Reducing Hypertensive Cardiovascular Disease Risk of African Americans with Diet: Focus on the Facts

Molly E. Reusser and David A. McCarron

*Academic Network, LLC, Portland, Oregon and 1Department of Nutrition, University of California, Davis, California

ABSTRACT Hypertension is more common and more severe in African Americans than in other population groups in the United States, placing them at increased risk of cardiovascular disease, stroke, and end-stage renal disease. Whereas past efforts to reduce blood pressure (BP) via the diet centered on manipulating isolated nutrients, there are now conclusive data demonstrating that it is not single dietary components but the overall dietary pattern that has the greatest influence on BP. A nutritionally complete diet rich in fruits, vegetables, and low-fat dairy foods has been clearly proven to significantly lower BP in all population groups. This diet, commonly referred to as the Dietary Approaches to Stop Hypertension (DASH) diet, has been tested in randomized, controlled trials emphasizing African American populations and documented the greatest beneficial effects in hypertensive African Americans. Improving diet quality has been shown to be simply implemented without adverse effects such as symptoms of lactose maldigestion. It is also known to beneficially affect other cardiovascular risk factors and is in keeping with dietary recommendations for prevention of some cancers and osteoporosis. This paper reviews the current data relating dietary patterns to BP control, and advocates dietary recommendations that can accomplish their intended objective of enhancing the health of Americans by promoting safe, feasible, and proven-effective means of doing so. In the case of hypertension prevention and treatment, and thus the reduction of cardiovascular disease risk, overall diet quality should be the primary focus of nutritional recommendations.


KEY WORDS: • blood pressure • diet therapy • blacks • cardiovascular disease risk

A diet rich in fruits, vegetables, and low-fat dairy foods, the dietary pattern that has come to be known as the Dietary Approaches to Stop Hypertension (DASH) diet, has been shown to significantly reduce blood pressure (BP) across all populations studied (1), confirming more than 2 decades of research in this area (2,3). Despite this, the message to the public regarding diet and BP remains unclear. Rather than clearly focusing on the benefits of a simply implemented and proven-effective strategy for BP management, dietary recommendations are mired in assumptions, theories, and a myriad of strategies that defy successful implementation by even the most health-conscious consumer. It is now clear that adoption of the DASH diet is the simplest, most effective dietary approach for the treatment and prevention of hypertension and, thereby, reduction of cardiovascular disease (CVD) risk (1,4).

The DASH diet unequivocally demonstrated that it is the overall diet, or dietary pattern, rather than any single dietary component, that has the greatest effect on BP (1,4). And in no group is this effect more pronounced, relevant, or beneficial than African Americans (5,6). According to the American Heart Association 2005 statistical report (7), among non-Hispanic black adults, 42% of men and 45% of women have hypertension (systolic BP >140 mm Hg or diastolic BP >90 mm Hg or taking antihypertensive medication). The NIH National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure states: "In African Americans, hypertension is more common, more severe, develops at an earlier age, and leads to more clinical sequelae than in age-matched non-Hispanic whites” (4). As a result, among hypertensive African Americans, the stroke mortality rate is 80% higher, heart
The DASH study, sponsored by the National Heart, Lung, and Blood Institute, assessed the effects of the total diet, or dietary pattern, on BP in persons with high-normal and mildly elevated BP (1,13). Three diets were tested in DASH: a typical American diet (low in fruits, vegetables, and dairy and high in fat); a “fruits and vegetables” diet that included 8–10 servings of these foods daily; and a combination diet, known as the DASH diet, which was also rich in fruits and vegetables and included ~3 daily servings of dairy products (mainly milk, yogurt, and cheese). Participants’ baseline sodium intake and weight, factors commonly associated with BP changes, were maintained at constant (and in the case of sodium, equivalent) levels in all 3 diet groups during the 8-wk intervention.

In the total DASH cohort, highly significant BP reductions were achieved with the DASH diet compared with the typical American (control) diet. Systolic BP was reduced by 5.5 mm Hg and diastolic by 3.0 mm Hg with DASH relative to the control diet. With the fruits and vegetables diet, BP reductions, although significant, were only about half those achieved with the DASH diet. Among the participants with established hypertension, BP reductions were even more striking. On the DASH diet compared to the control, systolic BP decreased by 11.4 mm Hg and diastolic by 5.5 mm Hg. These improvements were observed at 2 weeks and were sustained through the 8 wk of the study. Although it might be presumed that lactose maldigestion would have been an adverse effect of the DASH diet, known as the DASH diet, which was also rich in fruits and vegetables and included ~3 daily servings of dairy products (mainly milk, yogurt, and cheese). Participants’ (n = 459) baseline sodium intake and weight, factors commonly associated with BP changes, were maintained at constant (and in the case of sodium, equivalent) levels in all 3 diet groups during the 8-wk intervention.

