

Nonpharmacologic Strategies for Managing Hypertension

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The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends lifestyle modification for all patients with hypertension or prehypertension. Modifications include reducing dietary sodium to less than 2.4 g per day; increasing exercise to at least 30 minutes per day, four days per week; limiting alcohol consumption to two drinks or less per day for men and one drink or less per day for women; following the Dietary Approaches to Stop Hypertension eating plan (high in fruits, vegetables, potassium, calcium, and magnesium; low in fat and salt); and achieving a weight loss goal of 10 lb (4.5 kg) or more. Alternative treatments such as vitamin C, coenzyme Q10, magnesium, and omega-3 fatty acids have been suggested for managing hypertension, but evidence for their effectiveness is lacking. (*Am Fam Physician* 2006;73:1953-6, 1957-8. Copyright © 2006 American Academy of Family Physicians.)

► **Patient information:** A handout on high blood pressure, written by the authors of this article, is provided on page 1957.

Despite all that is known about its adverse health consequences, high blood pressure still is poorly controlled in the United States.¹⁻⁵

Only about one third of patients with hypertension have achieved the National High Blood Pressure Education Program goal of 140/90 mm Hg or lower.¹ With the mainstay of hypertensive therapy in the United States being pharmacotherapy, interventions such as lifestyle and dietary modification often are overlooked. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)¹ recommends lifestyle modification for all patients with hypertension (i.e., blood pressure of 140/90 mm Hg or higher) or prehypertension (i.e., blood pressure of 120/80 to 139/89 mm Hg), a new category developed by JNC 7 to draw attention to earlier intervention. Although some lifestyle modifications may seem to offer only minimal blood pressure-lowering effects, they should not be discounted. A reduction in systolic blood pressure of 5 mm Hg has been associated in observational studies with reductions of 14 percent in mortality caused by stroke, 9 percent in mortality caused by heart disease, and 7 percent in all-cause mortality.⁶ In addition, a weight loss of 10 lb (4.5 kg), a realistic

goal for most individuals who are overweight, can reduce or prevent hypertension.⁷

Recommended Lifestyle Modifications

Five lifestyle modifications are recommended by JNC 7 for reducing blood pressure: (1) reducing sodium intake, (2) increasing exercise, (3) moderating alcohol consumption, (4) following the Dietary Approaches to Stop Hypertension (DASH) eating plan (*Table 1*),⁸⁻¹⁰ and (5) losing weight.¹ These modifications have been proven to reduce blood pressure, although their direct impact on morbidity and mortality is not yet known.

SODIUM REDUCTION

In the Trial Of Nonpharmacologic interventions in the Elderly (TONE) study,¹¹ patients were randomized to a low-sodium diet (80 mEq per L [1.9 g; 80 mmol per L] per day) or usual care (i.e., no study-related counseling in lifestyle change). The intervention group had a 2.8 mm Hg greater reduction in systolic blood pressure than the control group. A later study¹² assessed the impact on blood pressure of three levels of daily sodium intake: 150, 100, and 50 mEq per L (3.6, 2.4, and 1.2 g; 150, 100, and 50 mmol per L), representing a typical American diet, the upper end of recommended intake, and a limited intake, respectively.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendations for persons with hypertension or prehypertension</i>	<i>Evidence rating</i>	<i>References</i>	<i>Systolic blood pressure reduction (mm Hg)</i>
Maintain a normal body weight (i.e., body mass index less than 25 kg per m ²).	C	1, 7	5 to 20
Eat a diet high in fruits and vegetables and low in fat.	C	1, 9, 12, 15	8 to 14
Consume less than 2.4 g of sodium per day.	C	1, 9, 11, 12	2 to 8
Get 30 minutes of aerobic activity at least four days per week.	C	1, 13	4 to 9
Men should have no more than two alcoholic drinks per day, and women no more than one alcoholic drink per day.	C	1, 14	2 to 4

NOTE: All recommendations are rated C because, although there is good evidence that they lower blood pressure, there is no direct evidence of mortality or morbidity benefit from clinical trials.

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see page 1874 or <http://www.aafp.org/afpsort.xml>.

Results demonstrated a graded blood pressure response, with a correlation between greater reduction in blood pressure and lower sodium consumption. The recommended sodium intake is less than 100 mEq per L per day for all patients with hypertension or prehypertension.^{1,12}

EXERCISE

Aerobic exercise has positive effects on blood pressure whether or not a person has hypertension, producing average reductions of 4 mm Hg in systolic blood pressure and 3 mm Hg in diastolic blood pressure.¹³ Physicians should

help patients find an activity that they enjoy, because enjoyment will increase their adherence. If a patient finds it difficult to make time to exercise, one suggestion might be a brisk walk at lunch, which helps break up the day and requires no additional time commitment. Physicians also could suggest that patients listen to books on tape while walking, which may help to maintain interest level. It is recommended that patients with prehypertension or hypertension exercise for 30 minutes on most days of the week.¹

LIMITING ALCOHOL CONSUMPTION

Limiting alcohol consumption is an important lifestyle modification for reducing blood pressure. One meta-analysis¹⁴ indicated a dose-response relationship between decreased alcohol consumption and blood pressure reduction. Pooled results showed reductions of 3 mm Hg in systolic blood pressure and 2 mm Hg in diastolic blood pressure for patients in the alcohol reduction groups (average reduction of 67 percent from an average intake of three to six drinks per day at baseline).¹⁴ As part of a comprehensive lifestyle program, men should have no more than two alcoholic drinks per day and women no more than one per day.^{1,14}

