



Health Connections

LINKING NUTRITION RESEARCH TO PRACTICE

BEYOND SODIUM:

Managing Hypertension Through a Healthy Lifestyle

In world history, salt, the rock we eat, was a sought-after commodity. Salt served as currency, established trade routes, made the fruit of the olive tree edible, protected mummies from decay and sustained life through the preservation of food.¹ Today, sodium intakes are linked to hypertension; approximately 30 percent of adults in the United States are hypertensive.² Current discussions around the 2010 Dietary Guidelines include potentially lowering the sodium recommendation for the general population. This issue of *Health Connections* looks at the role of sodium, diet quality and lifestyle factors on blood pressure so health professionals can advise clients according to their individual risk factors.

Background

Efforts to improve the nation's blood-pressure profile generally focus on limiting sodium. Sodium, which helps maintain electrolyte balance, normal cell and muscle function, occurs naturally in some foods, in table salt and is used in food processing for taste and functionality. While the body needs some sodium, world-health recommendations are trending downward as a means to reduce hypertension, a major risk factor for cardiovascular disease, stroke and kidney disease. Other often-overlooked factors affecting hypertension include lifestyle, diet quality and micronutrients such as potassium, fiber and magnesium, included in the DASH (Dietary Approaches to Stop Hypertension) dietary pattern.

Who's at Risk?

Hypertension is defined as having a systolic blood pressure (SBP) > 140 mm Hg, or diastolic blood pressure (DBP) > 90 mm Hg. Prehypertension is defined as having a SBP of 120 – 139 mm Hg or DBP of 80 – 89 mm Hg. (www.nhlbi.nih.gov/hbp). Although anyone can develop hypertension, risk factors include obesity, physical inactivity, high salt and sodium intake, low potassium intake, excessive

alcohol consumption and diabetes. Blood pressure has risen as the prevalence of overweight has risen among children and adolescents. Men prior to age 55 are at greater risk for hypertension, but after 55, the percentage of women with hypertension is greater. Our growing baby boomer/senior population and increasing incidence of overweight at all ages demonstrate the dire need to improve blood-pressure control.

Salt Sensitivity and Resistance

Approximately 50 percent of hypertensive individuals and 25 percent of normotensive individuals are considered by some to be salt-sensitive—a term that describes the tendency for blood pressure to fall during salt reduction and rise during salt repletion. Salt sensitivity and salt resistance have a variety of determinants, including genetics, race/ethnicity, age, body mass, overall diet quality and the presence of other associated disease states including diabetes and renal dysfunction.³

Intake and Recommendations

According to the U.S. National Health and Nutrition Examination Survey (NHANES) 2005 – 06, sodium intake was approximately 3,400 mg/day. This amount exceeds by over 1,000 mg the 2005 Dietary Guidelines recommendation to consume less than 2,300 mg/day and is more than double the 1,500 mg/day amount the Guidelines recommend for at-risk populations—individuals with hypertension,

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African Americans, middle-aged and older adults. Using data from NHANES for 1999 – 2006, the Centers for Disease Control (CDC) estimated about 69 percent of U.S. adults met the criteria for risk groups for whom sodium intake of 1,500 mg/day is recommended.⁴

Whether the 1,500-mg level currently recommended for at-risk populations should be applied to the general population is not without controversy, as there is great variability in individual blood-pressure responses to change in sodium intake. While acknowledging that those who are salt-sensitive manifest changes to salt depletion or repletion and benefit most from a lower sodium intake, a review of studies on the effects of dietary sodium reduction on blood pressure in the *general population* revealed minimal achieved reductions in blood pressure, no relationship between the magnitude of reduction in sodium intake/excretion and blood-pressure effect and no evidence of an effect of sodium reduction on death or cardiovascular events.³

Finding Salt

Sodium naturally occurs in a variety of different foods and across food groups, accounting for about 12 percent of total intake. Salt used at the discretion of an individual (at the table or while cooking) provides about 11 percent; more than 75 percent is derived from salt added in food processing.⁵ The food industry is developing or reformulating products to provide choices for consumers seeking to manage their intake of sodium and salt. Because salt is a complex component in the culinary world, food manufacturers are challenged to lower salt content without compromising taste, functionality or safety/preservation. Natural flavor enhancers and step-down plans to gradually lower the sodium content and help reshape salt-taste preferences

are some strategies being used.⁶ There are also policy initiatives to encourage the foodservice and restaurant industries to lower salt in menu offerings.

Improving Food and Lifestyle Choices

Changes in single nutrients—such as lowering sodium—have been the primary focus on dietary interventions to prevent and treat hypertension. However, weight reduction, adopting the DASH eating pattern (which emphasizes fruits, vegetables, low-fat dairy foods, whole grains, poultry, fish and nuts and is low in saturated fat, total fat and cholesterol) and engaging in physical activity have potentially the same or greater effect on managing hypertension as sodium reduction. The National Heart, Lung and Blood Institute (NHLBI) has identified lifestyle modifications to manage hypertension and the approximate reduction in blood pressure with such changes (see Side Bar). Health professionals can assist clients to combine two or more lifestyle modifications to achieve even greater results.

