

The Deal on DASH

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January 29, 2017

Recently, US News and World Report published its [annual diet rankings](#), and as usual, DASH was at the top. This is irresponsible. The DASH diet was designed to help reduce blood pressure for people with hypertension. It makes no sense to recommend this diet to a general population, for the main reason that DASH has pretty much only ever been tested on hypertensive or pre-hypertensive subjects, who cannot be generalized to the population at large.



Moreover, all trials have been short term, with outcomes indicating that DASH may actually *cause* heart disease—not prevent it.

Facts about the DASH Diet and preventing nutrition-related chronic disease:

1. DASH has never been shown to help people lose weight or prevent diabetes
2. DASH has only been tested on hypertensive populations (only 1 trial, in Iran, tested a healthy population, and those subjects were 60 adolescent girls). Thus, DASH cannot be generalized to normal, healthy, non-hypertensive populations.
3. DASH has, at best, mixed results for heart-disease risk factors. While it sometimes lowers LDL-C (a possible, though unreliable sign of improving CVD risk), it also invariably lowers HDL-C and fails to lower (or raises) triglycerides (both reliable signs of *increasing* CVD risk).
4. DASH has been tested on fewer than 1200 people.
5. Only 1 DASH trial has lasted longer than 8 weeks (and that trial was only 5 months).

I've drawn evidence from a list of DASH studies in the [2015 US Dietary Guidelines advisory committee report](#), which cited DASH studies as evidence that its "Dietary Patterns" could prevent heart disease—but none of these trials clearly supported that assertion.

DASH Trial Results

DASH (Original) Appel, 1997

Overview: 459 hypertensive adults, 8 week trial

Intervention: All subjects received a control SAD for 3 weeks, then randomized to (i) control (ii) a diet rich in fruits and veg (FV) or (iii) a “combination diet” (combo) rich in fruits, veg, and low-fat dairy with reduced total and sat. fat; 8 week intervention. Note that combo and FV have similar % energy of fat and SFA while combo is lower in both.

Results: Systolic and diastolic BP were reduced by FV and further reduced by combo. CVD outcomes were mixed: LDL-C was reduced, but so was HDL-C.

Limitations of the data for generalizing to all Americans: Only outcome tested was blood pressure, and subjects were all a non-normal, hypertensive population.

DASH (Original) Conlin, 2000

Overview: 133 hypertensive adults, 8 week trial

Intervention: 133 hypertensive participants; 3 wk control run-in; randomized to (i) control (ii) high fruit veg (FV) (iii) combo rich in fruits, veg, low fat dairy, w/ whole grains, fish, poultry, nuts, reduced red meat, sweet, and sugar sweetened beverages. Sodium and body weight held constant.

Results: BP was lowest in combo diet, then FV, then control. Relative risk for hypertension was: con (1.00), FV (0.72), combo (0.39). “a diet that emphasizes fruits, vegetables, and low-fat dairy products, includes whole grains, poultry, fish, and nuts, and is reduced in fat, red meats, sweets, and sugar-containing beverages led to significant hypertension control in persons with Stage 1 hypertension”.

Limitations of the data for generalizing to all Americans: Only outcome is BP and on a non-normal, hypertensive population. Not acceptable as advice for the general population.

DASH (Original) Obarzanek, 2001

Overview: 436 hypertensive adults, 8 week trial

Intervention: 436 DASH trial participants; 3 wk-run in; 8 wk diet **Intervention:** (i) control (ii) high fruit and veg (also more whole grains and less sweets, but similar macros to control) (iii) DASH (hi fruit/veg/low fat dairy, reduced fat/SFA/cholesterol).

Results: “changes (in the DASH diet compared to controls) represented net reductions of 7.3%, 9.0%, and 7.5% in mean concentrations of total, LDL, and HDL cholesterol, respectively.” No significant changes in TG (trended up), TC:HDL, LDL:HDL. No significant changes from FV diet in the whole study group (LDL, HDL, TG trended down and approached significance at $p = .055$), some significant lipid changes observed in some groups (i.e. men and non-African Americans saw reduced TC:HDL). “higher baseline HDL was associated with greater reductions in HDL.” “The observation that reduced-fat diets lower HDL has led to controversy over the advisability of lower-fat, higher-carbohydrate diets and whether CHD risk is reduced when HDL is lowered along with LDL.” “The DASH diet substantially reduced systolic and diastolic blood pressure, caused favorable changes in total and LDL cholesterol, resulted in no changes in triacylglycerol, and reduced HDL cholesterol.” To determine total effect of lipid changes (some good, some bad) they used the Framingham equation and estimated 10-y CHD risk decreased by 12.1% in DASH and increased 0.9% in control.

Limitations of the data for generalizing to all Americans: Adherence to DASH reduced risk based on Framingham equation, but the drop in HDL and upward trend in triglycerides indicate worsening CVD risk. On a non-normal, hypertensive population.