DIETARY CHANGES

The DASH eating plan outlines a diet rich in fruits and vegetables; high in low-fat dairy products, potassium, magnesium, and calcium; and low in total saturated fats (*Table 1*).⁸⁻¹⁰ Following this plan has been shown to produce mean reductions of 6 mm Hg in systolic blood pressure and 3 mm Hg in diastolic blood pressure,¹² and combining the plan with a reduction in sodium intake produces additional blood pressure reduction.¹²

TABLE 1
The DASH Eating Plan

High in:

Fruits and vegetables (four or five servings each per day)
Fiber (seven or eight servings per day)
Low-fat dairy products (two or three servings per day)
Lean meat (two servings per day)
Calcium
Magnesium
Potassium

Low in:

Saturated fat
Cholesterol
Salt*

DASH = dietary approaches to stop hypertension.

*—Low sodium intake was a later addition to the plan.

Information from references 8 through 10.

TABLE 2
Sources of Information on Implementing Lifestyle Modifications

American Academy of Family Physicians

Family Doctor (<http://familydoctor.org>)
 Americans in Motion (<http://www.aafp.org/x22874.xml>)

American Heart Association

Healthy Lifestyle (<http://www.americanheart.org/presenter.jhtml?identifier=1200009>)

National Heart, Lung, and Blood Institute

Lifestyle Modification Tips (<http://www.nhlbi.nih.gov/hbp/treat/treat.htm>)

DASH Eating Plan (<http://www.nhlbi.nih.gov/health/public/heart/hbp/dash>)

Shape Up America (<http://www.shapeup.org>)

In the PREMIER clinical trial,¹⁵ researchers assessed the impact on blood pressure of comprehensive lifestyle changes (i.e., reduced sodium intake, increased activity, moderate alcohol consumption, and weight loss) in addition to the DASH eating plan, compared with lifestyle changes alone or usual care (i.e., advice only). Participants in the lifestyle changes only group had a greater reduction in blood pressure than those in the usual care group, and this was further enhanced with the addition of the DASH eating plan. This was the first trial to demonstrate that all recommended lifestyle changes can be combined to reduce blood pressure successfully.

Potassium and sodium fluctuate antagonistically—a decrease in potassium leads to sodium retention, whereas an increase in potassium leads to sodium excretion, thereby promoting diuresis and natriuresis.¹⁶ Although the mechanism by which a diet low in potassium contributes to increased blood pressure is not known, it has been estimated that, in persons with essential hypertension, a diet low in potassium results in a systolic increase of 7 mm Hg because of increased sodium retention.¹⁷ Additionally, potassium supplementation appears to play an enhanced role in individuals with an initially high sodium intake.⁶ A meta-regression analysis of randomized trials that assessed blood pressure response to changes in potassium and sodium intake showed that increased intake of potassium could play a major role in the prevention of hypertension.¹⁸ Increased potassium resulted in a reduction of 2.42 mm Hg in systolic blood pressure and a drop of 1.57 mm Hg in diastolic blood pressure.¹⁸ Current recommendations, however, are to obtain adequate potassium intake through a healthy diet.¹ Some of the

organizations that provide helpful information about and support for the implementation of lifestyle modifications are listed in *Table 2*.

WEIGHT LOSS

Weight loss is an important lifestyle modification in reducing blood pressure. A reduction of 10 lb can help reduce blood pressure or prevent hypertension.¹ A reduction of approximately 20 lb (9 kg) may produce a reduction in systolic blood pressure of 5 to 20 mm Hg.¹

Other Lifestyle Interventions

SMOKING CESSATION

Nicotine released while smoking cigarettes is believed to impact blood pressure through arousal of the sympathetic nervous system followed by the release of norepinephrine and epinephrine.¹⁹ Cigarette use causes a 4-mm Hg increase in systolic blood pressure and a 3-mm Hg increase in diastolic blood pressure compared with placebo.²⁰

Hypertension is a well-documented risk factor for cardiovascular disease and stroke.² In patients with hypertension, there is an increase in cardiovascular events in those who smoke compared with those who do not. Studies have shown that men with high blood pressure who smoke have an increased risk of total, ischemic, and hemorrhagic stroke, and that this risk is related to the number of cigarettes smoked.^{21,22} Smoking cessation should be part of any comprehensive lifestyle modification plan to reduce the risk of high blood pressure and cardiovascular disease.

DIETARY SUPPLEMENTS

Vitamin C, omega-3 fatty acids, coenzyme Q10, and magnesium have been purported to reduce blood pressure. However, their use in management of hypertension is not recommended because of the lack of data from well-designed randomized controlled trials.

MEDITATION

Meditation includes a variety of techniques, such as repetition of a word or phrase (the mantra) and careful attention to the process of breathing, to achieve a state of inner calm, detachment, and focus. Meditation was shown to reduce blood pressure in one well-designed study that addressed baseline blood pressure measurements adequately,²³ although other studies have been inconsistent.²⁴ Long-term follow-up of 202 patients in two small studies indicated that transcendental meditation may even reduce mortality in patients with hypertension.²⁵ Meditation may have other benefits and does not appear to be harmful except to patients with psychosis.²⁶

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Author disclosure: Nothing to disclose.

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