PRACTICE POINTS FOR THE HEALTH PROFESSIONAL

- Stay current on research identifying those who can benefit from sodium reduction.
- Encourage clients to adopt the DASH dietary pattern and other lifestyle changes that can improve blood-pressure control—weight management, stress management and physical activity. See: <http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf> and <http://www.dairycouncilofca.org/PDFs/DASH-Dietary%20Patterns.pdf>.
- Sodium is a mandated nutrient for labeling. Foods that are labeled low in sodium provide less than 140 mg or 5 percent of the Daily Value (DV). However, because the DV is 2,400 mg, use the specific amount of sodium on the Nutrition Facts panel for those at risk for hypertension, who should aim for 1,500 mg.
- Identify patients/clients who are at high risk of hypertension and who might benefit from sodium restriction versus other ways to manage blood pressure. Encourage individualization in dietary choices, taking lifestyle, culture, taste and dietary preferences into account. Counseling by or referral to a registered dietitian can benefit those on low-sodium (1,500 mg/day) diets.

SIDE BAR: Lifestyle Modifications to Manage Hypertension

Modification	Recommendation	Approximate SBP Reduction/Range
Weight reduction	BMI 18.5-24.9 kg/m ²	5 – 20 mm Hg/10 kg weight loss
DASH eating plan	Rich in fruits, vegetables, low-fat dairy and reduced in total and saturated fat	8 – 14 mm Hg
Physical activity	30 minutes most days	4 – 9 mm Hg
Dietary sodium reduction	2,400 mg Na	2 – 8 mm Hg
Moderate alcohol	Two drinks/day for men and one drink/day for women	2 – 4 mm Hg

Source: Adapted from Table 5 in: <http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf>.

Interview — Alexander Lgoan, M.D., Professor of Medicine, University of Toronto, and Senior Scientist, Samuel Lunenfeld Research Institute, Mount Sinai Hospital

Q. What is the state of the research on the benefits of lower sodium intake for the general population? Are we chasing a biomarker (BP) or having a real effect on lowering cardiovascular disease and mortality?

- A. In my opinion, until there is better research, the totality of evidence supports the benefits of applying this intervention to manage patients with hypertension, renal or cardiovascular disease. For the general population, it remains open to debate. Blood pressure is an intermediate end point—it is not the same as hard outcomes such as death or cardiovascular events. The research on dietary sodium intake and hard outcomes is not robust; some results suggest no relationship or even harm (discussed below). You cannot extrapolate interventions for sick populations to the general population without high-quality supporting evidence. You risk taking a healthy individual and making the individual less healthy, which is counterintuitive to public-health goals. The level of evidence of the research to support lower sodium intake should be even stricter in the development of public-health policy to be certain we do no harm.

For example, a sleeper might be iodination of salt, which was undertaken decades ago to prevent goiter in Canada and regions around the Great Lakes. As a result, goiter has basically disappeared ... but it could increase again, along with other thyroid problems, with a lower salt intake. From a public-health perspective, there are never 'free benefits'—most come at some cost. This juxtaposition is what health professionals must research to find the right balance.

Q. How can health professionals use the concept of diet quality to help clients lower the risk of hypertension?

- A. If we want to focus on something for the general population, diet quality is it. There is stronger and more consistent evidence (both epidemiological and clinical trials) linking diet quality to health outcomes than for single nutrients. Improving diet quality is an important public-health management tool, especially with the policy emphasis to curb

the obesity 'epidemic' both in North America and worldwide. Populations that eat a high-quality diet live longer with less cardiovascular disease and cancer and weigh less.⁷ The DASH eating pattern certainly has been shown to have beneficial effects on blood pressure—particularly in African Americans—even without changes in weight or sodium intake.

Consumers identify and relate to diet quality. Well-informed patients that I see can clearly describe for me a high-quality diet, but are at a loss when trying to describe and manage a diet with a single-nutrient focus. They get the overall picture; like a recipe, they realize no single ingredient can give the same result.

The challenge for the health professional is to easily and economically identify those eating a poor-quality diet. This prompted us to develop a simple and inexpensive urine test. We measure urinary potassium, as healthy dietary patterns include foods that are rich in dietary potassium.⁷

Q. What are some areas of future research?

- A. Some research is focusing on the relationship of genetics to diet. This is not going to be easy for hypertension, as it is a complex condition. Its development is strongly influenced by environmental factors such as physical activity, stress and eating patterns.

Q. To reduce our population-wide sodium intake, if the Dietary Guidelines deem this is necessary for public health purposes, is it more effective to change the food we eat (through the food industry) or change consumer behavior (through education)?

- A. Rather than 'either/or,' there are different roles. The food industry fills voids and responds to consumer demand and the current thinking on nutrition. I don't think the food industry has dug in its heels—it responds with products that consumers and health professionals perceive to be part of a quality diet that improves health. Nutrition education is a necessary component such that the consumer is knowledgeable about the products the industry provides and can make appropriate, healthful choices that are a match to his or her individual needs.



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REFERENCES

- 1 Kurlansky M. Salt A world History. Penquin Books 2002.
- 2 CDC Health, United States, 2007 <http://www.cdc.gov/nchs/data/abus/hus08.pdf#071.htm>.
- 3 Franco V and Oparil S. J Am Coll Nutr 2006. Vol 25, No. 3 247S-255S.
- 4 SCDC MMWR Weekly March 27, 2009/58(11); 281-283. www.cdc.gov/mmwr/preview/mmwrhtml/mm5811a2.htm.
- 5 Mattes RD, J. Am Coll Nutr. 1991 in Dietary Guidelines for Americans 2005.
- 6 GMA issues science policy paper on sodium and salt. Jan. 13, 2009. www.foodnavigator.usa.com.
- 7 Mente A, Irvine EJ, Honey JDA, and Logan AG J. Nurt. 2009. 139:743-749. Citing references 4-8.