Even more dramatic BP reductions were observed in African American participants in the DASH trial. Because of the disproportionately higher burden of hypertension and resultant CVD in this population (8), the study cohort was designed to comprise two-thirds minority participants (60% African American, 6% who identified themselves as other than white or African American) (5). Subgroup analysis revealed that on the fruits and vegetables diet compared to the control, BP reductions among the African American group were 3.5 mm Hg systolic and 1.4 mm Hg diastolic; with the DASH diet, containing dairy products, BP was reduced by 6.9 and 3.7 mm Hg, respectively. Reductions in BP in the whites-only group consuming the DASH diet were 3.3 mm Hg systolic and 2.4 mm Hg diastolic, significantly lower than those reported in blacks.

The most powerful and clinically significant effect of the DASH diet occurred in African Americans with established hypertension. In this group, the fruits and vegetables diet reduced systolic and diastolic BP by 8.0 and 3.4 mm Hg, whereas the DASH diet lowered pressures by 13.2 and 6.1 mm Hg, respectively (5). Thus, the addition of nutrient-rich dairy products to the dietary pattern produced BP reductions that were nearly twice those achieved without the dairy component. The evidence is remarkable for demonstrating a favorable BP reductions among the African American group were 3.5 mm Hg systolic and 1.4 mm Hg diastolic; with the DASH diet, containing dairy products, BP was reduced by 6.9 and 3.7 mm Hg, respectively. Reductions in BP in the whites-only group consuming the DASH diet were 3.3 mm Hg systolic and 2.4 mm Hg diastolic, significantly lower than those reported in blacks.

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**TABLE 1**

<table>
<thead>
<tr>
<th>Modification</th>
<th>Approximate reduction</th>
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<tbody>
<tr>
<td>Weight reduction</td>
<td>5–20 mm Hg/10 kg</td>
</tr>
<tr>
<td>DASH diet</td>
<td>8–14 mm Hg</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>2–8 mm Hg</td>
</tr>
</tbody>
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Comparison of the systolic blood pressure-lowering effects of lifestyle modifications to prevent and manage hypertension as cited by the National Heart, Lung, and Blood Institute (5).
response to improved diet quality in the African American population.

Curiously, much of the publicity regarding DASH has focused on the fruits and vegetables components of the combination diet, even though the BP improvements with the fruits and vegetables diet were doubled with the addition of nutrient-rich dairy products. This emphasis is both misplaced and misleading. Analysis of the specific predictors of the BP changes in the DASH trial verified that improvements in urinary calcium, phosphorus, and potassium levels, along with vitamin D, tracked with BP improvements (14). These findings parallel those of a similar analysis of the Vanguard dietary intervention study; the significant BP decreases observed in that study were associated with improvements in these nutrients (15). Additional evidence of the importance of dairy in the DASH diet is provided in the DASH investigators’ report that of the tested diets, only the combination diet, containing ~3 daily servings of dairy foods, produced favorable changes in folate and homocysteine levels (16).

The DASH-sodium trial. A second DASH study, DASH-Sodium, was done to examine the BP effects of the DASH diet in combination with reduced sodium intake (17). Two diets were used in this study, the DASH diet, emphasizing fruits, vegetables, and low-fat dairy, and a typical American (control) diet, low in those foods and higher in fat, cholesterol, red meat, and sugars. Participants (n = 412) were randomly assigned to 1 of the 2 diets, and consumed them with sodium content at high (150 mmol/d), moderate (100 mmol/d), and low (50 mmol/d) levels for 30 d each. Compared to the high-sodium control diet, the low-sodium DASH diet resulted in decreases in systolic BP of 7.1 mm Hg in normotensive persons and 11.5 mm Hg in those with hypertension.

In this study, persons regularly consuming diets of poor nutritional quality experienced BP reductions as seen in the first DASH study with lowered sodium intake (17). Oddly, the authors and commentators argued that the combination of the DASH diet and severe salt restriction produced the optimal BP for all individuals regardless of BP status, ethnicity, age, etc. (17). However, once participants were consuming the nutritionally replete DASH diet, restricting dietary sodium levels contributed little or no additional benefit to BP in the vast majority (6). With the exception of older persons and African Americans with established hypertension, most study participants consuming the DASH diet alone realized optimal BP benefits. Thus, simply improving diet quality, with the daily consumption of 3–4 servings of dairy foods and 7–9 servings of fruits and vegetables, virtually eliminated any effect of salt on BP.

