MEDICAL RESEARCH

New Study Says Low-Fat Diet Can Lower Blood Pressure

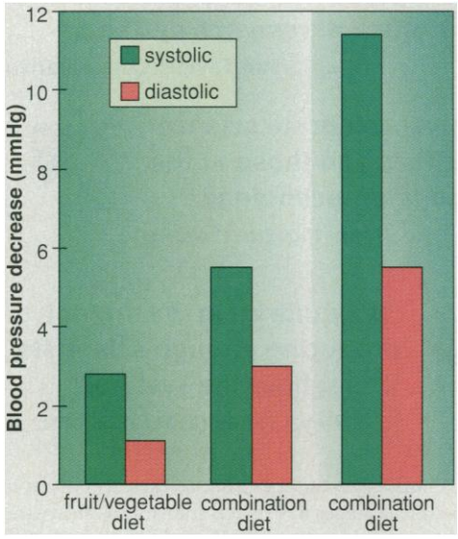
In developed countries, high blood pressure is among the most common chronic diseases, afflicting roughly 50 million people in the United States alone. If untreated, it can have serious consequences, contributing to strokes, heart attacks, and kidney failure. But even though studies have hinted that diet can influence the risk of developing this important problem, researchers have made remarkably little effort to come up with a diet that would lower blood pressure and that Americans might actually eat. Until now, that is.

A study known as DASH, for Dietary Approaches to Stop Hypertension, described in the 17 April issue of *The New England Journal of Medicine*, provides compelling evidence that a low-fat diet rich in fruits, vegetables, and dairy products can lower blood pressure as much as any single drug treatment, and do it in 2 weeks, to boot. Suzanne Oparil, a University of Alabama, Birmingham, cardiologist and a past president of the American Heart Association, describes the result as "the most dramatic effect of diet on blood pressure I've ever seen—as good as or better than [the effect of] many drugs."

Just how the diet works isn't clear, although some researchers not involved in the study think it supports a controversial notion that low calcium intake may play a bigger role in high blood pressure than the high sodium most experts cite. But its public health implications are obvious, says Jeremiah Stamler, a cardiologist at the Northwestern University Medical School, who chaired the study's Protocol Review Committee: "We have the potential for applying the knowledge learned here to markedly blunt the rise of blood pressure with age."

Previous studies had suggested that supplementing the diet with various nutrients or minerals, such as calcium, magnesium, or potassium, might lower blood pressure, but the results had been ambiguous. Other studies favored a vegetarian diet, but few researchers considered such a diet likely to be palatable to most Americans. So, DASH tested a diet that was low in fat content—about 26% compared to the 36% in the average U.S. diet—but did allow modest amounts of meat, fish, and poultry.

The study, which cost $7 million and was sponsored by the National Heart, Lung, and Blood Institute (NHLBI), included 459 adults with slightly higher than normal blood pressure or mild hypertension, defined as systolic blood pressure between 140 and 159 millimeters of mercury or diastolic blood pressure between 90 and 99 mmHg or both. For the first 3 weeks, all participants were fed the control diet, considered the typical U.S. diet, including four servings of fruits and vegetables and a half-serving of dairy products a day. Then, the participants were randomized into three groups; one group was fed the control diet for another 8 weeks; one was fed a diet richer in fruits and vegetables, 8.5 servings a day; and the third was fed the DASH or "combination" diet, which was lower in saturated fat than the other two, and included two servings of low-fat dairy products as well as almost 10 of fruits and vegetables.



Getting it down. People with mild hypertension (right pair of bars) had greater blood pressure decreases than did those with high normal pressures (two pairs of bars at left).

The diets were designed to control for two factors already shown to affect blood pressure: dietary sodium, usually taken in the form of salt, and body weight. "Everybody had the same sodium intake," a smidgen less than the average American consumes, says DASH researcher Laura Svetkey, a hypertension specialist at Duke University. "And we didn't allow folks to lose or gain weight. We didn't want to study what we already knew." In addition, the four centers that conducted the study prepared all the food for the participants, who ate at least one meal every weekday at the centers. That way, says DASH researcher Eva Obarzanek, an NHLBI nutritionist, "we eliminated uncertainty with respect to compliance."

The results were dramatic. The diet rich in fruits and vegetables resulted in mild reductions in blood pressure, lowering the systolic pressure by 2.8 mmHg and the diastolic by 1.1 mmHg. The combination diet more than doubled those numbers, reducing blood pressure by 5.5 and 3.0 mmHg, respectively, in individuals with normal blood pressure. And in people with mild hypertension, says DASH first author Lawrence Appel, a hypertension specialist at Johns Hopkins University, "the reductions were particularly striking: 11.4 mmHg in systolic and 5.5 in diastolic. Such reductions are similar to that achieved with single-drug therapy in people with mild hypertension."

Researchers who argue that the role of sodium in high blood pressure has been overplayed find the results intriguing. "What [the DASH trial] found was that it was possible to keep people pretty much at the salt intake of most Americans while still lowering blood pressure," says one member of that camp, Michael Alderman, an internist at the Albert Einstein College of Medicine in New York City and president of the American Society of Hypertension. And to internist David McCarron of the Oregon Health Sciences University, who touched off a storm 13 years ago when he published a paper saying that blood pressure is more likely to be caused by low calcium consumption than by high salt intake (*Science*, 29 June 1984, p. 1392), the DASH results strongly suggest that calcium does indeed play a crucial role in blood pressure regulation. He points out, for example, that the level of consumption of dairy products, with their high calcium content, was the biggest difference between the combination diet and the other diets.

The DASH researchers insist, however, that no such conclusions can be drawn from their study, as it was not designed to test the influence of salt or any other specific nutrient. They note that there were many differences between the three diets, and one or more of these may have caused their different effects. "It may be nutrients we're completely unaware of. It may be a combination of nutrients," Svetkey says.

The DASH researchers are planning a further study that may shed light on the sodium issue, however. They want to test the combination diet at three different levels of sodium intake to see whether they can get an even greater reduction in blood pressure. Regardless of the outcome, the first DASH results are a "win-win situation," says Judith Stern, a nutritionist at the University of California, Davis. "The right diet will certainly have benefits with blood pressure, and it absolutely will help us on other diseases, as well."

–Gary Taubes