

# Dietary Patterns to Reduce Weight and Optimize Cardiovascular Health

## Persuasive Evidence for Promoting Multiple, Healthful Approaches

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**H**ealthful dietary patterns have a major role in healthy lifestyles and are necessary for cardiovascular health promotion.<sup>1</sup> Over the past decade, dietary patterns have been a focus of human nutrition research studies. This is largely because of the well-recognized fact that we do not eat nutrients, we eat foods, and that we do not eat foods in isolation, we eat them in patterns. As a result, evidence is mounting on the effectiveness of multiple dietary patterns in reducing body weight<sup>2-4</sup> and improving cardiovascular risk.<sup>5-7</sup> The specific components of these patterns, including the types of foods they include, macronutrient balance, and amount of energy deficit created (if weight loss is desired), can impact adherence and effectiveness.

In this issue of *Circulation*, Sofi et al<sup>8</sup> report findings from the CARDIVEG trial (Prevention of Cardiovascular Disease With the Vegetarian Diet) conducted in Florence, Italy, from 2014 to 2015. Participants in the trial were overweight (body mass index  $\geq 25$  kg/m<sup>2</sup>) and met one of the following criteria: total cholesterol  $>190$  mg/dL, low-density lipoprotein cholesterol  $>115$  mg/dL, triglyceride levels  $>150$  mg/dL, and glucose levels  $>110$  but  $<126$  mg/dL. Individuals were randomly assigned to 1 of 2 interventions: (1) a low-calorie vegetarian diet, or (2) a low-calorie Mediterranean-style diet.

The low-calorie vegetarian diet excluded meat, meat products, poultry, fish, seafood, and flesh from any other animals. It included eggs and dairy products and all other nonmeat food groups. The low-calorie Mediterranean diet comprised all food groups, including meat, meat products, poultry, and fish. To facilitate compliance with the intervention, participants were given a 1-week detailed menu plan and instructions containing tips and details about food groups that could be included and those that should be excluded. To my knowledge, this represents the first randomized trial comparing the effectiveness of a low-calorie vegetarian diet with a low-calorie Mediterranean diet on cardiovascular risk parameters in individuals considered to be clinically healthy and exhibiting a low-risk profile for cardiovascular disease.

Study participants (n=118) were followed for 3 months and, over this time, had measurements of body weight, body composition, and cardiovascular disease risk factors such as lipids, markers of glycemia, oxidative stress, and inflammation. Eighty-five percent of study participants provided measurements at baseline and at the 3-month follow-up. Those who did not complete the study were younger, had a higher body mass index, had a higher percentage of fat mass, and consumed a lower percentage of total calories from carbohydrates.

At the end of the first dietary intervention period, participants reported significant dietary changes relative to baseline, including fewer calories, less total fat,

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less saturated fat, and lower cholesterol. With regard to body weight and composition, the vegetarian and the Mediterranean diets had similar effects ( $P>0.05$ ) on weight, body mass index, and fat mass with between-diet differences of 0.11 kg, 0.03 kg/m<sup>2</sup>, and 0.23 kg, respectively. The vegetarian diet was more effective than the Mediterranean diet was in lowering low-density lipoprotein cholesterol levels (−5.4%,  $P<0.05$ ) and leukocyte-derived reactive oxygen species (−8.4%,  $P<0.05$ ). Conversely, the Mediterranean diet was significantly more effective than the vegetarian diet was at reducing triglycerides (−5.9%,  $P<0.05$ ).

These findings are significant for several reasons. First, the dietary changes that participants made, whether following the low-calorie vegetarian diet or the Mediterranean diet, are consistent with contemporary diet guidelines,<sup>1,9,10</sup> which include following a healthy dietary pattern rich in fruits and vegetables, legumes, whole grains, and nuts; focusing on diet variety, nutrient density, and appropriate amount of food; and limiting energy intake from saturated fats. It is important to note that overall adherence to the study diet protocol was high, and participants were equally adherent to the vegetarian and Mediterranean diets. It is noteworthy that the changes that participants may have made during the study in dietary factors such as added sugars and sodium are not reported, nor are the effects of the dietary interventions on blood pressure.