This finding from the DASH-Sodium Trial is noteworthy because the study population was heavily skewed toward persons known to be more likely to express salt sensitivity. The study population comprised primarily African Americans, many of whom had hypertension and were significantly overweight, all factors that should have made the effects of salt on BP more evident. However, once on the DASH diet, just the reverse was observed: salt sensitivity was eliminated except in a very small percentage of participants. Thus, DASH-Sodium demonstrated that a diet containing the full complement of nutrients, including the mineral profile available primarily through dairy products (calcium, potassium, magnesium, phosphorus), can mitigate the negative effects of high salt intake on BP in salt-sensitive persons, including high-risk populations such as African Americans.

Coronary heart disease and stroke. Hypertension is a primary risk factor for coronary heart disease and stroke. Coronary heart disease (CHD) is the single highest cause of death of American adults, and stroke, considered separately from other cardiovascular diseases, is the third leading cause of death in this country (1). For both of these, the incidence and the death rates are significantly higher in African Americans than in other ethnic groups (4,7). Based on the BP reductions observed in the first DASH trial, it was estimated that population-wide adoption of the DASH diet could reduce coronary heart disease and stroke incidence by 15% and 27%, respectively (1). Recognizing the likelihood that different populations would have different responses to a given intervention, Erlinger et al. (18) assessed the potential impact of BP reduction on CHD events using race-specific analyses. They estimated that overall reductions in the number of CHD events would be 94,828 or 9% in African Americans and 321,686 or 3% in whites over 10 y.

Direct evidence in support of these calculated improvements comes from the findings of Kant et al. (19) in their prospective study of the relationship between diet quality and mortality. They classified the dietary patterns of >42,000 women on the basis of intake levels of recommended foods, including fruits, vegetables, low-fat dairy, whole grains, and lean meats. Comparing the highest intake levels with the lowest, they found that in the high-quality diet group, coronary heart disease risk was 30% lower, stroke risk was 40% lower, and all-cause mortality was 30% lower. In a longitudinal cohort study in men aged 50 to 70 y, the dietary pattern meeting current recommendations was associated with 13% lower all-cause mortality than a poor quality diet; the investigators concluded that “the dietary pattern as a whole is more important than specific dietary components with respect to survival among older people” (20).

In their study utilizing data from the Health Professionals Follow-up Study (n = 44,875), Hu and colleagues (21) identified 2 major dietary patterns and assessed the cardiovascular disease risk associated with each of them. The prudent diet included higher intake of fruits, vegetables, whole grains, low-fat dairy, fish, and poultry; the Western pattern was characterized by higher intake of meats, refined grains, high-fat dairy products, and sweets. The relative risks from the lowest to the highest quintiles of the prudent diet pattern were 1.0, 0.87, 0.79, 0.75, and 0.70 (95% confidence interval [CI] 0.56, 0.86; P for trend < 0.001). These values for the Western pattern were 1.0, 1.21, 1.36, 1.40, and 1.64 (95% CI: 1.24, 2.17, P for trend < 0.0001). Based on their findings, which included adjustments for age, coronary heart disease risk factors, smoking, body mass index, and family history of myocardial infarctions, the authors concluded that these dietary patterns significantly predict the incidence of coronary heart disease and provide strong evidence of the cardioprotective effects of the prudent diet pattern.

Conclusion. Nearly 25 y of research, culminating in the striking results of the DASH trials, have confirmed the direct relationship between diet quality and BP management, and CVD risk. In addition to improvements in BP, high-quality diets have been shown to lower coronary heart disease and stroke incidence. Adoption of a nutrient-rich dietary pattern is associated with benefits. Thus, simply improving diet quality, with the daily consumption of 3–4 servings of dairy foods and 7–9 servings of fruits and vegetables, virtually eliminated any effect of salt on BP. With their much higher burden in terms of hypertension and cardiovascular disease compared to whites, African Americans could likely realize the greatest gains from improved diet quality. Although other approaches may improve single conditions in certain individuals, emphasis on these cannot achieve what
dietary guidelines are intended to achieve; rather, this misplaced emphasis serves only to divert time, effort, and money away from patients, healthcare providers, and taxpayers that could be directed toward proven practices with population-wide benefits. It is incumbent on nutrition policy makers in this country to base dietary recommendations on the strategies that have the greatest likelihood of accomplishing the purposes for which they exist. Because of its simplicity, feasibility, safety, and clearly proven and multiple health benefits, improved diet quality should be the focal point of lifestyle recommendations for BP management.

LITERATURE CITED