DASH (Original) Moore, 1999

Overview: 354 hypertensive adults, 8 week trial

Intervention: 354 subjects; 3 wk SAD run in; randomize to continuation of SAD control, high fruits and veg, or combo emphasizing fruits, veg, and low fat dairy. 8 wk intervention.

Results: Combo diet reduced SBP and DBP; “the combination diet exerted its BP-lowering effect throughout the day and night. With the combination diet, both SBP and DBP fell significantly during 24 hours, daytime, and night in all participants combined”.

Limitations of the data for generalizing to all Americans: Only outcome is blood pressure and on a non-normal, hypertensive population.

DASH (Variation) Blumenthal Babyak Sherwood, 2010

Overview: 144 hypertensive adults, 4 month trial

Intervention: 144 overweight men and women with high BP assigned to (i) DASH alone (DASH-A) (ii) hypocaloric DASH + exercise (DASH-WM) (iii) usual diet control. Intervention appears to be 4 months.

Results: Despite clinically significant reductions in blood pressure, the DASH diet alone, without caloric restriction or exercise, resulted in minimal improvements in insulin sensitivity or lipids pertinent to CVD risk.

Limitations of the data for generalizing to all Americans: The only meaningful change was in blood pressure. The DASH diet did not otherwise result in beneficial cardiovascular effects; ON a non-normal, hypertensive population.

DASH (Variation) Saneei, 2013

Overview: 60 adolescent girls with metabolic syndrome, 6 week trial

Intervention: 60 post-pubescent adolescent girls (11-18 yr) with MetSyn; 2 wk run in control diet; randomized to DASH or usual dietary advice (UDA); crossover after 4 wk washout.

Results: “Despite a slight decline in the prevalence of the MetS and its features, we failed to find a significant effect of recommendations to follow the DASH diet on most of its features.” “No significant changes were found in glucose and lipid profiles.

Limitations of the data for generalizing to all Americans: In short, DASH significantly reduced BMI while UDA insignificantly reduced BMI, however the between group comparison of BMI was not significant. DASH and UDA significantly reduced waist circumference. UDA significantly increased diastolic BP while DASH did not (trended down). DASH significantly reduced insulin (UDA did not, but no significant between groups difference). DASH insignificantly reduced prevalence of MetSyn while UDA didn’t change at all, and the between groups difference was significant.

DASH (Variation) Appel, 2005 The “Omniheart Trial”

Overview: 164 hypertensive adults, 6 week trial

Intervention: 164 hypertensive or pre-hypertensive subjects, on cross-over trial with 3 diets, each lasting 6 weeks; diets were variously: high in protein (range from low to high was 15-25% cal), carbs (48-58%) or unsat fat, mostly monounsat (13-21%).

Results: Blood pressure was reduced in all diets from baseline. HDL-C dropped on high-carb and high-protein diets but not high-mono diet. Triglycerides dropped on high-mono and high-protein but not high-carb. LDL-C was only lowered on the high-protein diet, when compared to high-carb. High-carb diet had worst outcomes in all comparisons. In other words, The low-fat, highest carb diet, which most closely resembles the DGA Dietary Patterns, had the least favorable CVD outcomes, compared to the diets higher in protein and unsaturated fats.

Limitations of the data for generalizing to all Americans: On a hypertensive population, not acceptable as advice for the general population.

DASH (Sodium) Sacks, 2001

Overview: 412 hypertensive adults, 30 day trial

Intervention: 412 subjects with BP over 120/80 including stage 1 hypertensive; 2 wk run in (high Na control); randomized to control or DASH matched at 1 of 3 Na levels – hi (150 mmol/d, reflects average consumption), intermediate (100 mmol/d, reflects guidelines upper limits), or lo (50 mmol/d, hypothesized to produce greater benefits); parallel crossover where each subject ate their assigned diet (con or DASH) at each Na level for 30 days, so it appears the crossover is only per Na level, not diet.

Results: “reduction of sodium intake significantly lowered systolic and diastolic blood pressure in a stepwise fashion, with both the control diet and the DASH diet. The level of dietary sodium had approximately twice as great an effect on blood pressure with the control diet as it did with the DASH diet.” “DASH diet, as compared with the control diet, resulted in a significantly lower systolic blood pressure at every sodium level and in a significantly lower diastolic blood pressure at the high and intermediate sodium levels.” Weight was lower in DASH at each Na level, but baseline values are not given and they say weight remained stable (as per the design) so weight change is probably not relevant here.

Limitations of the data for generalizing to all Americans: Only outcome is BP and results are limited to those with raised blood pressure. Not acceptable as advice for the general population.

In sum, a total of 2,162 people have been studied on DASH, in trials nearly all of which lasted 8 weeks or less. Only 60 of these 2,162 subjects were normal (not hypertensive/pre-hypertensive), and those 60 were adolescent girls.

The above is not a systematic review, obviously, so please feel free to let me know what is missing.

Note that when a small [“high-fat DASH” study was conducted](#), it outperformed a regular DASH diet on improving cardiovascular risk factors. This is consistent with evidence that the vast majority of higher-fat diets outperform low-fat, high-carb diets on nearly all outcome markers.

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