Second, a low-calorie healthy vegetarian or Mediterranean diet pattern may offer a possible solution to the ongoing challenges to prevent and manage obesity and cardiovascular diseases. Data from the NHANES (the National Health and Nutrition Examination Survey) show that 36.5% of Americans are obese,<sup>11</sup> and this prevalence is higher in Hispanics (42.5%) and blacks (47.8%).<sup>12</sup> Globally, ≈600 million people are obese, and it has been estimated that most of the world's population live in countries where overweight and obesity contributes more to mortality than underweight.<sup>13</sup> In addition, substantial increases in the prevalence and medical costs of cardiovascular diseases are projected to occur from 2015 to 2035,<sup>14</sup> underscoring the urgent need for prevention and reduction of disease prevalence. Although the findings by Sofi et al are from a relatively short-term intervention, they suggest a role for low-calorie vegetarian and Mediterranean diets in primary prevention, and possibly primordial prevention of cardiovascular disease risk factors.

These findings have several implications for health-care providers, patients, researchers, and policy makers. First, nearly every healthcare provider has to manage obesity or its consequences in the clinical setting or in his or her personal life. Low-calorie vegetarian or Mediterranean dietary patterns are 2 strategies for weight loss that can be promoted in the clinical setting. It is well recognized, however, that engaging in

dietary counseling in clinic is not feasible for many providers. Reasons include lack of training in nutrition, lack of time in the clinical encounter, or a basic belief that uptake of and adherence to dietary advice will be low and ineffective. Continuing education on diet and nutrition for providers may help to improve engagement in dietary counseling by increasing providers' skill levels and confidence. Also, providers' use of these evidence-based dietary strategies in their personal lives may also help them relate to patients when discussing barriers and facilitators to dietary adherence.

Future research to extend the findings from this study should be considered. The current evidence base for vegetarian diets is weak, and the findings by Sofi et al should be replicated. In addition, given the modest study size and a study population that is at relatively low risk for cardiovascular disease, the applicability of these findings to other populations should be investigated. Whether healthful versions of traditional diets around the world that emphasize fresh foods and limit sugars, saturated fats, and sodium can prevent and manage obesity and cardiovascular diseases needs to be further examined. Research is also needed to understand the relevance of these diets to populations that experience a disproportionate burden of cardiovascular disease and those in whom disparities persist by factors such as income, geography, and race and ethnicity. Furthermore, investigation of how the vegetarian and Mediterranean dietary patterns influence intake of specific types of fatty acids, especially monounsaturated fatty acids, is needed given ongoing scientific interest in refining the amount of dietary fat and cholesterol that should be included in healthful patterns.

Improving dietary patterns is not just an individual problem, it is a societal problem. Policies are needed to facilitate healthy eating across the lifespan and the primordial prevention of chronic diseases. Policies that change systems can increase access to healthful options, promote reformulation of food products, and create a food environment where the healthy dietary choice is the default choice. The 2015 to 2020 US Dietary Guidelines and the World Health Organization's Global Strategy on Diet, Physical Activity and Health call on stakeholders to take action at the global, regional, and local level to improve dietary patterns at the population level. The randomized trial conducted by Sofi et al contributes to the currently limited but growing evidence base about the health effects of vegetarian dietary patterns. As is typical for other nutrition exposures, the use of study designs other than clinical trials is needed to investigate whether the findings by Sofi et al can be corroborated, especially over the longer term.<sup>15</sup>

Although the societal pressures to find the best diet are great, the study by Sofi et al, and much of the evi-

dence that precedes it, provides persuasive evidence that multiple healthful dietary patterns can reduce weight and optimize cardiovascular health. These dietary patterns should include a few basic principles such as being nutrient dense; rich in vegetables and fruits, whole grains, legumes and nuts; low in refined grains and commercially processed foods with added sugars, saturated fats, and sodium; sustainable; culturally relevant; and enjoyable.

## ARTICLE INFORMATION

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### Disclosures

None

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