optimal score for improving quality and quantity of life.

Mozaffarian and Forouhi (11) summarized in 2018 the general dietary priorities for cardiometabolic health as follows: “Eat minimally processed, bioactive rich foods (fruit, nuts, seeds, beans, vegetables, whole grains, plant oils, yogurt, fish) and avoid ultra-processed foods rich in refined starch, sugars, and industrial additives such as *trans* fatty acids and sodium.” Findings discussed here, including the study by Lagström et al. (5), confirm that adhering to these dietary guidelines may prolong disease-free life expectancy in Western countries. Thus, implementing public health policies to promote a healthy diet and lifestyle could help to reduce chronic disease burden on individuals and the health care system by reducing the risk of developing chronic diseases and contributing to increasing the number of years lived with good health. A healthy diet seems to be an essential tool for adding years to life but also life to years.

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